



## INFORMATION ITEM

### Lead Scientist Report

## Summary

The month's highlighted article examines the use of a structured decision-making (SDM) process to address complex water resource issues in the Bay-Delta. This article creates a pilot SDM project on water management for the Delta to test the suitability of a full SDM process for this region. They find that the SDM process can save time and money while facilitating collaboration and identifying knowledge gaps. The broad and expert working group chose to assess 4 key management objectives simultaneously - Chinook salmon, delta smelt, water availability and reliability, and agricultural use - and 14 actions, which included the then-proposed Yolo Bypass Fremont Weir notch (enlarged opening). The study concluded that a full SDM process was warranted and could enhance natural resource management in the Bay Delta by linking research, monitoring, and decision-making, thereby reducing conflicts and improving transparency.

### Recent Delta Science: Prototyping structured decision-making for water resource management in the San Francisco Bay-Delta

*James T. Peterson, Erin McCreless, Adam Duarte, Patti Wohner, Scott Hamilton, Josue Medellín-Azuara, Alvar Escriva-Bou. Prototyping structured decision making for water resource management in the San Francisco Bay-Delta. 2024. Environmental Science & Policy. Volume 157. 103775. ISSN 1462-9011. <https://doi.org/10.1016/j.envsci.2024.103775>.*

The article "Prototyping Structured Decision Making for Water Resource Management in the San Francisco Bay-Delta" by Peterson et al. (2024) explores implementing a structured decision-making (SDM) process to address complex water resource issues in the Bay-Delta. This effort was coordinated by Ben Geske, a Senior Engineer with the Delta Stewardship Council, Delta Science Program.

SDM is a method that simplifies complex decisions in natural resource management by breaking them down into manageable components to evaluate their effectiveness and

potential trade-offs. This approach can provide continuity in decision-making, ensuring that the process remains consistent despite changes in personnel. Maintaining a stable framework for evaluating decisions helps prevent negative management outcomes that could affect both ecological and human elements. Although a decision-making process can be improved by employing an SDM, it is not always appropriate. Here, the authors aimed to determine the suitability of completing a full SDM process for the San Francisco Bay-Delta region. They did this by creating a pilot SDM model and by sharing the lessons learned from this preliminary effort.

Creating a full SDM is a comprehensive, detailed process that includes six key steps (see Attachment 1), as well as extensive data collection, deep engagement from a broad group of collaborators, and significant financial and personnel investment. To save money and time while still conducting a thorough assessment, the group created a “prototype” SDM, which allowed for quicker evaluations and adjustments. Prototyping an SDM, is a condensed version of the full SDM process, which can complete the six steps in 30-40 hours versus 120-150 hours. Not only does a prototype SDM save time and money, but it also allows participants to become familiar with the steps of SDM, learn to collaborate with other groups effectively, and identify barriers and possibilities for progress. Lastly, it uses existing models and data sets to reveal gaps in knowledge and data. The prototype SDM approach allowed the authors to assess the appropriateness of a full SDM for the Bay-Delta's complexities.

The prototype SDM team included experts in hydrologic modeling, biology, and agriculture, as well as representatives from local, state, and federal agencies, non-profits, and recreational fishers. The working group identified four fundamental objectives: maximizing Delta Smelt persistence and abundance, maximizing juvenile Chinook Salmon, minimizing losses to California's water availability and reliability, and minimizing losses to agricultural revenue. They proposed 14 candidate management actions to achieve these objectives and used existing models to evaluate trade-offs and benefits. The process highlighted the importance of having a diverse group of participating interests and the need for active engagement from all relevant disciplines to avoid misunderstandings and ensure comprehensive evaluations. In this study, the top candidate action was ultimately deemed to be the then-proposed Yolo Bypass Fremont Weir notch (enlarged opening), which had numerous positive effects on salmon and Delta Smelt as well as no negative effects on other water management efforts, including North of the Delta and South of the Delta water deliveries, and crop revenue. This action also resulted in slight positive effects on water available for irrigating crops and average agriculture water use.

The authors concluded that a full SDM process would benefit natural resource management in the Bay-Delta by linking research, monitoring, and decision-making more effectively. They emphasized that ongoing efforts should integrate new information into quantitative models to continually refine management strategies. This approach can help improve decision-making in the Delta by reducing conflicts, improving transparency, and ensuring that decisions are rooted in best available science.

Structured Decision Making has become a well-reviewed approach to optimizing resources by integrating research into the weak points in decision-making protocols. For example, the Department of Water Resources (DWR) uses SDMs for evaluating tradeoffs and benefits of habitat actions and water management, such as Delta Smelt habitat in Suisun Marsh. DSP completed the independent peer review for DWR's Summer-Fall Habitat Action and Structured Decision Making Approach in May 2024, and the charge and independent review letters can be found at <https://www.deltacouncil.ca.gov/delta-science-program/summer-fall-habitat-action-monitoring-and-science-plans-and-structured-decision-making-approach-peer-review>.

## Delta Science Program Activities

### Suisun Adaptive Management Advisory Team (AMAT)

The Suisun Adaptive Management Advisory Team (AMAT), which is convened by the Delta Science Program's Adaptive Management Unit to support implementation of adaptive management requirements under the Suisun Marsh Plan and Delta Plan, gathered in person on May 14<sup>th</sup> for their quarterly meeting, bringing together practitioners of adaptive management to learn about and discuss projects in the Suisun Marsh. This meeting was centered on site visits to three projects at various stages of the adaptive management process and provided for networking and exchange between participants due to the field-visit format. This meeting was well attended by representatives from state, federal, and local agencies.

The meeting began at the Rush Ranch Nature Center with an introductory presentation by Stuart Siegel of the SF Bay National Estuarine Research Reserve on the adaptive management of a planned tidal wetland restoration project on Goat Island and a completed tidal wetland restoration project on Lower Spring Branch Creek. This presentation included discussions of pre- and post-project data collection to inform management, the integration of public access features, and design features to promote ecological processes. After the presentation, participants visited both sites and heard from Delta Lead Scientist Lisamarie Windham-Myers on the neighboring marsh site where greenhouse gases and carbon and water fluxes have been monitored by the US Geological

Survey since 2014. The second portion of the meeting consisted of a field visit to Montezuma Wetlands, a private restoration project that works to reverse subsidence in the Suisun Marsh through beneficial reuse of dredged sediment from San Francisco Bay. This project has been ongoing for over 20 years and is self-funded by fees associated with sediment disposal. It has successfully reversed the effects of subsidence caused by peat decomposition in phase I of the project and created 600 acres of vegetated intertidal wetland habitat that is actively used by native fish and migratory birds. Project managers from Vollmar Natural Lands Consulting shared plans for future project phases and lessons learned from implementation to date. This type of social learning across partner agencies is a critical component of the adaptive management process.

### Modeling updates

On June 10-12, 2024, Delta Science Program staff participated in the Chesapeake Community Research Symposium in Annapolis, Maryland. The theme of the symposium was *Managing Water Quality for Living Resources in a Changing Climate*. Ben Geske, a Senior Engineer in the Delta Science Program, was invited to be a guest panel speaker for a session focused on Coupled Human and Natural Systems (CHANS). CHANS refers to the dynamic two-way interactions between human systems (e.g., economic, social) and natural (e.g., hydrologic, atmospheric, biological, geological) systems. This coupling expresses the idea that the evolution of humans and environmental systems may no longer be treated as individual isolated systems.

Symposium presentations included many topics relevant to the Bay-Delta, including modern research innovations, harmful algal bloom (HAB) monitoring, water quality modeling, fisheries, and many more. The three-day symposium provided significant opportunities for Delta Science Program staff to engage with other professionals in the field and to share information about current Delta Science Program initiatives and priorities, including the development of a Modeling Collaboratory that supports group analysis, shared data management, and provides publicly accessible modeling tools and results in support of Bay-Delta decision-making.

### Early Career Leadership Workshop

On May 7-9, 2024, the Delta Science Program and California Sea Grant co-hosted the Early Career Leadership Workshop for the 2022 Class of Delta Science Fellows. The purpose of the Delta Science Fellows Program is to support early career scientists doing research in the Delta and train the next generation of science leaders in the Delta. A cornerstone of the program is to pair fellows with research mentors and community mentors in collaborative research, data analysis, and synthesis projects relevant to Delta policy and management. The Early Career Leadership Workshop helps to put this research in the context of

management challenges, provides training in communicating science, and provides advice on how to build a successful science career. Over three days, six Delta Science Fellows and several Delta Science Program staff participated in the workshop, which included a science communication training, presentations from a diverse range of Bay-Delta scientists and managers, and a field trip to the Yolo Bypass and Fremont Weir.

## On Your Radar

### Brown Nichols Award Nominations due July 1

Nominations are now open for the Brown-Nichols Science Award. This award recognizes the contributions of a scientist for significant research and active involvement in facilitating the use of science to manage the San Francisco Estuary and watershed. The deadline for nominations is July 1, 2024, and the winner will be announced at the 2024 Bay-Delta Science Conference, which will be held from September 30 to October 2, 2024, at the SAFE Credit Union Convention Center (1401 K Street, Sacramento, CA 95814). Nomination information can be found on the conference website: [baydeltascienceconference.com](http://baydeltascienceconference.com).

### Delta Research Award Seminar Series

This summer, the Delta Science Program is hosting a weekly, virtual seminar series to feature outcomes from the 2020-2021 Delta Research Awards, which totaled over \$10 million in combined funds from the Delta Science Program, U.S. Bureau of Reclamation, and State Water Contractors. To improve the connection between research findings and the managers and decision-makers working on environmental and water issues related to the Sacramento-San Joaquin Delta, scientists will present seminars about how their projects addressed critical biophysical and social science knowledge gaps identified in the 2017-2021 Science Action Agenda. All seminars will be recorded and posted on the Council's YouTube site: <https://www.youtube.com/@DeltaCouncil/>. Check our research funding and fellowships web page (<https://deltacouncil.ca.gov/delta-science-program/research-funding-and-fellowships>) for the latest information.

Upcoming seminars include:

*Wednesday, July 10, 2024*

#### **Migratory Fishes: Science Tools to Inform Management and Recovery**

- Comparing the Impact of Predation on the Outmigration Mortality of all Central Valley Salmon Ecotypes Relative to Other Habitat Related Covariates
  - *Mark Henderson, University of Vermont*
  - *Additional presenter: Jordan Massie*

*Wednesday, July 17, 2024*

### **Multi-Benefit Wetland Habitat and Delta Food Webs**

- From Microbes to Zooplankton, What Defines a Beneficial Wetland?
  - *Michelle Jungbluth, San Francisco State University*
- Non-Invasive Environmental DNA Monitoring to Support Tidal Wetland Restoration
  - *Raman Nagarajan, UC Davis*
  - *Additional presenters: Leigh Sanders and Andrea Schreier*

### **By the Numbers**

Science Program staff will summarize current numbers related to Delta water and environmental management. The summary (Attachment 2) will inform the Council of recent counts, measurements, and monitoring figures driving water and environmental management issues.

### **List of Attachments**

*Attachment 1: Visual Summary of Article*

*Attachment 2: By the Numbers*

### **Contact**

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