

Data Applications: Research Partnerships in Land and Water Management

Improving Fish Monitoring to Support Informed Decision Making

Overview

Effective land and water management strategies are dependent on using accurate and precise data to inform decisions. Thus, extensive management resources are often allocated for the collection of fish occupancy and abundance data over time. Although most fishery professionals generally understand that the accurate identification of individual fish can be difficult when relying solely on external morphological features, nearly all fish research and monitoring programs assume perfect identification within their assessments despite a lack of scientific support. The implications of this potential source of uncertainty relative to water management decisions is poorly understood.

Ingredients for Success

In 2017, the Enterprise Program collaborated with the U.S. Fish and Wildlife Service, U.S. Geological Survey, and Metropolitan Water District of Southern California to evaluate the fish misidentification rates among professional observers working within the San Francisco Estuary. The Enterprise Program led the interagency project and conducted a suite of hierarchical logistic regression modeling using identification exam data collected by the U.S. Fish and Wildlife between 2012 and 2014 (figure 1).



Figure 1. Observers identifying fish during an examination proctored by the U.S. Fish and Wildlife Service in 2017. (Photo credit: Steve Martarano, U.S. Fish and Wildlife Service)

Findings

In general, the project demonstrated that fish misidentification was fairly common, varied considerably among species and observers, and may be an important source of sampling bias within similar systems containing diverse fish assemblages. The information generated could be used to develop useful analytical tools to properly calibrate raw data and reduce bias, and in turn, better inform management decisions within natural resource agencies. The project's findings were published by the Journal of Fish and Wildlife Management in 2018.

Next Steps

Based on the success of the project, the clients requested that the Enterprise Program lead a new multifaceted scientific investigation focused on assessing the effects of fish misidentification and sampling inefficiency on the monitoring of federally listed juvenile Chinook salmon occupancy near the Delta Cross Channel gates (figure 2), which are used to divert water from the Sacramento River into the interior of the Sacramento-San Joaquin River Delta through the Mokelumne River. As part of the investigation, multistate occupancy modeling tools will be developed to better help inform future Delta Cross Channel gate closure decisions. This investigation is ongoing and is being conducted in collaboration with additional partners, including the National Marine Fisheries Service, East Bay Municipal Utility District, and Florida Fish and Wildlife Conservation Commission.



Figure 2. Opened Delta Cross Channel gates in the San Francisco Estuary. (Photo credit: Todd Plain, U.S. Bureau of Reclamation)

For More Information

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