

Restoration Fund Request
Monitoring and Research Project Funding Request for Pikeminnow eDNA Work
January 26, 2018

Background

The Chorro Creek watershed supports a federally-listed population of steelhead and California red-legged frog. Both species rely on Chorro Creek, as well as its five tributaries, for reproduction and rearing. However, the presence of an invasive population of Sacramento pikeminnow (hereafter referred to as “pikeminnow”) has reduced juvenile steelhead abundance and survival through direct predation as well as competition for food and habitat. Pikeminnow have also been reported to prey heavily on frogs from locations where California red-legged frogs occur.

In recognition of the role that pikeminnow play, both in suppressing the steelhead population through competition and predation and being an obstacle to funding important habitat restoration projects (e.g., fish passage removal), an effective pikeminnow control strategy is included as a high priority action in the National Marine Fisheries Service 2013 steelhead recovery plan. The United States Fish and Wildlife’s 2002 red-legged frog recovery plan also includes actions targeting the reduction and/or removal of non-native fish.

To address the invasive predatory Sacramento pikeminnow in Chorro Creek, the Estuary Program and Stillwater Sciences developed a pikeminnow management plan in 2017 (Stillwater Sciences 2017), with support from partners including Stillwater Sciences, California Conservation Corps (CCC), Central Coast Salmon Enhancement (CCSE), California Department of Fish and Wildlife (CDFW), Trout Unlimited, city of San Luis Obispo, National Marine Fisheries Service, NOAA Fisheries Science Center, USDA Forest Service Research Center, Coastal San Luis Resource Conservation District, Upper Salinas-Las Tablas Resource Conservation District, California Men’s Colony, Camp San Luis Obispo Army National Guard Base, and California Polytechnic University, San Luis Obispo. The management plan describes an approach to support recovery of steelhead and California red-legged frog.

The plan was implemented in 2017, and 240 pikeminnow were captured and removed during spring and fall sampling. Strong partnership with the CCC and the contributions of volunteers from City of San Luis Obispo, Cal Poly, and Cuesta Community College were key to the success of the effort. Despite strong support, it has been challenging to secure adequate funding for full implementation of the plan. Some funding agencies are skeptical that pikeminnow are a serious threat to native species. This is due in part to the traditional method of assessing the diet of predatory fish, which consists of removing the contents of the stomach and visually identifying prey items consumed. The limitation with this approach is that evidence of prey consumed a day or more prior to capture is digested, and so the results can far under-represent potential impact of predators.

Benefits of the Project

If we could provide positive verification of predation on two federally-listed species, we anticipate stronger support from funding agencies for the management plan. We have made multiple attempts to apply for funding for barrier removal, and the reason given for not receiving funding was the potential for pikeminnow to expand their territory. If accurate diet analysis indicated that pikeminnow are not consuming listed species, that information would allow the Estuary Program to pursue funding for other priority restoration actions in the watershed (e.g., fish passage removal).

The Estuary Program has made two recent unsuccessful attempts to apply for funding to support pikeminnow removal. As we have found that work related to pikeminnow has been difficult to fund, we feel that this project is a good fit for Restoration Funding.

Proposed Project

Stillwater and the Estuary Program are interested in using environmental DNA (eDNA) to improve our understanding of potential pikeminnow impacts in Chorro Creek. This technique is based on analyzing the gut contents of pikeminnow for the environmental DNA (eDNA) signature of steelhead and California red-legged frogs. If either of these species have been consumed in the 17 to 33 hours prior to capture, we will be able to detect its presence in the gut of the predator. Although this application of eDNA is relatively unique, analysis of eDNA is now common. To our knowledge, no other researchers have applied this technique with pikeminnow, but it has been applied to analyze gut contents of other predatory fish, including striped bass in Carmel River.

During the fall 2017 creek sampling effort, Stillwater Sciences and the Estuary Program sampled the stomach content of fourteen captured pikeminnow. Sampling was conducted per the protocols for eDNA analysis, and the samples were preserved for future analysis. In this proposal, we request funds to collect additional gut and water samples during spring and send all samples to the eDNA lab at University of California, Santa Barbara to complete the analysis.

The proposed project includes the following:

- Conduct pikeminnow sampling in the spring, including fish removal and gut sample collection for eDNA analysis
- Collect water samples in Chorro Creek and its tributaries and in Los Osos Creek for eDNA analysis
- Conduct eDNA analysis by UCSB on gut content and creek water for presence of steelhead, pikeminnow and California red-legged frogs
- Develop a brief report

We would like to conduct sampling in the spring because pikeminnow diets vary seasonally, and young steelhead emerge during this period. Water samples collected during spring would also provide more precise data on pikeminnow distribution in the Chorro Creek watershed (and Los Osos Creek) than is currently available using snorkel surveys.

Total Project Cost: \$41,480

Project Timeline

Sampling and analysis is expected to be conducted in the spring of 2018, with a report completed in the summer of 2018.

Relevant CCMP Action Plans

Suppression of pikeminnow and improvement of steelhead habitat in Chorro Creek is consistent with MBNEP's Comprehensive Conservation and Management Plan (2012), including these specific Action Plans:

- ECR-1: support maintenance and enhancement of in-stream habitat for freshwater aquatic species (includes fish barrier removal)
- ECR-13: develop better understanding of population dynamics of special status species populations in estuary and watershed (includes inventorying special status species and their habitats)
- ECR-14: support implementation of species recovery plans, including steelhead (technical and data support for plans)
- ECR-15: support removal of barriers to steelhead migration and enhancement and maintenance of instream habitat for steelhead and other species (barrier removal, instream restoration)
- ECR-16: develop and update invasive species action plan (remove or control invasive species)