



## INFORMATION ITEM

### Delta Independent Science Board (ISB) Update

#### Summary

Delta ISB Chair Dr. Inge Werner and Delta ISB Member Dr. Bob Naiman, will provide an update on the Delta ISB's current activities, including a presentation on the recently completed food-webs review. To help inform Delta Stewardship Council (Council) efforts, the Delta ISB provides the Council with independent scientific advice on the Delta Plan and reports findings and recommendations from Delta ISB reviews on the scientific programs that support adaptive management in the Delta.

#### Background

As mandated by the Sacramento-San Joaquin Delta Reform Act of 2009, California Water Code sections 85000, et seq., (Delta Reform Act), the Delta Independent Science Board (Delta ISB) is responsible for providing oversight of the scientific research, monitoring, and assessment programs that support adaptive management in the Delta (Water Code Section 85280(a)(3)) and providing independent science advice on the Delta Plan (Water Code Section 85308(a)). The findings and recommendations of the Delta ISB inform updates to and the implementation of the Delta Plan, the Science Action Agenda, the Delta Science Plan, and other Council, including Delta Science Program, efforts.

The Delta ISB reviews programs that support adaptive management by "thematic" or topical areas to meet its legislative mandate. To date, the Delta ISB has completed and presented the following thematic reviews to the Council: restoration (2013), fish and flows (2015), adaptive management (2016), levee hazards (2016), Delta as an evolving place (2017), water quality (2018), the Interagency Ecological Program (2019), non-native species (2021), the monitoring enterprise (2022), and water supply reliability estimation (2022). The Delta ISB also reviews specific science documents related to adaptive management or the Delta Plan. These reviews can be either self-initiated or based on a specific request from an individual or entity. In

addition, the Delta ISB may develop “call-to-action” memos and letters to specific agencies, including the Council, which are meant to share the Delta ISB’s emerging insights, key findings, or recommendations that require action.

As described in the Delta ISB’s operating guidelines, the comments, findings, and recommendations of the Delta ISB are expected to increase scientific credibility, improve research clarity, advance the debate about Delta issues, and seek better connectivity between science, management, and policy. The communication and relationship between the Council and Delta ISB are critical for helping to inform the Council’s work.

## Recently Completed Products

Since the last update to the Council in November 2024, the Delta ISB completed the following reviews.

### [Review of “Tribal and Environmental Justice Issues in the Sacramento-San Joaquin Delta: History and Current Perspectives: Public Review Draft”](#)

In December 2024, the Delta ISB reviewed the Council’s Public Review Draft of its Tribal and Environmental Justice Issues report (or issue paper; see Attachment 1 for review). Overall, the Delta ISB found that the issue paper offers comprehensive coverage of a wide range of tribal and environmental justice issues currently affecting the Delta. Given the importance of this issue paper for the Council and other interested parties, the Delta ISB offered several comments and recommendations in the spirit of helping improve the quality and clarity of its evidence and findings. For example, one overarching concern noted by the Delta ISB is that in combining tribal justice and environmental justice issues into the same report, the reader could confound Tribes with environmental justice communities, or disadvantaged communities, rather than recognizing the diverse cultures and traditions present within the Delta.

Since submitting its review, Council staff worked to address the Delta ISB’s comments. Council staff presented the revised report to the Councilmembers on April 24, 2025. At this meeting, the Council unanimously adopted the tribal and environmental justice issue paper and its recommendations.

### Review of “Delta Adapts: Creating a Climate Resilient Future, Adaptation Plan, Public Review Draft”

In February 2025, the Delta ISB reviewed the Council’s Delta Adapts: Creating a Climate Resilient Future, draft Adaptation Plan (see Attachment 2 for review). The Delta ISB found that the draft Adaptation Plan provides a comprehensive framework for adapting the Sacramento–San Joaquin Delta to climate change while emphasizing outreach and engagement with vulnerable groups, Tribes, and a broad range of interested parties. However, the Delta ISB identified areas that need further clarification, expansion, and refinement to improve the usefulness of the planning document. For example, one criticism identified by the Delta ISB is the lack of clarity in the plan regarding the process of how the strategies and Implementing Actions were selected.

### Final Thematic Review: Advancing Scientific Understanding and Management of the Delta Through a Food Web Perspective

Food-web interactions may directly influence how environmental drivers and management actions affect the abundances of individual species, as changes in one species can affect the abundances of other species. In October 2024, the Delta ISB completed a review on food-webs (Attachment 3), which assessed the importance of upper trophic level food-web interactions in the Delta and identified where improved understanding and tools (e.g., food-web models) might substantially improve predictions of an individual species’ response to environmental drivers and management actions. This review was included in the Council’s November 2024 meeting package but was not discussed at the meeting. At this meeting, the Delta ISB will present its findings and recommendations to the Council for discussion.

The key finding from this review is that an improved mechanistic understanding of food webs, especially the inclusion of upper trophic levels, is essential for predicting the impacts of biophysical drivers (e.g., climate, flow, nutrients, contaminants, invasive species) and management actions (e.g., habitat restoration) on individual fish species as well as on ecosystem-level processes relevant to agencies, Indigenous Tribes, and the public. Given the potential for providing management relevant insights into aquatic ecosystem management, the Delta ISB recommends that a focused and adequately funded scientific collaboration among agencies, academia, Tribes, and the public be established to design and implement a food

web science strategy. Currently, the Interagency Ecological Program (IEP) Synthesis Team is proposing a food web modeling project to assess effectiveness of tidal wetland restoration and other resource management actions, which directly addresses the Delta ISB's recommendations.

## Current Reviews

For the rest of the year, the Delta ISB will be working on completing its thematic reviews on decision-making under deep uncertainty as well as subsidence, and will continue scoping out new reviews on contaminant monitoring, along with a climate symposium. Highlights of some of the current activities are below.

### Subsidence

Subsidence is particularly pronounced in the Central Delta where approximately 50,000 acres of agricultural land lie several meters below sea level, protected by over 1,000 miles of levees. A broad cross-section of stakeholders, including both public agencies and private sector parties, are developing approaches to mitigate subsidence. The purpose of this review is to support ongoing and future subsidence management efforts by summarizing, examining, and assessing the existing or planned programs, barriers and opportunities, state of scientific understanding, and the scientific gaps and deficiencies of interconnected areas of subsidence. This review will be primarily based on synthesizing information from panel presentations and public discussions with invited experts at a two-day public workshop, which occurred in October 2023. The Delta ISB is in the process of completing the review and will release a draft for public comment later this year. For more information, please refer to the final prospectus.

### Decision-making under Deep Uncertainty Review

To build an understanding of scientific tools and concepts that can increase the capacity to anticipate and adapt to the growing uncertainty of future conditions in California's Sacramento-San Joaquin Delta, the Delta ISB began a review of decision-making under deep uncertainty (DMDU) in the spring of 2023. The review explored the techniques that could be applied to the Delta to better characterize and prepare for uncertainty and improve decision-making processes. Deep uncertainty is defined here as unpredictable events or system variability that cannot be well characterized with existing data, models, and understanding. Often, there is little or

no agreement among interested parties on how systems are likely to behave or the probabilities of occurrence of such events, including the duration, sequence, and co-occurrence of events.

As part of this review effort, the Delta ISB hosted a five-part seminar series that introduced concepts from the decision sciences to the broader Delta community. The Board completed a synthesis of the seminar presentations on decision-making under deep uncertainty in October 2024, and is working on subsequent reports, including overall findings and recommendations for the full review which also includes an inventory and analysis of scenario planning in the Delta, and manuscripts for peer-reviewed publications.

#### Contaminant Monitoring Review

Thousands of contaminants, often in quantities meaningful to ecosystem processes and human health, enter Delta waterways primarily via urban and agricultural stormwater and irrigation runoff, industrial and municipal wastewater effluents, and atmospheric deposition. They include metals, pesticides, pharmaceuticals, industrial chemicals, tire-wear constituents, and microplastics. Many have been shown to pose ecological risks in aquatic and riparian environments. The sheer number of chemicals and the complexities of assessing and measuring their toxic effects in ecosystems present significant challenges for monitoring, ecological risk assessment, and management of chemicals.

The Delta ISB is proposing a review to assess current contaminant monitoring programs in the Sacramento-San Joaquin Delta and is currently seeking feedback on the draft prospectus. The review will focus on how monitoring programs can effectively inform management and decision-making regarding contaminant sources and ecological risks to aquatic ecosystems. It will further evaluate the potential of advanced toxicity testing methods (“effect-based methods”) to contribute to a better understanding of contaminants' impacts on the Delta ecosystem.

#### Emerging Climate Research Symposium

As global climate change intensifies, human-altered and engineered landscapes around the world are beginning to face increasing stressors and shocks that threaten their stability and functionality. California, a state that already experiences

significant hydrometeorological variability, could be faced with increasing risks of mega-floods due to atmospheric rivers, less snow, extreme droughts, and warmer ocean temperatures. The Delta ISB seeks to stay informed on pressing and important topics affecting the Delta system. To help achieve this, the Delta ISB is planning to host a symposium in the fall of 2025 that explores the: 1) current climate projections for California's Sacramento-San Joaquin Delta and related uncertainties; and 2) how organizations in the region are incorporating climate change into their decision making.

## Attachments

*Attachment 1: Review of "Tribal and Environmental Justice Issues in the Sacramento-San Joaquin Delta: History and Current Perspectives: Public Review Draft"* (available here: <https://deltacouncil.ca.gov/pdf/isb/products/2024-12-09-isb-comments-tribal-ej-issues-report.pdf>)

*Attachment 2: Review of "Delta Adapts: Creating a Climate Resilient Future, Adaptation Plan, Public Review Draft"* (available here: <https://deltacouncil.ca.gov/pdf/isb/products/2025-02-18-isb-final-memo-delta-adapts-adaptation-plan.pdf>)

*Attachment 3: Thematic Review: Advancing Scientific Understanding and Management of the Delta Through a Food Web Perspective* (available here: <https://deltacouncil.ca.gov/pdf/isb/products/2024-10-02-isb-food-webs-review.pdf>)

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