



Fish Habitat Response to Streamflow Augmentation in Support of Salmon Recovery in the Russian River Basin

Principal Investigator:
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Technical Completion Report
Project Period: March 1, 2017 – February 28, 2019

Project Summary

We evaluated the ecological benefits of a Sonoma County, CA streamflow augmentation project, in which stored water was released into a stream to sustain habitat conditions for endangered salmon. We implemented a before-after-control-impact (BACI) to evaluate how stream flow, water depths, water quality, and fish behavior responded to different rates of water releases from the augmentation system. The field study was implemented between June and September in 2017 and 2018. We found that flow augmentation increased the length and duration of stream connectivity and had a beneficial effect on water depths and fish health. Flow augmentation did not have a strong effect on water quality in the first month of the study, but improved water quality in the last month of the study. The flow treatments definitively prevented the mortality of endangered fish trapped in isolated pools that would have dried up in the late summer season. Findings of the study are being used to develop an operations plan which will establish recommendations for the timing and rate of flow releases in future years. The study also guided the development of a successful proposal to the California Wildlife Conservation Board, to continue research at the project site through 2021. Research products from this project include an undergraduate thesis, abstracts in conference proceedings, and two manuscripts as part of a PhD dissertation that will be submitted to peer-reviewed journals for publication in fall 2019.

Student Support

Project funding was used to support a PhD graduate student and two undergraduate field assistants in the summers of 2017, 2018, and part of 2019.

Outreach

Findings of project activities were shared with the landowner (E.J. Gallo, Inc.) and regional conservation partners in 2018 and 2019 at one-day meetings in Santa Rosa, California. Results from the project were also presented at the annual meeting of the Salmonid Restoration Federation in 2018 and 2019 to natural resource agency staff, conservation organizations, and academic researchers. Results from the study are being used to develop an operations plan which will establish recommendations for the timing and rate of flow releases in future years, to be managed by the landowner.

Notable Achievements and Awards

The project involved close collaboration with the landowner (E.J. Gallo, Inc.), University of California Sea Grant, Trout Unlimited, and the Sonoma County Resource Conservation District. We prepared a successful grant proposal to Wildlife Conservation Board (WCB) Stream Flow Enhancement Program, supported by Proposition 1 funding, which provides \$530k in funding over three years to expand our research activities at the site. The project supported on

undergraduate thesis and a two dissertation chapters for a PhD student, which will be published as peer-reviewed manuscripts in the future.

Publications & Products

- Rossi, Gabriel, Weston Slaughter, and Theodore Grantham, 2018, "[A study of aquatic habitat and fish behavior in a Russian River Tributary](#)" in Proceedings of the 36th Annual Salmonid Restoration Conference, April 11-14, 2018, Fortuna, CA, pg 23.
- Slaughter, Weston, Keane Flynn, Gabriel Rossi, and Theodore Grantham, 2019, "[The effects of flow augmentation on invertebrate drift, salmonid foraging behavior, and inter-pool movement in a Mediterranean stream](#)" in Proceedings of the 37th Annual Salmonid Restoration Conference, April 23-26, 2019, Santa Rosa, CA, pg 23.