INFORMATION ITEM

Lead Scientist's Report

Summary: Delta Lead Scientist Dr. Laurel Larsen will discuss an article from *San Francisco Estuary and Watershed Sciences,* which represents a synthesis of long-term species trends. Dr. Larsen will also report the outcomes from the Council-sponsored Sacramento River Spring Run Chinook Salmon Workshop, Science Action Agenda Workshop, and Science Needs Assessment Workshop, and highlight the Council's important role in organizing these events.

COMPARING AND INTEGRATING FISH SURVEY IN THE SAN FRANCISCO ESTUARY: WHY DIVERSE LONG-TERM MONITORING PROGRAMS ARE IMPORTANT. SAN FRANCISCO ESTUARY AND WATERSHED SCIENCES. JUNE. 2020.

Many fish species have suffered declines in recent decades in a phenomenon called the Pelagic Organism Decline (POD), as increasingly shown by long-term monitoring programs like the Interagency Ecological Program (IEP). The POD describes the trend by which four species of San Francisco Bay-Delta management concern (delta & longfin smelt, striped bass, and threadfin shad) have starkly declined since roughly 2002 (Mac Nally *et al.* 2010). Programs like IEP conduct a suite of surveys performed by state or federal agencies or academic institutions. These programs produce incredibly rich data sets that are useful for tracking species trends over time. Surveys and other data may offer differences in the trends reflected, which can often raise concerns about their reliability or usability. Researchers from the UC Davis Center for Watershed Sciences quantitatively rated these surveys based on their ability to represent species trends, present methods for integrating long term data sets, and provide examples highlighting the importance of integrated analyses and large-scale data synthesis.

The team analyzed 14 data sets and first produced "species-survey ratings" that estimated which species were best represented. This data was then merged into one open-access data set, called the "SFE Integrated Data Set (SFEIDS)." The SFEIDS was used to compare differences in catch and salvage data of all POD species among the data sets. A subset of surveys from the SFEIDS that were most comparable in terms of longevity and consistency was selected to evaluate species abundance trends. The team found that survey differences were likely attributable to gear type, sampling sites, and seasonality. For example, surveys sampled using midwater trawls disproportionately caught species that dwelled within the water

column. In contrast, otter trawls showed a preference for capturing species that lived mostly on the estuary floor. Overall, pelagic fishes were most surveyed in the estuary, with sampling concentrated in the North Delta, West Delta, Suisun Bay, Suisun Marsh, and San Pablo Bay. Fish in the Central and Southern Delta associated with submersed aquatic vegetation were inadequately sampled. This was theorized to be attributed to poor sampling capacity by the most widely used survey gear, trawls, and seines. Even a survey composed of high-quality data on diverse species, like those discussed here, inadequately captures species abundance trends.

This research was published in SFEWS, a product funded by the Council with support from UC Davis John Muir Institute of the Environment and the eScholarship Publishing group. SFEWS is unique as it publishes research specifically about the science and resource management of the San Francisco Bay, the Delta, and upstream watersheds. This scope allows managers and stakeholders in these areas to have access to high quality, geographically specific science to inform their management needs. This study clearly demonstrates the utility of long-term sampling programs that employ many survey types to understand species abundance trends. The team identified potential dangers of relying on limited data to inform ecosystem management and advocate for more intensive analyses that build upon the SFEIDS to holistically understand drivers of differences in species trends. This paper represents a clear example of the value of capitalizing on existing data by increasing science synthesis, which is an action identified in the 2016-2021 Science Action Agenda.

2020 SACRAMENTO RIVER DRAINAGE SPRING RUN CHINOOK SALMON WORKSHOP

As mentioned at the September Council meeting, the Delta Science Program, in coordination with the Department of Water Resources (DWR) and Department of Fish and Wildlife, hosted a three-day workshop on Spring Run Chinook Salmon (Spring Run) focused on understanding the state of the science, knowledge and data gaps, and identifying additional science and monitoring needs to inform the development of population estimates for Sacramento River drainage spring-run Chinook salmon. The workshop's first day laid the groundwork by presenting five talks on the state of the science on Spring Run in order to inform productive discussions in topic-specific breakout groups on day two. The groups discussed field and genetic identification methods for Spring Run, approaches to developing juvenile production estimates, and current monitoring and gaps. On the third day, the participants listened to a recap of the breakout sessions' outcomes, a workshop

synthesis, and next steps by DWR's Lead Scientist Ted Sommer and the Council's Deputy Executive Officer for Science Louise Conrad. Over 200 individuals attended the three-day workshop. A recording of day one and day three and workshop materials is posted on the Council's website under the Event tab. A summary report will be released by the end of November.

SCIENCE NEEDS ASSESSMENT WORKSHOP

The Delta Independent Science Board (Delta ISB), in coordination with the Delta Plan Interagency Implementation Committee (DPIIC), hosted a two-day workshop from October 5 to 6, 2020, on science and governance in the Delta in the face of future rapid environmental change. The workshop, supported by the Council, convened longstanding experts and leaders to inspire and facilitate discussion around the Delta Plan's topical themes. The workshop opened with plenary remarks by Felicia Marcus (former chair of the State Water Resources Control Board), Peter Goodwin (former Delta Lead Scientist), and Ernest Conant (regional director for the U.S. Bureau of Reclamation). During the first day of the workshop, participants considered the science needs that will prepare Delta stakeholders to respond to oncoming environmental changes. On the second day, the discussion focused on the structure and possible restructuring of Delta science governance. This workshop was an opportunity for Delta stakeholders to provide input for the development of a long-term science strategy in the Delta in the form of the Science Needs Assessment, a report that will be released in early 2021. The virtual workshop was well-attended, with over 130 participants.

SCIENCE ACTION AGENDA WORKSHOP

The Delta Science Program is in the process of updating the Science Action Agenda (SAA) for 2022-2026. As one of three core components of the Delta Science Strategy, the SAA is a science agenda for the Sacramento-San Joaquin Delta that prioritizes and aligns science actions to inform management decisions, identifies major gaps in knowledge, promotes collaborative science, and builds science infrastructure. One of the 2017-2021 SAA's key values is that it forms the foundation for the Delta Science Program's focus for science funding, including for the Delta Science Fellowship Program, in addition to the 2019 and upcoming 2020/2021 Delta Science Proposal Solicitations. The first step in the 2022-2026 Science Action Agenda (SAA) update process is to identify major management questions for the Sacramento-San Joaquin Delta. Over 1,200 management

questions were submitted to the Delta Stewardship Council's (Council) Delta Science Program (DSP) in spring-summer 2020 for the effort.

On September 29, over 85 participants from Federal (12) and State (51) agencies, academia (4), NGOs and consulting groups (7), and water agencies (12) came together to discuss, edit, and prioritize the list of over 1300 management questions for the Sacramento-San Joaquin Delta, now winnowed down to just over 1,100. Breakout sessions at the workshop were facilitated by staff in the Science and Planning Divisions. The Delta Science Program is currently incorporating the feedback from participants at the workshop and in the weeks leading up to the workshop and gathering additional input in order to circulate a list of top Delta management questions later this fall. A subset of these questions will be selected for incorporation into the 2022-2026 Science Action Agenda (SAA), ensuring that the update to the SAA is relevant to existing management, supported by members of the Delta science community, and integrated with other planning efforts, including outcomes of the Science Needs Assessment Workshop hosted October 5-6. We are encouraged by the tremendous engagement in the effort and look forward to continued collaboration in the development of the 2022-2026 SAA.

ON YOUR RADAR

Proposal Solicitation Notice

The Delta Stewardship Council's Delta Science Program, in coordination with the U.S. Bureau of Reclamation (Bureau) and California Sea Grant, has drafted a proposal solicitation notice for its next funding cycle. The notice solicits scientific research proposals in two categories: focused Research Awards and Integrated Socio-Ecological Systems Awards that are larger and more integrative in scope. Both types of projects must address one or more management challenges, demonstrate benefits to vulnerable communities in the Delta, and be directly relevant to the Science Action Agenda. We anticipate awarding up to $9,000,000 in funding for 12-24-month projects, with up to $5,500,000 from the Council and up to $3,500,000 from the Bureau.

The draft proposal solicitation notice is out for public comment, with comments due by 5:00 pm PST on November 2, 2020. We anticipate publication of the solicitation notice on November 9, 2020. Letters of intent from prospective PIs will be due December 15, with proposals due February 12, 2021. Please visit the website https://deltacouncil.ca.gov/delta-science-program/delta-science-proposal-

solicitations for more detail and help us spread the word about this funding opportunity.

Frontiers for Young Minds: Where the River Meets the Ocean – Stories from the San Francisco Estuary

Frontiers for Young Minds is a publication of Frontiers, a leading open-access publisher and open science platform. Frontiers for Young Minds publishes "science for kids, edited by kids." A large group of scientists in the Delta are contributing to a special issue on the San Francisco Estuary, called "Where the River Meets the Ocean – Stories from the San Francisco Estuary." This includes several scientists from the Delta Science Program, including Ted Flynn, who is serving as one of the editors. The article submission deadline was October 1, and the articles are now in peer review. Stay tuned for this exciting outreach product and pass it on to the young people in your life!

Zooplankton Ecology Symposium

On October 27th – 28th, the Delta Science Program is hosting a virtual symposium featuring the latest research on zooplankton ecology and monitoring. This symposium will span two consecutive half-days with talks and panel discussions focusing on the San Francisco Estuary and work from other systems. The target audiences for this symposium include scientists, resource managers, and interested members of the public. The program consists of content on zooplankton biology and ecology, current monitoring programs, emerging data collection methods, and the IEP's integrated zooplankton dataset. There will also be a panel discussion on data synthesis. The Delta Science Program is organizing this symposium in collaboration with the IEP, the California Department of Fish and Wildlife, and the California Department of Water Resources.

Registration for the workshop is free. For the registration link and the program agenda, visit https://deltastewardshipcouncil.cmail20.com/t/r-i-juviiky-l-u/.

BY THE NUMBERS

Delta 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.

DELTA SCIENCE PROGRAM SCIENTIFIC PUBLICATIONS

The Science Program recently compiled a list of peer-reviewed publications that our staff has authored in 2020. This is quite an accomplishment and credit to our organization and the quality of staff that we have dedicated to Delta issues. The list includes 21 journal articles, with four additional articles in review, three published datasets, and two Shiny apps. Details will appear in the Council Annual Report.

LIST OF ATTACHMENTS

Attachment 1: By the Numbers Summary

CONTACT

Dr. Laurel Larsen
Delta Lead Scientist
Laurel.larsen@deltacouncil.ca.gov