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Discussion Topic: Environmental Flows and a Resilient Delta

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Environmental flows as a Delta Independent Science Board (Delta ISB) topic has evolved. Overall, the thinking has been influenced by some practical considerations, several previous discussions within Delta ISB, and a number of important documents.

Practical Considerations:

- A. There is already a highly respected environmental flows research group in California.
- B. The Delta ISB, as structured, does not appear to have the critical mass to carry out an environmental flows investigation on its own; any effort would require more than 2-3 people.
- C. Initially, it was not clear what the outcomes or products of a Delta ISB environmental flows activity might be.

Nevertheless, even with those practical considerations, there are also compelling reasons for examining *the role of environmental flows in helping establish long-term resiliency for the Delta*:

1. Foremost are the [amendments to the ecosystem chapter of the Delta Plan](#) . The amendments propose ecosystem performance measures for increasing fish populations as well as aquatic and riparian habitats. The increases are largely based on implementing functional flows. If approved, the performance measures are expected to significantly increase habitat (by many 10s of thousands of acres) as well as native fish populations in the coming decades. Will the proposed functional flows be adequate to meet the performance measures?
2. The Norgaard et al. 2021 article (SF Estuary and Watershed Science) provides important insights for a rapidly changing Delta. They suggest that "... *those involved in science, policy, and management must adapt and change and anticipate what the ecosystems may be like in the future.*" They highlight several ways of looking ahead—scenario analyses, horizon scanning, expert elicitation, and dynamic planning— and make a suggestion that recent advances in resilience thinking (among other topics) may provide a new way

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of addressing how to resilience can be maintained despite the rapid changes. Establishing functional (environmental) flows may be an essential component for helping maintain a resilient Delta ecosystem.

3. The [Landscape Scenario Planning Tool \(Version 2.0\)](#), developed by the San Francisco Estuary Institute, is up and running. The Tool estimates how well a proposed project will achieve ecological goals tracked under the Delta Plan. At first glance, there appears to be a good synergy between the Tool and the implementation of functional (environmental) flows for estimating gains in habitat as well as fish populations.
4. Other considerations: Current actions for maintaining ecological flows in rivers do not appear to be meeting the intended goals. Therefore, establishing science-based functional (environmental) flows may soon be a necessity. As well, there is proposed CA legislation for broader activities on Delta water. Environmental flows are expected to be an essential component of any new legislation.

Recommendation

While the outcomes or products of a Delta ISB activity on environmental flows are not yet fully transparent, the topic is 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 related to risk assessment, human-environmental interactions, scenario analyses and other basic issues and challenges that will need to be addressed – ones that could involve additional Delta ISB members. Therefore, I suggest that the ISB continue to discuss environment flows – and the ancillary issues – with the objective of either establishing a set of agreed upon activities by October – December 2022 or, if agreement is not possible, then table the topic for the time being.

Other Possible Topics for Consideration

The proposed ecological amendments to the Delta Plan are substantial, with many 10s of thousands of acres of additional wetland and riparian habitat being envisioned. While the acreage is impressive, these ecological proposals provide two potentially important challenges that the Delta ISB could explore:

1. Despite the apparently massive amount of acreage being proposed, to what extent will these habitats increase ecosystem productivity (e.g., carbon sequestration, decomposition processes) in the Delta? Recent research has suggested that it will increase ecosystem productivity by relatively small

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amounts. Cloern et al (2021) have estimated that successfully meeting habitat restoration targets could recover only 12% of lost net primary production (NPP). Could the Delta ISB provide guidance on how estimated ecosystem functions from habitat additions could guide restoration plans by projecting functional outcomes of different restoration scenarios and establishing performance metrics to gauge success?

2. The use of riparian zones to improve landscape management is well established (Naiman et al. 2005). While the Delta's riparian zones are mapped, there is little quantitative information on their ecological characteristics (e.g., primary productivity, biophysical characteristics, life history strategies), information that is vital for successful restoration. The Delta Plan amendments propose that riparian areas be increased by nearly 20,000 acres. Could the Delta ISB provide guidance on the ecological details required to shape an enduring riparian plan that provides benefits for both agriculture and the environment?

References

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