

June 2, 2023
California Department of Fish and Wildlife
Northern Region
619 Second Street
Eureka, CA 95501

Subject: Kurt Moffitt – Moffitt Stream Crossings Remediation Project
Humboldt County APN: 210-072-009; Larabee Valley, CA
Streambed Alteration Agreement Notification No. 1600-2019-0662-R1
Aquatic Invasive Species Management Plan - Bullfrog Management Plan

This memo summarizes how compliance will be achieved under the final Streambed Alteration Agreement (**Notification No. 1600-2019-0662-R1**), executed on June 1st, 2020. The conditions of the Agreement include requirements for aquatic invasive species (AIS) management, including bullfrog management. CDFW's Aquatic Invasive Species Management Plan (2008) and Exhibit A from the Agreement were referred to in developing management plans. Please see the attached **Bullfrog Management Plan** document.

Aquatic Invasive Species Management

.Any regulated Aquatic Invasive Plant or Animal Species will be managed and/or eradicated according to protocol found in the Aquatic Invasive Species Management Plan (CDFW 2008). Appendix G of the Plan is a list of regulated species used for reference; Figure 1 below, taken from the Plan, is a list of species management types for prioritizing management of AIS.

There are additional invasive species other than bullfrogs that have potential to colonize the lake: New Zealand mudsnail (*Potamopyrgus antipodarum*), Hydrilla (*Hydrilla verticillata*), Eurasian watermilfoil (*Myriophyllum spicatum*), and Red-eared slider (*Trachemys scripta elegans*). A combination of prevention, early detection, and rapid-response will be utilized in preventing the spread of invasive species. All project personnel will adhere to CDW's AIS decontamination protocol for any field gear or equipment that will be used at the Lake. In addition, no stocking in waters of the state will occur without written permission from the department pursuant to Section 6400 of Fish and Game Code.

Table 3: Species Management Types

SPECIES MANAGEMENT TYPE	REPRESENTATIVE SPECIES	MANAGEMENT RESPONSE
Type 1 Not yet detected in California or eradicated	<i>Caulerpa</i> Northern Pacific seastar South African sabellid polychaete snakehead zebra mussel	Monitoring Early detection
Type 2 Limited in extent	Hydrilla channeled apple snail <i>Salvinia</i> smooth cordgrass quagga mussel	Early detection Rapid response Eradication
Type 3 Established but manageable	African clawed frog <i>Egeria</i> Chinese mitten crab Eurasian watermilfoil European green crab purple loosestrife salt cedar water hyacinth	Localized eradication Impact mitigation Control of spread to other water bodies Research on control technologies
Type 4 Widespread but currently no large-scale control options	Asian overbite clam inland silverside New Zealand mudsnail bullfrog water lettuce pale yellow iris	Monitoring Prevent spread to new water bodies Research
Type 5 Unknown invasion potential	Asian swamp eel green sunfish salt meadowcordgrass	Research and evaluation

The Species Management Type (SMT) characterizes the distribution and degree of establishment of an AIS in California and could be assigned to any AIS species. This characteristic is useful to consider when setting management priorities or planning for a management response to a potential or actual AIS infestation. Representative species are merely examples, as this table is not meant to provide a comprehensive list of species sorted by SMT. Though valid at the time of publication, the status of the species mentioned is likely to change over time. For more examples see Chapter 8.

Figure 1. Species Management Types for AIS (CDFW 2008)

Bullfrog Management Plan

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This document outlines the standard protocol for the management of the American bullfrog (*Lithobates catesbeianus* = *Rana catesbeiana*) on the subject property in accordance with all requirements set forth in the Exhibit A of the Streambed Alteration Agreement. This management plan is subject to change based on new information and relies heavily on CDFW's guidance.

Site Description

The project site is located on a 269-acre parcel in Larabee Valley, Humboldt County. Water for commercial cannabis cultivation is provided by a rain catchment pond. Although bullfrog habitat is available, no bullfrogs have been found by the landowner.

Management

If any life stage of bullfrog is detected or incidental observations, then management protocols will be implemented to eradicate the species from the property. According to the CDFW, implementing reservoir dewatering and manual direct removal are the best methods for managing bullfrogs. Therefore, the applicant will incorporate both methods into this management plan.

1. Manual removal of individuals

Depending on the level of bullfrog infestation, the applicant will employ methods outlined by CDFW. If the infestation level is relatively low, and direct removal of individuals will be sufficient, then the applicant will utilize the authority under a sport fishing license (California Code of Regulations, Title 14, section 5.05(a)(28)). If the infestation level is high and the use of sport fishing license authority is not sufficient to effectively manage the bullfrog population, then the applicant may apply for a permit to destroy the species through seining and draining of the reservoir (Fish and Game Code 5501; Section CCR T-14 226.5 Issuance of Permits to Destroy Harmful Species of Fish in Private Waters for Management Purposes).

All direct removal efforts must be made by a person knowledgeable in bullfrog identification and will be completed as follows:

- Removal efforts must occur during, but are not be limited to the active/breeding season, occurring May – July;
- A minimum of five efforts throughout the season are considered necessary;
- Direct removal efforts are typically most effective when conducted at night with use of lights but can also be conducted during the day;
- Direct removal must include working the entire perimeter of the reservoir;
- A rubber raft or small boat may be necessary to successfully remove some individuals;
- A team of two individuals or more is often helpful, one person for shining lights and/or operating a boat and the other person to perform removal efforts;

- Bullfrog tadpoles must be removed and dispatched and must not be relocated or kept as pets.

2. Reservoir Dewatering

For reservoirs that are heavily infested with juvenile bullfrogs and/or tadpoles, reservoir dewatering may be necessary to break the bullfrog's life cycle and prevent on-going reproduction. Prior to conducting reservoir dewatering activities, the applicant will coordinate with CDFW staff, obtain a permit to destroy the harmful species and provide a timeline for completing the work.

Pond dewatering may be incorporated into the applicant's operation yearly so that the irrigation demands meet a dual purpose of dewatering the reservoir at the appropriate time. If pond dewatering requires water to be pumped out and discarded, then it will only occur with the careful planning and coordination with CDFW. Discharge of polluted water to waters of the state may require permitting from other agencies with permitting authority, such as the Regional Water Quality Control Board. To the maximum extent feasible, the pond dewatering will be designed to slowly disperse pond water onto uplands without discharging any waters or sediment to nearby stream courses.

In general, bullfrog tadpoles require two years to develop into frogs, whereas native amphibians only require one year. Therefore, draining a reservoir every year is intended to interrupt bullfrog tadpole development, dramatically decrease bullfrog populations and allow for reduced efforts as a measure of adaptive management. Typically, in Northern California, reservoir draining should occur in September through October to avoid impacts to sensitive native amphibian and fishery resources. While draining occurs, direct removal efforts should be employed as described above if possible.