DRAFT (DO NOT CITE)

Emerging Climate Research Symposium: Considerations for the Delta Region

Delta Independent Science Board

Draft Prospectus

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Motivation:

As global climate change intensifies, heavily altered and engineered landscapes around the world are beginning to face increasing stressors and shocks that threaten their stability and functionality. Coastal areas are predicted to be particularly affected by climate change impacts of sea level rise and storm surges, intense rainfall, flooding, and severe storms (EPA, 2024). California, a state that already experiences significant hydrometeorological variability, could be faced with increasing risks of mega-floods due to atmospheric rivers, decreased snow fraction, extreme droughts, and warmer ocean temperatures (Huang & Swain, 2022, Shi et al., 2021).

As part of its legislative mandate to provide scientific oversight of adaptive management, the Delta Independent Science Board (Delta ISB) seeks to stay informed on pressing and important topics affecting the Delta system. There is a timely need for Delta ISB members, the scientific community, and public at large to better understand the rapidly evolving science of ongoing and anticipated climate change impacts to the Sacramento-San Joaquin Delta region in order to consider the range of possible climate futures in decision making. To help achieve this, the Delta ISB will host a symposium exploring recent climate science research as it relates to the Delta region and its relevance to planning for the near and distant future. This symposium builds on the Delta ISB's decision-making under deep uncertainty (DMDU) review, which explores the scientific tools and concepts that can increase the capacity to anticipate and adapt to growing uncertainty of future conditions in the Delta.

Goals:

The Delta ISB's goal is to organize and host a two-day symposium that explores 1) current climate projections for the region and related uncertainties; and 2) how organizations in the Delta are incorporating climate change into their decision making. This symposium will also explore the science to management connection that can help shed light on the process of incorporating emerging research into management decisions. The event will consist of presentations and panel discussions by experts relevant to the questions described below:

1. What are the important climate drivers for planning under future conditions (e.g., atmospheric rivers, warming, droughts, extreme precipitation)?
    a. What changes in these drivers are already being observed?
    b. What changes in the drivers of regional impacts are expected under future climate change?
2. What are state-of-the-science projections for the Delta region based on existing climate scenarios (e.g., sea level rise, precipitation and temperature changes, extreme events, eutrophication), and what are associated ranges of uncertainty?
3. How can understanding of evolving impacts and risk help to build resilience in the region?
4. What do we know about the potential for compounding impacts (e.g., extreme precipitation and warming)?
5. How reliable are current downscaled climate products for regional application in the Delta region?
6. How are organizations in the Delta region integrating climate projections into planning?
7. What types of uncertainties and projections are most useful and critical for decision-support?
8. What if anything is missing for this information to be incorporated into existing models used for decision-support (e.g., what are the gaps between quantities predicted by climate models and those needed to drive other models)?

Audience:

The symposium is intended to inform the Delta ISB on the latest climate science and climate projections as they relate to the Delta region. The symposium will be open to the public and any interested parties can attend.

Input:

The symposium will be organized by the Delta ISB with support from Delta ISB support staff. The Delta ISB will discuss symposium planning at its monthly public meetings and will take public comments on format and potential speakers into consideration. In addition, this draft prospectus will be circulated for public comment via the Delta Stewardship Council listserv and other mailing lists. The current plan is to have a two-day symposium, which may be spread out throughout the year. This may evolve as planning gets underway and based off public feedback.

Expected Products and Outcomes:

The goal of the symposium is to increase the understanding among Delta ISB members, researchers, practitioners, and affected parties about the latest climate science. The Delta ISB's current plan is to prepare a summary/memorandum of the event that highlights the key takeaways. The Delta ISB will check with Maven's Notebook to see if it can prepare a proceedings report. Based on the event, the Delta ISB may consider drafting a perspective piece for publication in a peer reviewed journal or other publication.

Timeframe:

The symposium is targeted to take place in early 2025, possibly in March, and will have a hybrid format.

Target Date	Benchmark
October 2024	Release draft prospectus for public comments, and request for ideas for speakers
November/December 2024	Finalize prospectus

Target Date	Benchmark
December 2024	Contact speakers for event
January 2025	Open registration for event and finalize agenda
March 2025	Host hybrid event
May 2025	If symposium in March is only one day, host day 2 of the event.
July 2025	Prepare and release summary/memorandum of event
Summer 2025 to Early 2026	Work on manuscript for peer review publication

Related Reviews and Events:

As previously mentioned, this symposium will build on the Delta ISB's DMDU review, which the Delta ISB will concurrently complete as it plans for this symposium. Extensive work has been conducted on the topic of climate change, such as reports produced by the International Panel on Climate Change (IPCC) and the California Climate Change Assessments (currently working to produce the fifth assessment). We will coordinate with the following activities occurring in the region:

- the latest edition of the State of Bay Delta Science, a science communication effort, facilitated by the Delta Science Program, that synthesizes relevant information for management in the region. The next edition of the State of Bay Delta Science will focus on extreme events.

- the Interagency Ecological Program Climate Change Project Work Team, which synthesizes relevant science and develops conceptual models for understanding the effects of climate change on the aquatic resources of the upper San Francisco Estuary.

- The Delta Stewardship Council's climate initiative known as Delta Adapts, which consists of two parts: (1) a Climate Change Vulnerability Assessment for the Delta and Suisun Marsh, and (2) an Adaptation Plan (formerly referred to as the Adaptation Strategy) detailing strategies and actions to adapt and respond to the identified vulnerabilities. The Delta ISB plans to review the draft Adaptation Plan when it is released.

- The State of California Sea Level Rise Guidance: 2024 Science and Policy Update, developed and adopted by the Ocean Protection Council (OPC). It provides updated scenarios and policy recommendations tailored to California's coastline.

In addition, this symposium will be informed by previous work that has occurred in the Delta region. This includes, but is not limited to the:

- 2023 Symposium: Implications of Rising Temperatures: Coastal, Marine and Estuarine Ecosystems: This symposium, organized by UC Davis Coastal and Marine Sciences Institute and the Delta Science Program, brought together researchers from the natural and social sciences to discuss the state of research on the influence of extreme heat on organisms, communities, and socio-ecological systems.

- 2022 Adapting Restoration for a Changing Climate Symposium: This symposium, organized by the Delta Science Program, explored how restoration projects are incorporating climate change considerations into their planning and implementation in the San Francisco Estuary.

- 2016 State of Bay Delta Science: Climate Change and the Delta. This synthesis summarizes the current state of climate-change science as it applies to the restoration and sustainability of the Delta environment, facilities, and ecosystems.

References:

EPA. Climate Change Impacts on Coasts. Environmental Protection Agency. Accessed on August 16, 2024 at https://www.epa.gov/climateimpacts/climate-change-impacts-coasts

Huang, X. & Swain, D. 2022. Climate change is increasing the risk of a California megaflood. Science Advances. Vol 8, 32. DOI: 10.1126/sciadv.abq0995

Shi, H., Garcia-Reyes, M., Jacox, M., Rykaczewski, R., Black, B., Bograd, S., Sydeman, W. (2021). Co-occurrence of California Drought and Northeast Pacific Marine Heatwaves Under Climate Change. Geophysical Research Letters. Vol 48-17. https://doi.org/10.1029/2021GL092765