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North Central Region/Region 2
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GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director

June 16, 2023

Kimberly D. Bose, Secretary
FEDERAL ENERGY REGULATORY COMMISSION
888 – 1st Street, N.E.
Washington, D.C. 20426-0001

SUBJECT: COMMENTS FROM THE CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE ON FOOTHILL YELLOW-LEGGED FROG STATUS AND REGIONAL HYDROPOWER IMPACTS

Dear Secretary Bose and Hydropower Licensees[1]:

The California Department of Fish and Wildlife (Department) sends this letter to the Federal Regulatory Energy Commission (FERC) and affected hydropower projects in the Department's North Central Region[1] to achieve the following between the Department, FERC, and Hydropower Licensees:

1. A shared awareness of the imperiled status of foothill yellow-legged frogs (FYLF; *Rana Boylii*) in California;
2. A shared understanding of the known and potential impacts of hydropower operations on FYLF, and opportunities for reducing impacts; and
3. Good faith cooperation to minimize hydropower project impacts to FYLF.

AUTHORITY

The Department is the appropriate State fish and wildlife agency for resource consultation and Federal Power Act Section 10(j) (16 U.S.C. section 803 (j)) purposes. The fish and wildlife resources of the State of California are held in trust for the people of the State by and through the Department (Fish & G. Code § 711.7). The Department has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and the habitat necessary for biologically sustainable populations of those

[1] FERC-licensed hydropower projects within the Department's North Central Region that overlap California Endangered Species Act-listed Foothill Yellow-Legged Frog clade ranges include FERC Project Numbers: P-137, P-184, P-619, P-803, P-1403, P-1962, P-2019, P-2088, P-2100, P-2101, P-2105, P-2107, P-2155, P-2246, P-2266, P-2310, P-2699, P-2709, P-2916, P-2997, P-3189, P-6281, P-6780, P-6896, P-7242, P-10505, P-11563, P-14796 (Attachment A).

depend, for their ecological values and for their use and enjoyment by the public. It is the goal of the Department to preserve, protect, and as needed, to restore habitat necessary to support native fish, wildlife, and plant species within the FERC-designated boundaries of a given Project, as well as the areas adjacent to said Project in which resources are affected by ongoing Project operations and maintenance activities and recreational use.

FOOTHILL YELLOW-LEGGED FROG & HYDROPOWER

Foothill Yellow-Legged Frog Listing Status

The Center for Biological Diversity submitted a petition in December 2016 to the California Fish and Game Commission (Commission) to list FYLF as threatened pursuant to the California Endangered Species Act (CESA; Fish & G. Code, § 2080 et seq.). The Commission followed the Department's recommendation and voted to advance the species to candidacy on June 21, 2017, publishing its related findings on July 7, 2017 (Cal. Reg. Notice Register 2017, No. 27-Z, p. 986) (California Department of Fish and Wildlife, 2018). Under the California Code of Regulations, Title 14, Section 670.5, the following FYLF designations have been made: the Southwest/South Coast, West/Central Coast, and East/Southern Sierra clades are "Endangered"; the Northeast/Northern Sierra and Feather River clades are "Threatened". The Northwest/North Coast clade is not listed under CESA but retains the status of California "Species of Special Concern" (California Department of Fish and Wildlife, 2018). A map of FYLF clade geography is available here: https://gis.data.ca.gov/datasets/CDFW::foothill-yellow-legged-frog-clade-boundaries-ds2865/explore.

It is the policy of the State to conserve, protect, restore and enhance any endangered or threatened species and its habitat (Fish & G. Code, § 2052). The conservation, protection, and enhancement of CESA-listed species, including FYLF, and their habitat is of statewide concern (Fish & G. Code, § 2051(c)) and is a Department priority (California Department of Fish and Wildlife, 2022). In addition to CESA-listing status, specific FYLF clades throughout California and Oregon are currently under review by the U.S. Fish and Wildlife Service for listing as threatened or endangered under the federal Endangered Species Act (United States Fish and Wildlife Service, 2022).

Foothill Yellow-Legged Frog Decline, Flow Regulation, & Hydropower Impacts

Although FYLF are subject to impacts from climate change, pollution, predation, disease, and other factors, the most widespread threats to the species are associated with dams and their flow regimes (Hayes et al., 2016). Regulated rivers impact the FYLF life cycle by altering the timing, temperature, duration, frequency, and magnitude of water discharge. Artificial, dam-controlled flow patterns diverge from the natural Mediterranean climate runoff patterns to which the frog's life history is adapted (Kupferberg et al. 2009a). FYLF were historically abundant throughout many western rivers, but populations have declined since the onset of flow regulation. Throughout the state there are very few large foothill yellow-legged frog populations that remain. As of 2005, only 30 of the 213 sites in California with FYLF (14%) had populations estimated

rivers, but populations have declined since the onset of flow regulation. Throughout the state there are very few large foothill yellow-legged frog populations that remain. As of 2005, only 30 of the 213 sites in California with FYLF (14%) had populations estimated to be 20 or more adult frogs (Center for Biological Diversity, 2016). The U.S. Forest Service estimated that FYLF have disappeared from over 50% of their historical localities in the Sierra Nevada (U.S. Forest Service, 2016).

Genetic analyses have also provided a lens on trajectories of genetic diversity within FYLF populations. Genetic diversity is an important component for long-term population persistence because it is associated with the evolutionary capacity for adaptation to environmental changes (Peek et al., 2021). In a 2021 study, population genomics were used to analyze the impacts of flow alteration on FYLF in the Middle and North Fork American River; Bear River; and South, Middle, and North Yuba Rivers. The study found that FYLF in rivers that contain the hydrological alteration of flow by dams and diversions demonstrated patterns of isolation and trajectories of genetic diversity loss compared to unregulated rivers. Every population within regulated watersheds displayed this trajectory of genetic diversity loss, despite this species' ability to pass potential physical infrastructure barriers such as dams, canals, and reservoirs (Peek et al., 2021). Population decline combined with these genetic diversity losses underscore both the imperiled condition of FYLF and the risk of continued decline under status-quo flow regimes.

Flow regulation, inclusive of hydropower operations, affects many aspects of FYLF life history. This species is especially vulnerable in early life stages, and dam releases have been documented as a main cause of egg mortality in several studies due to the scouring and stranding of egg masses during FYLF spring breeding season (Hayes et al., 2016). Dams and corresponding flow operations can also result in reduced quality and quantity of breeding and rearing habitat, artificial temperature regimes and mis-timed reproductive cues, reduced tadpole growth rate, disrupted gene flow among populations, and the establishment and spread of non-native species. FYLF habitat can also be significantly altered and fragmented as a result of the management of flow regimes and dams that block sediment flow (Hayes et al., 2016). These impacts to FYLF appear to be most severe when the dam is operated for the generation of hydropower utilizing hydropeaking and pulse flows (California Department of Fish and Wildlife, 2019).

The contrast in FYLF habitat between regulated and unregulated rivers is stark. Frogs occur more often and have higher abundances along streams lacking large dams (Hayes et al., 2016), whereas in many regulated rivers in the Sierra Nevada, populations are now restricted to small unregulated tributaries flowing into the regulated mainstem (Peek et al., 2021). A FYLF Population Viability Analysis revealed that populations in regulated rivers face a 4- to 13-fold greater extinction risk over a 30-year time horizon compared to populations in unregulated rivers due to smaller population sizes (Kupferberg et al., 2009b). Several risk factors contribute to this probability of extirpation such as decreased survival from scouring and stranding flows, poor food quality, and increased predation and competition (California Department of Fish and

Wildlife, 2019). The hydropower licenses that currently govern flow regimes through wide swaths of the Sierra Nevada typically expire 30-50 years after license issuance. These long license terms risk continued detrimental hydropower operations, and accordingly, continued decline and potential regional extirpation of FYLF, within a given license implementation period before more protective practices and conditions can be incorporated into a new license.

In the Department's North Central Region (Region 2), there are 27 licensed hydropower projects – and several more exempt hydropower projects – overlapping known populations of CESA-listed FYLF (Attachment A). Of these licensed projects, 18 licenses are not scheduled to expire for many years and in some cases multiple decades, ranging between the years 2030-2070. Original licensing for many of these projects did *not* consider protective measures for FYLF due to the timing of license issuance preceding improved frog knowledge and CESA listing status, and accordingly, current hydropower operations are likely significantly impacting remaining FYLF populations.

Opportunities for Reducing Hydropower Impacts to Foothill Yellow-Legged Frog

Well-documented hydropower impacts on FYLF populations signal the urgent need to work towards frog-friendly hydropower operations. With well over 100 hydropower projects scheduled to be re-licensed in California over the next 15 years by FERC, conservation of California's riverine habitat will increasingly depend on the details of dam operations (Kupferberg et al., 2011). The Department requests that FERC and Hydropower Licensees offer their good faith cooperation to help reduce the burden of hydropower impacts on FYLF populations. The Department offers several suggestions for doing so:

- For projects actively undergoing relicensing, prioritize the development of mandatory protective license conditions such as: seasonal flow requirements that preserve ecological function, consideration of thermal regimes, gradual up- and down-ramping rates to reduce the likelihood of early life stage scour or stranding, limitations on flow increases after spring recession during summer low flows, and limitation of recreational pulse flows during the frog breeding and early rearing seasons.
- Engage the Department in an informal consultation on current license conditions to identify risks to frogs and areas of operational flexibility where risks may be reduced within the constraints of existing license conditions.
- Educate operators to improve their identification and understanding of FYLF life-history and to increase awareness of operational risks and mitigation strategies. The Department is willing to provide its expertise to help develop educational tools.

- Diligently monitor FYLF populations within and downstream of hydropower project areas to track changes in populations and help characterize relationships between operations and population trends.
- Consider FERC license condition amendments, inclusive of State Water Resources Control Board Water Quality Certification (WQC) conditions and United States Forest Service 4(e) conditions, where conditions are irreconcilably incompatible with FYLF needs.

CONCLUSION

The incorporation of hydropower best practices to protect FYLF populations is possible and already being implemented by project Licensees in many cases. Several Sierra Nevada hydroelectric projects currently in the process of relicensing are considering implementing spring spill recession flows in order to minimize adverse impacts from sudden changes in flow during the spring breeding season, as well as to provide the ecological cues that many native species depend on for successful reproduction (Yarnell et al. 2016). Regardless of a hydropower project's license status, the Department is optimistic that there are opportunities to better understand and minimize a project's impacts on FYLF. The Department stands ready and willing to support actions to reduce hydropower impacts on these imperiled frogs.

If you have questions regarding our comments or would like to discuss the contents of this letter, please contact the Department's North Central Region FERC Coordinator, Michael Maher at Michael.Maher@wildlife.ca.gov.

Sincerely,

DocuSigned by:
Tanya Sheya for
1ABC45303752499...

Colin Purdy, Acting Regional Manager
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16 United States Code §803(j). Conditions of license generally.

ATTACHMENT A

FERC-licensed hydropower projects within the Department's North Central Region that overlap California Endangered Species Act-listed Foothill Yellow-Legged Frog clade ranges.

Hydropower Project Name	FERC Project Number	CESA Status
Angels	P-2699	Endangered
Chili Bar	P-2155	Endangered
El Dorado	P-184	Endangered
Lower Mokelumne	P-2916	Endangered
Mokelumne	P-137	Endangered
Mokelumne Pumped Storage	P-14796	Endangered
Rock Creek	P-3189	Endangered
Upper American River	P-2101	Endangered
Upper Utica	P-11563	Endangered
Utica	P-2019	Endangered
Bucks Creek	P-619	Threatened
Camp Far West	P-2997	Threatened
Deadwood Creek	P-6780	Threatened
DeSabla-Centerville	P-803	Threatened
Drum Spaulding	P-2310	Threatened
Feather River/Oroville	P-2100	Threatened
Five Bears	P-6281	Threatened
Forks of Butte	P-6896	Threatened
Graeagle Golf Course	P-10505	Threatened
Kanaka	P-7242	Threatened
Middle Fork American River	P-2079	Threatened
Narrows 1	P-1403	Threatened
Poe	P-2107	Threatened
Rock Creek-Cresta	P-1962	Threatened
South Fork Feather River	P-2088	Threatened
Upper North Fork Feather River	P-2105	Threatened
Yuba Bear	P-2266	Threatened
Yuba River Development	P-2246	Threatened