

## Potential Review Topics

Draft (11/25/2025)

Delta Independent Science Board

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### *Background*

By legislative mandate, the Delta Independent Science Board (Delta ISB) reviews the adequacy of the science in support of adaptive management of the Sacramento-San Joaquin Delta and Suisun Marsh (the Delta). The Delta ISB reviews programs that support adaptive management by “thematic” or topical areas to meet its legislative mandate. 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.

The Delta ISB review topics have been guided by both the Delta Plan and input from the Delta community through retreats, public comments, and surveys. Based on previous Delta ISB planning retreats, meetings, and [survey results from 2019](#), below are a few topics that the Delta ISB were considering in the past, but did not move forward with. The Delta ISB will be revisiting these topics and new topics at its planning retreat in December 2025 (see [meeting notice/agenda](#)). To help inform the discussion, [a summary of science gaps and uncertainties](#) from various documents was prepared.

As described in the Delta Stewardship Council’s charge to the Delta ISB ([Appendix A in the Operating Guidelines](#)), “The Delta ISB will review activities of science programs and projects for balance, rigor, and use of best available science.” Prior to pursuing a major review topic, the Delta ISB will prepare a prospectus on the scope of the review and expected outcomes.

### *Current Review Topics*

The Delta ISB are working on the following thematic reviews, where the first two already having preliminary products, and may wrap up in the next year or two.

- Subsidence (see [draft review](#))
- Decision-making under Deep Uncertainty (see [seminar synthesis](#))
- Emerging Climate Science (see [prospectus](#))
- Contaminants Monitoring (see [prospectus](#))

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## Completed Reviews

Below are a list of completed thematic reviews to date by the Delta ISB. Previously, the Delta ISB discussed revisiting past review topics after four years, and assessing how its prior recommendations are being addressed. The contaminants monitoring review is intended to build off the 2018 water quality review and the 2022 monitoring enterprise review. To help inform whether past topics should be revisited, various presentations are being organized at Delta ISB meetings, as described below.

Year	Thematic Area	Products
2013	<b>Habitat Restoration</b>	<ul style="list-style-type: none"> <li>• <a href="#">Report</a></li> <li>• <a href="#">Summary</a></li> </ul>
2015	<b>Fish and Flows</b>	<ul style="list-style-type: none"> <li>• <a href="#">Report</a></li> <li>• <a href="#">Summary</a></li> </ul>
2016	<p><b>Adaptive Management</b></p> <p>The Delta Science Program hosts biennial <a href="#">Adaptive Management Forums</a>, as recommended by the Delta ISB. The focus of the 2025 Forum was the idea of ‘progress’, and the results and lessons learned will be integrated into an Adaptive Management report expected to come out in 2026. This upcoming report highlights examples of successes, barriers, and opportunities to implementing adaptive management in the Delta and will serve as a follow-up to the Delta ISB’s 2016 review on adaptive management. More information will be provided at future Delta ISB meetings.</p>	<ul style="list-style-type: none"> <li>• <a href="#">Report</a></li> <li>• <a href="#">Summary</a></li> <li>• <a href="#">Journal Article</a></li> </ul>
2016	<p><b>Levees</b></p> <p>Delta ISB support staff are in the process of organizing a panel on progress made since the 2016 review. This will be held in 2026.</p>	<ul style="list-style-type: none"> <li>• <a href="#">Report</a></li> </ul>
2017	<p><b>Delta as an Evolving Place</b></p> <p>The Delta Stewardship Council will provide an update on integrating social sciences, as recommended in this review at the December 2025 Planning Retreat.</p>	<ul style="list-style-type: none"> <li>• <a href="#">Report</a></li> <li>• <a href="#">Summary</a></li> </ul>
2018	<b>Water Quality (Chemical Contaminants and Nutrients)</b>	<ul style="list-style-type: none"> <li>• <a href="#">Report</a></li> <li>• <a href="#">Summary</a></li> </ul>
2019	<b>Interagency Ecological Program</b>	<ul style="list-style-type: none"> <li>• <a href="#">Report</a></li> <li>• <a href="#">Summary</a></li> </ul>

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Year	Thematic Area	Products
2021	<b>Non-native Species</b> The Delta ISB had previously talked about doing a blog post or journal article as a follow-up to this review, but have yet to decide on the direction. The Delta ISB will attend the sixth biennial Delta Invasive Species Symposium on December 4, 2025 to help inform the discussion.	<ul style="list-style-type: none"><li>• <a href="#">Report</a></li><li>• <a href="#">Summary</a></li></ul>
2022	<b>Monitoring Enterprise Review</b>	<ul style="list-style-type: none"><li>• <a href="#">Report</a></li><li>• <a href="#">Summary</a></li></ul>
2022	<b>Water Supply Reliability</b>	<ul style="list-style-type: none"><li>• <a href="#">Report</a></li><li>• <a href="#">Summary</a></li></ul>
2024	<b>Food Webs</b>	<ul style="list-style-type: none"><li>• <a href="#">Report</a></li></ul>
2024	<b>Decision-making under Deep Uncertainty</b>	<ul style="list-style-type: none"><li>• <a href="#">Seminar</a></li><li>• <a href="#">Synthesis</a></li></ul>

## Topics that were almost selected

Below are the topics that were not selected in 2022, but were discussed by the Delta ISB with panels and presentations organized to inform the scope of the review.

### *Harmful Algal Blooms*

Previously, the Delta ISB discussed conducting a review on harmful algal blooms and organized a [panel discussion](#) back in 2020. The Delta ISB held off on a review at the time, as an article was about to be published on the status, trends, and drivers of harmful algal blooms, as part of the State of Bay-Delta Science ([Kudela et al. 2023](#)) and the [Cyanobacteria Harmful Algal Bloom Monitoring Strategy for the Sacramento San Joaquin Delta](#) was in development, which was finalized in 2024. Since these products are now complete, the Delta ISB will discuss whether to pursue a review on harmful algal blooms at the December 2025 planning retreat. To help inform this discussion, Dr. Ellen Preece of the California Department of Water Resources will provide an update on implementing the monitoring strategy, as well as providing an update on the recent cyanobacteria harmful algal bloom synthesis project that builds off of the monitoring strategy.

### *Environmental Flows*

Environmental flows describe quantity, timing, and quality of water flows required to sustain freshwater and estuarine ecosystems and the human livelihoods and well-being that depend on these ecosystems ([Brisbane Declaration 2007](#)). Environmental flows are vitally important for establishing a resilient Delta for the long term. If the idea of environmental flows is accepted as the core of an activity, there will be issues

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related to risk assessment, human-environmental interactions, scenario analyses and other basic issues and challenges that will need to be addressed – ones that Delta ISB could help with. In March 2022, Dr. Sarah Yarnell, professor of research at the Center for Watershed Sciences at UC Davis, and Dr. Julie Zimmerman, lead scientist for the Nature Conservancy's water program in California, gave a presentation on the state of the science of environmental flows, an overview of the California Environmental flows framework, and the opportunities and challenges for improving the science underpinning environmental flows (see [Maven's Notebook Summary](#)). Based off the work of the California Environmental Flows Framework and the State Water Resources Control Board's update to the [Bay-Delta Water Quality Control Plan](#), the Delta ISB decided not to pursue a review on this topic. Former Delta ISB Dr. Bob Naiman's perspective on holding off on this topic can be found [here](#).

## Other Topics

Below are other topics that have been discussed from 2020 to 2022.

### *Restoring Ecosystem Function*

Restoration was the very first thematic review completed by the Delta ISB, and remains a core strategy of the Delta Plan. There will be an opportunity to assess how the [Delta ISB recommendations from 2013](#) were addressed, whether they are still relevant, and explore new ways of thinking on restoration in the context of novel ecosystems, resilience, and field experimentation.

### *Environmental Forecasting*

Adaptive management requires identification of expected outcomes and threshold triggers for action. The Delta ISB can review how well the science enterprise can forecast environmental changes, and at what time and spatial scales. This review could identify gaps in research to improve environmental forecasting.

### *Socio-Economic Drivers*

In 2022, the Delta ISB finished reviewing the [monitoring enterprise](#) in the Delta and assessed whether information obtained from monitoring are meeting the needs of management. Given the potentially vast scope of socio-economic monitoring related to the Delta, the Delta ISB's 2022 review only focused on the direct socio-economic drivers of ecosystem change, such as hydrologic alterations (e.g., water exports), habitat alterations (e.g., levees), biological resource use (e.g., fishing), human intrusion and disturbance, and transportation and service corridors. It did not focus on indirect socio-economic drivers of ecosystem change, such as demographics, economics, politics or religion. The Delta ISB could conduct

a review on socio-economics drivers that were considered out of scope of the monitoring review.

### ***Water Quality and Hydrodynamic Modeling***

Hydrodynamic and water quality modeling is key to evaluating the short and long term future of the Sacramento–San Joaquin Delta in terms of the California co-equal goals of ecosystem health and reliable water supply. Water operations in the Delta depend on planning and operational understanding as well as analyses of the interaction of Delta hydrodynamics and water quality. Different types of hydrodynamic models are used to calculate spatial and time distribution of water velocities (speed and direction) and water levels with suitable space-time resolutions, and it is customary to couple hydrodynamics with salinity and temperature calculations.

Additional variables of water quality concerns include transport of sediments (turbidity), nutrients and species. Such variables are calculated by passing on information from hydrodynamic to water quality models, where transport and mixing as well as rates of chemical and biological processes are computed. Several computer models are commonly employed for Delta hydrodynamics and water quality calculations, including DSM2, SCHISM, RMA2, UNTRIM, and Deltares codes. These models have different complexity (1D, 2D and 3D), architecture, institutional origins and support, performance, applicability, and capabilities. The diversity of applications as well as differing performance of these models seem to indicate that a review of their efficacy for Delta applications, particularly based on the experiences of the user community, is timely.

### ***Professional Support for Science and Quality of Scientific Communications in the Delta***

Two common concerns for Delta science and its involvement in decision support are the professional support and development of scientists and science communications among agencies. These topics have been mentioned as important and perhaps less than optimally effective in the Delta. The first concern commonly involves access to professional journals, incentives for peer reviewed publication, management training, and travel to conferences. The communications concern can have many aspects including: effective professional communications, communications of science across agencies and programs involved in the Delta, and effective communications generally among scientists, managers, policy-makers, and the public.

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This is an important topic and it should be done as an external review if it is not undertaken as a review of the Delta ISB.

### ***Emerging Tools***

New technologies can enable scientists and managers to assess the status of critical resources and the condition of Delta ecosystems more rapidly, more precisely, and more efficiently, thereby enhancing monitoring and adaptive management. This review would focus on how technologies, such as environmental DNA (eDNA), remote sensing and tracking, uses of drones, artificial intelligence, risk assessment and decision-support, and other technologies can contribute to the effective management of the Delta and its resources. It might also explore the potential uses of genomic tools, such as CRISPR-Cas9 and gene drives to control or eradicate invasive species.

### ***Data Management***

This review could focus on how data are collected and managed in the Delta to inform adaptive management. An article by [Pendelton et al. \(2019\)](#) looked at the challenges of data management, sharing, and analysis to inform management of ocean ecosystems. The article provided solutions to overcome these challenges and how to make better use of all the collected data. A similar review could be pursued in the Delta. The Delta ISB could review the implementation of Assembly Bill 1755 (“The Open and Transparent Water Data Act”), and the efforts of the California Water Quality Monitoring Council and the Interagency Ecological Program’s Data Utilization Workgroup to improve data management and usability in the Delta. Aspects of data management have been covered in the Delta ISB’s [2016 adaptive management review](#), [2019 Interagency Ecological Program review](#), and [2022 monitoring enterprise review](#).

### ***Performance Measures***

Performance measures have become central to the Delta Plan and its implementation. This Delta ISB review would examine the process of developing, adopting, implementing, employing, and improving performance measures for various aspects of the Delta, and their potential for value and standardization across Delta management and regulatory agencies. The review would also include an assessment of the use of science and scientific programs to support, improve, and supplement performance measure assessments. Generic and specific weaknesses of performance measures would also be addressed.

*Delta Science Program*

The Delta ISB reviewed a specific science program, [the Interagency Ecological Program \(IEP\)](#), because of its importance to the overall Delta science enterprise. Another very broadly influential science program in the Delta is the Delta Science Program. Thus, it may be appropriate for the Delta ISB to review this critical science program and the Delta Science Strategy.