Oct 2025

Delta ISB Update: Insights from the Emerging Climate Science Symposium

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DELTA STEWARDSHIP COUNCIL

Who are we?

Dr. Inge Werner
Ecotoxicology

Dr. Diane McKnight
Biogeochemistry

Dr. Lisa Wainger
Economics

Dr. Tanya Heikkila
Governance

Dr. Jayantha Obeysekera
Engineering

Dr. Anna Michalak
Engineering

Dr. Kenny Rose
Fisheries

Dr. Steve Lindley
Fish Ecology

Dr. Cathleen Jones
Geophysics

Dr. Peter Goodwin
Engineering

What we do?

The Delta ISB:

- ❑ Provides oversight of Delta scientific research, monitoring, and assessment that supports adaptive management
- ❑ Generates independent reviews and advice on plans and programs

Emerging Climate Symposium Highlights

- Occurred from September 16-17 at UC Davis
- Over 250 attendees across two days (virtually & in-person)
- **Purpose:**

Understand the current climate projections for the region and related uncertainties

Review how the current state of climate science is being integrated into decision-making in the Delta

State of Science: Key Takeaways

➢ Warming Trends

- Globally 1.3-1.5°C. Possibly 3°C by 2100. California has warmed rapidly since 1980s
- Accelerating (nonlinear) atmospheric and hydrologic response to warming
- Expanding moisture storage in the atmosphere (~7% per °C)

➢ Snowpack and Runoff Regime Shift

- Changes in runoff timing and magnitude due to less snow and more rain
- Rain on snow. Increased flood risk due to flashier runoff (‘snow-eater’ heatwaves)
- Growing loss of snowpack, our ‘natural water storage,’ especially after 2050
- More intense wildfires leading to increased runoff, and sediment delivery

➢ Intensifying Hydro-Climate Variability

- Storms may be fewer but more intense and clustered, especially atmospheric rivers
- More severe droughts due to higher evaporative demand
- Rapid succession of a flood followed by a drought (“Hydro-Climate whiplash”)

➢ Accelerating Sea Level Rise

- Local rise in the Bay–Delta is influenced by ice sheet melt potentially exceeding current high-end estimates
- Higher seas will increase levee stress, salinity intrusion, and flood exposure

Scientific Advances (Last 5-10 Years)

- Improved sub-seasonal forecasting (near-term, 2-3 weeks) for extreme events
- Better understanding of rare events (e.g. atmospheric rivers) driving system-wide changes
- Recognition of flash droughts, hydroclimate “whiplash” and wildfire connections
- Enhanced climate model reliability and assessment. Potential benefits of using AI
- Understanding of timing of transition to low-to-no-snow conditions

Additional Concerns

- Pacific Decadal Oscillation and ENSO changes under warming
- Dynamic vs. thermodynamic precipitation changes
- Medieval drought recurrence potential
- Infrastructure vulnerability assessment
- Ecosystem tipping points and forest transitions

Adaptation Strategies

Nature-based solutions: Headwater restoration, floodplain restoration, forest management

Technology integration: Forecast-informed reservoir operations (FIRO), advanced early warning systems

Multi-benefit approaches: Flood-MAR combining flood control with groundwater recharge

Adaptive management: Flexible planning with regular updates and trigger points

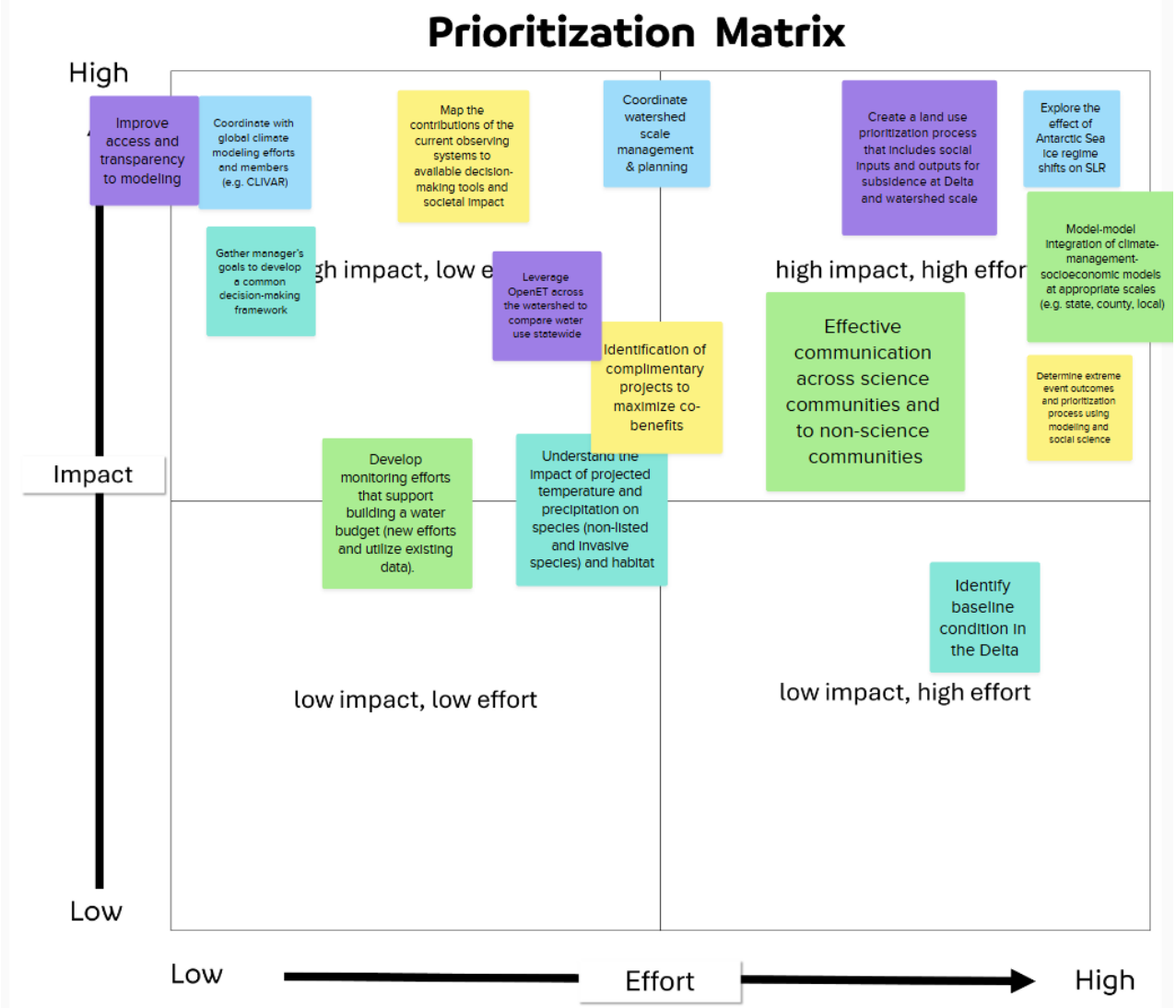
Current Needs & Considerations Identified

a) Expand monitoring networks, especially for vertical land motion

b) Develop more scenario-based planning exercises

c) Focus on win-win interventions beneficial even without climate change

d) Consider upstream watershed management as part of Delta solutions



What more should be done?

- Considering the extremes and not rely on averages (“Manage Floods to get through Droughts”, and vice versa)
- Greater community engagement and co-production of knowledge
- Improved cross-agency coordination
- More integration of compound risks (climate + seismic + subsidence, hydroclimate whiplash)
- Create tools with end-user focus

Next Steps

Share & Present Highlights

- Delta Stewardship Council Meeting – **October 23**
- California Natural Resources Agency Secretary Speaker Series – **October 27**
- State of Estuary Conference – **October 28**

Additional Follow Up

- What more can be done with the science
- How to facilitate thinking more at a system level
- How science is absorbed and integrated into practice

Develop Products

- Short memo with key highlights of what was learned
- Proceedings
- Perspective piece for peer review publication (**potentially**)

Thank you!

If you want to learn more...

Watch recordings from the symposium

Email **disb@deltacouncil.ca.gov** with comments and questions