Kerry Kriger, Ph.D.
Executive Director
415-878-6525

PO Box 78758
Los Angeles, CA 90016 USA
E-mail: kerry@savethefrogs.com

savethefrogs.com

The proposed listing of *Rana boylii* under the Endangered Species Act

8/20/2015

Public Comments Processing
U.S. Fish and Wildlife Service, MS: BPHC
5275 Leesburg Pike
Falls Church, VA 22041-3803
http://www.regulations.gov
Sent Via Email

Attn: Docket number FWS-R8-ES-2015-0050 (Foothill yellow-legged frog)

To whom it may concern:

On behalf of the SAVE THE FROGS! community, I would like to thank you for allowing me this opportunity to comment on the United States Fish and Wildlife Service's call for information regarding the listing determination of Foothill yellow-legged frogs (*Rana boylii*) under section 4(a)(1) of the Endangered Species Act (16 U.S.C. 1531 et seq.). California's native amphibians face a multitude of threats in the 21st century. SAVE THE FROGS! wants to ensure that the USFWS has access to information relevant to *Rana boylii* in the Alameda Creek watershed of Alameda and Santa Clara counties in California, an area for which we have extensive knowledge. The threats to *Rana boylii* in the Alameda Creek watershed are rooted in competing demands for scarce water resources, and the conflicts in this watershed are emblematic of difficulties occurring across the species' range. As the threats to *Rana boylii* appear to be increasing, we recommend full protection of this frog under the Endangered Species Act.

Foothill Yellow-Legged Frogs at Alameda Creek

The streams of the Alameda Creek watershed (Figure 1) have been extensively modified by dams, reservoirs, flood control channels, and general urbanization over the last century to meet the municipal water supply needs of the City of San Francisco and other cities in the East Bay. *Rana boylii* populations have declined significantly due to similar appropriation of riverine water resources for human use across California and Oregon. As part of the City of San Francisco's project to replace the seismically unsafe Calaveras Dam, the National Marine Fisheries Service has imposed several conditions on the City in an effort to restore steelhead salmon. Because it is not possible for steelhead to get around Calaveras Dam and access spawning habitat above the reservoir, several other modifications are being made to create spawning and rearing opportunities elsewhere in the upper watershed that remains undeveloped. Amphibians, including *Rana boylii*, have persisted despite the dams, but the populations are fragmented and have been particularly hard hit by the droughts of recent years, which have dried up many stretches of creek upstream of the flow diversions and reservoirs. Unfortunately, the new fish-centric projects will modify the physical structure, the flow regime, and thermal regime of Alameda Creek, and come at a particularly vulnerable time for the amphibians.

Drought Effects

Among watersheds draining to San Francisco Bay, *Rana boylii* remains in 4 fragmented locations within the Alameda Creek watershed (Figure 1). Two stream reaches have been extensively monitored by the East Bay Regional Park District and independent biologists[1].

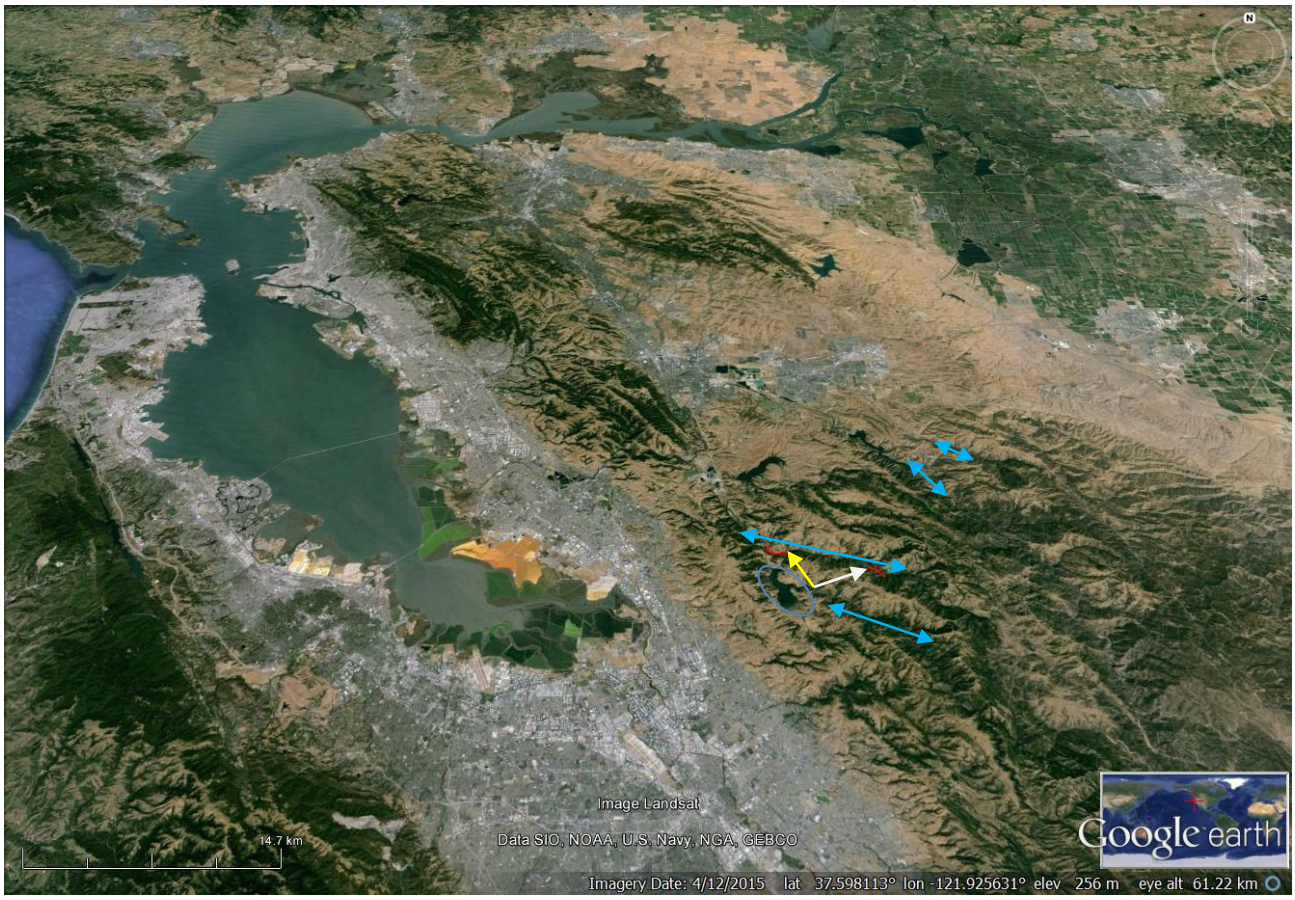

Figure 1. Location of extant *Rana boylii* populations in watersheds that drain to the San Francisco Bay (blue arrows from North to South: Arroyo Mocho, Arroyo Valle, Alameda Creek, and Arroyo Hondo). Locations of monitoring reaches in Alameda Creek are shown by red lines; white arrow = Camp Ohlone, upstream of all flow regulation, but affected by drought; yellow arrow = regulated reach affected by diversion to, and releases from, Calaveras Reservoir (blue oval).

Spring censuses of breeding have been conducted since 1997 in an unregulated reach, and since 2003 in a reach where flows are regulated by both diversion of water through a tunnel to Calaveras Reservoir and by releases through Calaveras Dam. Until the recent drought (2012-2015), *Rana boylii* was consistently more abundant in the unregulated reach (Figure 2). The population in the upstream unregulated reach, as indicated by the number of clutches of eggs laid in the reach, has dwindled and there has been a lack of recruitment because the stream dried prior to successful metamorphosis of the tadpoles. In the downstream regulated reach, there were consecutive years with no recruitment and small population size because of high flow releases from the reservoir[1]. Just as the population appears to have rebounded in the regulated reach, a new set of stressors is on the horizon because of conditions imposed by the National Marine Fisheries Service.

[1] Kupferberg, S. J., Palen, W. J., Lind, A. J., Bobzien, S., Catenazzi, A., Drennan, J., and Power, M. E. 2012. Effects of flow regimes altered by dams on survival, population declines, and range-wide losses of California river-breeding frogs. Cons. Biol. 26:513–524. doi: 10.1111/j.1523-1739.2012.01837.x.

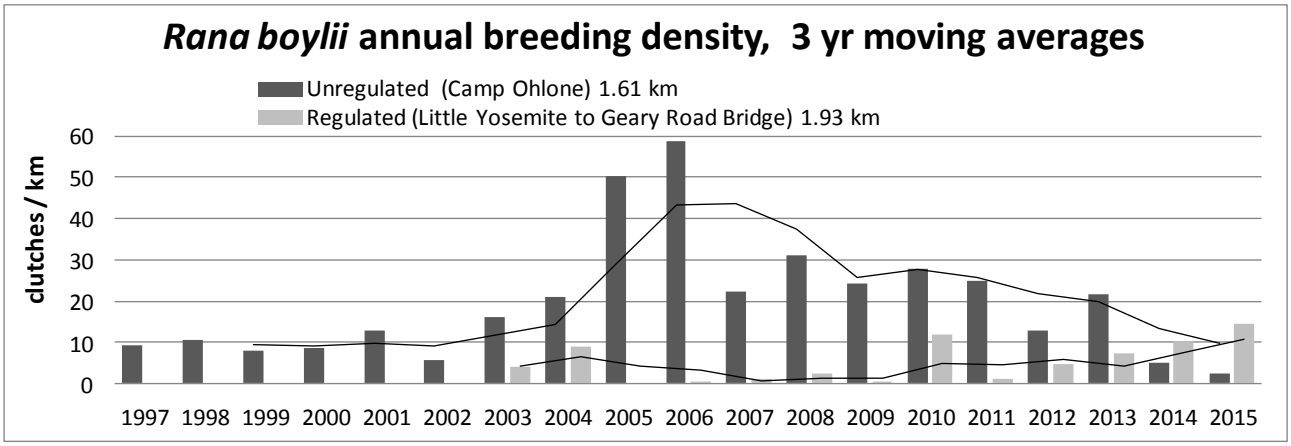

Figure 2. Density of breeding female *Rana boylii* as indicated by number of clutches laid per stream kilometer searched in two stretches of Alameda Creek. (Data from Kupferberg et al. 2012, and East Bay Regional Park District unpublished data).

Detrimental impacts of proposed fish passage project

In December of 2014, SAVE THE FROGS! began efforts to protect *Rana boylii* where they persist in the upper parts of the Alameda Creek watershed, by filing an appeal with the City of San Francisco to block their attempts to modify a natural barrier to fish migration that would have the side effect of destroying critical habitat for this species in a section of the creek called Little Yosemite. We also filed Public Records Act requests with the San Francisco Public Utilities Commission and the California Department of Fish and Wildlife to obtain documents relevant to the current status in the watershed and threats to this species in the future. We have submitted these documents along with this letter which summarizes what we have learned.

The City is proposing to alter a natural rock canyon in Alameda Creek, called Little Yosemite, to improve fish passage. While salmonid restoration is important, conservation actions have to be implemented wisely to avoid unintended negative consequences. Alameda Creek currently has no anadromous salmonid fish attempting to swim up the canyon, likely due to the impassable rubber coffer dams downstream in Fremont. Until the downstream problems are fixed, we see no reason to degrade critical amphibian habitat in Little Yosemite, since the fish cannot even access the site. Because *Rana boylii* does not have federal protection, the plans for steelhead restoration have been largely developed without consideration of the consequences to this equally rare and threatened vertebrate.

The City intends to install weirs (small dams) along three stretches of prime breeding habitat currently used by *Rana boylii* in order to create deep pools from which fish can more easily jump to the next pool upstream. To build the weirs they will fill the spaces between boulders (moist places where frogs hide) and create concrete structures at the pool outlets. The pools will no longer be suitable for the *Rana boylii* to lay their eggs or for their tadpoles to develop because of the changes to the hydraulic geometry. The depth, velocity, substrate size, and canopy cover at the new water's edge will no longer be within the range of conditions that are required by *Rana boylii*. The pools will attract predatory crayfish and non-native American Bullfrogs (*Lithobates catesbeianus*) that thrive in altered conditions and which pose significant threats as predators and vectors of chytrid

fungus.

The City also proposes to change the timing of when they flush sediments built up from the upstream Alameda Creek Diversion Dam into the creek (an activity known as sluicing). Their goal is to avoid sluicing during winter fish migrations. Instead of sluicing during winter storms, they are seeking permission to sluice as late as March 31st, which is high frog breeding season and the worst time of year in terms of protecting amphibians.

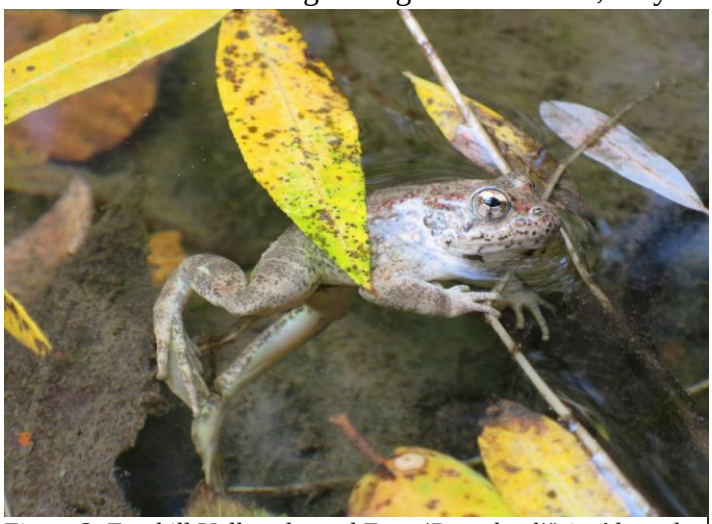

Figure 3. Foothill Yellow-legged Frog (*Rana boylii*) in Alameda Creek, 2014.

In a flawed attempt to offset the numerous problems they are causing, the City plans to transport the affected frogs to currently undetermined stream locations to give them new homes. This will cause crowded conditions for the amphibians already present, and facilitate the spread of infectious disease: Little Yosemite is the epicenter of a recent outbreak of chytrid infections so it is expected that the transported frogs will spread their infections to healthy frogs (Figure 3) if moved.

Lack of effective mitigation for Calaveras Dam Replacement Project

The fish passage project comes at a time when the City has a mitigation commitment to provide project benefits to Alameda Creek's amphibians and compensate for the loss of habitat when the Calaveras Dam Replacement Project (CDRP) is complete. When the dam is finished, the fully filled reservoir will submerge 1.8 miles of Arroyo Honda Creek. The watershed's most dense population of *Rana boylii* is presently in the stretch of Arroyo Hondo that has reverted to stream channel in the decade since the dam was designated as unsafe and the reservoir was operated at one third its total capacity. The CDRP Mitigation Monitoring and Reporting Program published by SFPUC in the 2011 Final Environmental Impact Report, states (in Section 5.4.3) that SFPUC will:

> "Document that project benefits to foothill yellow-legged frog habitat in Alameda Creek from the Alameda Creek Diversion Dam (ACDD) to the Calaveras Creek confluence fully compensate for any loss of foothill yellow-legged frog at the ACDD and for the loss of approximately 9,421 linear feet (approximately 1.8 miles) of habitat in Arroyo Hondo, fully compensate for 0.03 acre of aquatic habitat at the ACDD, and for any loss of breeding habitat in Alameda Creek downstream of the confluence with Calaveras Creek that may result from a potentially increased bullfrog population through monitoring and adaptive management within 5 years of the start of bypass flows at the ACDD."

In fact, analysis of the data in the reports we received via Public Records Act Requests indicate that the size of the population in Alameda Creek would have to double to compensate for the population losing habitat in Arroyo Hondo. Sustained population doubling is an unlikely outcome given all the other forces at work which would predict negative effects on the population:

- Direct habitat mapping at a range of stream discharges showed that suitable habitat area for frogs will decline under the new proposed spring and summer flow release schedule relative to the present flow regime and unimpaired flow regime.
- The new diversion schedule is unlikely to lengthen the hydroperiod sufficiently in the section that dries every year between ACDD and the top of Little Yosemite to increase usable habitat area and enhance production of frogs.
- Little Yosemite Fish Passage project will permanently alter and render unsuitable three pools used by breeding frogs.
- There is an ongoing outbreak of chytrid infection in the regulated reach of Alameda Creek
- Proposed mitigation and minimization measures for the fish passage project that involves re-locating frogs will spread chytrid fungus.
- There are no plans to reduce the abundance of non-native predators and competitors and disease vectors in the reach (i.e. bullfrogs, crayfish, and bass).
- NMFS/SFPUC is requesting a change to the sluicing schedule to allow passage of sediment from behind Alameda Creek Diversion Dam in months when amphibians (especially California red-legged frogs) are known to breed in Alameda Creek.
- The specific actions expected to "fully compensate" for loss of FYLF habitat are undefined. Because of flow diversion at the Alameda Creek Diversion Dam and storage of water behind the Calaveras Dam, there has been almost 100 years with decreased intensity of winter floods, which changed the shape of the river channel to make it a less hospitable place for the native amphibians. In the absence of the winter disturbance, the channel became incised and woody plants grew in what used to be the active channel. This vegetation encroachment initiated more changes to the stream channel's shape: banks became steep where they are held together by roots, while the tree trunks and roots trap sediment and built up a berm, which decreases the shallow edgewater habitat that is important for successful rearing of *Rana boylii* tadpoles.
- A possible habitat enhancement action, creating gaps in canopy cover, while a promising idea, is experimental and may not be effective.
- The ACDD fish ladder will be built at a *Rana boylii* breeding site, causing permanent destruction of a breeding site. Recently published research on the species indicates the importance of preserving breeding sites for conservation of this species.

Fish vs. Frog conflicts with respect to thermal niche and physical habitat

Some advocates of the current scheme justify the plans on a superficially plausible, but actually incorrect, idea. They argue that if stream breeding amphibians and steelhead co-occur in some parts of their overlapping ranges, then modifications to the stream channel and the thermal regime to benefit anadromous fish could not be harmful to frogs. This reasoning mis-directs attention away from some important facts. For example, the directions of spawning migrations for salmonids and frogs are opposite. While the fish swim upstream to spawn in cool shaded tributaries where adult frogs occur, the frogs move downstream from tributaries to mainstems to lay eggs in sunny stream reaches where warm water and algal food resources promote rapid growth and development of grazing tadpoles. The history of salmonid and amphibian co-evolution did not unfold against a template of dam-altered conditions and the fragmented Alameda Creek watershed of today bears

little resemblance to a free-flowing and heterogeneous natural system in which fish and frogs could segregate spatially.

The co-existence of lotic breeding amphibians and anadromous fish is context dependent and life-stage specific. Dam-altered flow regimes can cause mass mortality events due to ill-timed flow fluctuations and lead to repeated recruitment failures. Dam-altered thermal regimes where there are hypolimnetic releases of cold water can shift water temperatures outside the thermal niche of *Rana boylii*. Future summer thermal regimes in Alameda Creek between Calaveras Creek Confluence and Welch Creek Confluence will be 5 °C cooler than at present during the summer, and future conditions will be below thresholds for tadpole growth. These predictions are supported by models SFPUC had developed using the peer-reviewed and published studies on *Rana boylii*. A well-studied example is at the Trinity River, where *Rana boylii* proliferate in the South Fork Trinity, but are at the brink of extirpation in the cold Mainstem Trinity due to a flow regime primarily with salmonid management in mind. Other well-documented stressors to *R. boylii* include genetic isolation caused by reservoirs as barriers to movement and non-native predators that can flourish in regulated rivers.

Conclusion

SAVE THE FROGS! thanks the USFWS for the opportunity to comment during this phase of the listing process. While this letter highlights issues in one watershed, the combined effects of similar stressors are at work in many regulated river systems across the species range. Most locations with flow regulation have very small population sizes of *Rana boylii* relative to unmodified systems. We believe that its current status as a California Species of Special Concern and US Forest Service Sensitive Species does not provide adequate protection. We urge USFWS to provide full protection to *Rana boylii* under the Endangered Species Act by: (1) conducting a full status review of *Rana boylii*; (2) listing it as threatened or endangered; and (3) designating the Alameda Creek watershed as part of the Critical Habitat needed to sustain persistence in the southern and central segments of the species range.

Kindly add our organization to the distribution list so we may receive direct notification of the next steps in the listing determination.

Sincerely,

Kerry Kriger, Ph.D.
SAVE THE FROGS! Founder, Executive Director & Ecologist