



INFORMATION ITEM

Lead Scientist Report

Summary

Spring-run Chinook salmon have been extirpated from the San Joaquin River. Despite habitat restoration and recent high-profile reintroductions, survivorship to the Pacific Ocean remains low. Scientists do not have full understanding on whether survival within the San Joaquin River portion of the Delta is a function of water quality. This study, funded by the Delta Science Program, used state-of-the-art acoustic fish tracking advances to test competing hypotheses regarding the role of water quality. The research team found water quality, particularly water temperature, to be an important driver of differences in salmon survival rates.

Survival of a Threatened Salmon is Linked to Spatial Variability in River Conditions

Colby Hause, Gabriel Singer, Rebecca Buchanan, Dennis Cocherell, Nann Fangue, and Andrew Rypel. Canadian Journal of Fisheries and Aquatic Sciences (2022)

<https://doi.org/10.1139/cjfas-2021-0243>.

High-profile efforts to reintroduce hatchery-raised juvenile spring-run Chinook Salmon to the San Joaquin River have been challenged with low rates of survival. Reasons for those low survival rates remain poorly understood, with previous research focusing primarily on geographic patterns and the role of flow. The role of habitat quality, particularly water quality, is less understood. Only recently have advances in sensing technology—including networks of acoustic “listening stations” that track the movement of tagged fish, and boat-mounted water quality sensors—made it possible to study the association between spatially and temporally varying survival rates and water quality. These advances, funded in part by the Delta Science Program, made it possible for this team of UC Davis and University of Washington researchers to test competing hypotheses about factors that govern variations in survival rate of juvenile spring-run Chinook.

The researchers used statistical models to compare alternative hypotheses for factors dominantly responsible for observed differences in juvenile survival rates. Models best reproduced the observations when differences in survival rate were governed by spatial differences in water quality, rather than by distance from the headwaters, other spatially varying factors, or temporal changes in water quality. Survival was lowest in two regions within the study area: surprisingly, the upstream habitat restoration region, and the mainstem Central Delta. These two regions shared high water temperatures--commonly regarded as an important aspect of water quality--but the study did not rigorously determine how water quality differences were related to survival. The research findings underscore the importance of accounting for water quality in managing and researching listed species. The study addresses Management Need 5 of the 2022-2026 Science Action Agenda (*Acquire new knowledge and synthesize existing knowledge of interacting stressors to support species recovery and ecosystem health*).

Delta Science Program Activities

Bay-Delta Social Science Community of Practice Advancing Interdisciplinary Research Event Report-Out

The 2019 Delta Social Science Task Force Report calls for better supporting and integrating social sciences in the Delta, as the complex challenges that face the Delta have large human dimensions that must be effectively addressed in tradeoff analyses and decision making. However, Delta-oriented research that combines social science (e.g., sociology, science and technology studies, economics) with biophysical sciences and engineering remains rare. Last month, the Council and the [Bay-Delta Social Science Community of Practice](#) hosted a two-part "[Advancing Interdisciplinary Research](#)" event to promote interdisciplinary research and build connections for the development of interdisciplinary research teams of social and biophysical scientists in the Bay-Delta. Both events were held virtually and well-attended.

On October 14th, 84 people attended a training that was held to provide background on social science disciplines and interdisciplinary research. The plenary provided fundamental background on the diverse disciplines within the social sciences and showcased how they may be applied to complicated environmental

management issues. Subsequent presenters discussed case studies of interdisciplinary projects on agricultural conservation practices in the Great Lakes region, climate adaptation planning from across 14 cities in the U.S., and indigenous fire management approaches in Northern California. Polls given during the event showed that 77% of participants felt that a lack of understanding of how to do interdisciplinary work is the largest barrier to more integrated research in the Delta.

On October 20th, 59 attendees joined the interactive workshop, which included presentations from the Delta Independent Science Board and three collaborative science groups (CSAMP, IEP & WRMP) that support the advancement of interdisciplinary research in the Delta and breakout sessions for participants to develop mock proposals to address interdisciplinary management needs from the 2022-2026 Science Action Agenda.

The video recordings and materials are posted on the Council's Social Science Community of Practice webpage events tab (<https://deltacouncil.ca.gov/bay-delta-social-science-community-of-practice>) and the Council's YouTube channel (<https://www.youtube.com/user/DeltaCouncil/featured>).

Harmful Algal Blooms Workshop

The two-day hybrid Harmful Algal Blooms workshop was held November 8-9th, 2022, **with in-person attendance** at the California Natural Resources Headquarters. A detailed report-out will be forthcoming in a future report.

Water Temperature Modeling Platform Independent Review Panel Report Releases

The Delta Science Program facilitated an independent review panel in July 2022 to review the temperature models, model framework, and implementation of a Water Temperature Modeling Platform (WTMP) for US Bureau of Reclamation (Reclamation).

The WTMP was developed to assist resource managers of major Central Valley Project (CVP) reservoirs to balance water resources for downstream uses and temperature demands. The CVP is a network of 20 dams and reservoirs that can store nearly 12 million acre-feet of water and has more than 500 miles of major

canals and natural channels for water serving urban, agricultural, and industrial demands in the Central Valley and San Francisco Bay area. Temperature management is a key parameter for the protection of species with specific cold-water needs and is one of the most complex subjects related to CVP operation.

The July 2022 panel meeting focused on the WTMP for the Sacramento River northern system (including Shasta and Keswick reservoirs) and the panel submitted their final report to the Delta Science Program on September 30, which was transmitted to Reclamation on October 16 and posted publicly on the Council's website (<https://deltacouncil.ca.gov/delta-science-program/water-temperature-model-development-independent-advisory-panel>).

Reclamation will incorporate these comments to the modeling effort and a final review by the same panel in Summer 2023 will focus on the entire project scope, including the American River and Stanislaus River systems. Findings and recommendations from the panel will provide important guidance to improve modeling tools for predicting water temperatures in short time frames for real-time operations, seasonally for developing temperature management plans, and longer time frames for planning studies.

On Your Radar

Integrated Modeling Framework Workshop

The Delta Science Program and a planning group that includes Integrated Modeling Steering Committee members are planning a workshop titled "Integrated Modeling Framework Workshop: "One Delta, One Science, One Modeling Framework". The workshop is scheduled for March 1-2, 2023, and will advance the first steps in development of a modeling collaboratory: a community and set of open-source tools for advancing integrated, transparent modeling to better inform resource management decisions. Through plenary presentations, breakout and panel discussions, participants will curate a set of case-studies for which a collaboratory can or would have made a big difference for resource management, engage in opportunities to collaborate, and discuss technology needs and the detailed components of the modeling framework. An anticipated outcome is a detailed

proposal for moving the collaboratory forward, including a plan to address funding needs. Registration and location details will be communicated in a future report.

Ask-Me-Anything (AMA) Sessions have Resumed on Zoom

The Lead Scientist team is pleased to announce that the Ask-me-anything series is back! Following feedback from the science committee, this series has switched from Instagram to the Zoom platform to promote more interactive engagement. Our first session was hosted on November 14, 2022, at noon and featured a discussion with Henry DeBey regarding priorities for the Delta Science Program under his leadership as the new Deputy Executive Officer.

By the Numbers

Science Program staff will provide a summary of current numbers related to Delta water and environmental management. The summary (Attachment 1) will inform the Council of recent counts, measurements, and monitoring figures driving water and environmental management issues.

List of Attachments

Attachment 1: By the Numbers Summary

Attachment 2: Visual Summary of Hause et. al. (2022)

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