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Ideas for Future Reviews

Delta Independent Science Board

September 9, 2017

1. Background

During its July 2017 planning retreat, the Delta Independent Science Board (Delta ISB) brainstormed ideas for future thematic reviews. Based on input from invited guests and the public, the Delta ISB identified the following major categories for future thematic reviews:

- a) Water Supply Reliability (Lund, Collier, Fernando)
- b) Ecosystems (Resh, Brandt, Wiens)
- c) Restoration (Zedler, Norgaard, Wiens)
- d) Water Quality II (Collier, Canuel, Atwater)

Individual Delta ISB members were assigned to small groups to draft short descriptions for each of the major categories. These descriptions are compiled in Section 2. The short description may eventually be turned into a prospectus if the Delta ISB decides to pursue the review.

Each of the future thematic reviews should consider including the following topics:

- Climate change impacts
- Connections upstream and to the Bay
- Modelling and forecasting capabilities
- State of science integration
- Broad science vision on the topic
- Uncertainty
- Science and social system linkages

Eventually, these topics can turn into its own review, so a matrix will need to be developed to track this information for completed, current, and existing reviews.

After the planning retreat in July, the Delta ISB also received input from those who could not attend the retreat via a questionnaire. Based on this input, two members of the Delta ISB decided to draft a description for reviewing the Interagency Ecological Program (IEP) since it has been a long standing request.

Other topics to consider in the future include:

- Sediments
- Levees
- Seismic risk
- Risk assessment in general

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2. Draft Descriptions for Major Categories

- a) *Water Supply Reliability (Lund, Collier, Fernando)*
Review of the organization, development, and use of science for water supply reliability issues involving the Sacramento-San Joaquin Delta

The Sacramento-San Joaquin Delta is a central water supply for California's Central Valley, Bay Area, and southern California through upstream and in-Delta diversions. Water supply reliability is one of the State's co-equal goals for managing the Delta.

A wide range of local, state, federal, academic, consulting, and non-governmental organization efforts analyze water supply reliability. Perhaps the most public effort is DWR's biennial report that estimates the delivery reliability of the State Water Project. Other agencies routinely provide or fund long-term and seasonal operations planning estimates of water delivery reliability.

A broad range of policy discussions benefit from existing and past scientific and technical work on water supply reliability. Many of these discussions would benefit from additional or differently organized scientific and technical work. A broad review of all scientific work related to water supply would be overwhelming and ponderous, including the science of urban and agricultural water conservation, reservoir operations, groundwater supplies, evapotranspiration estimation and management, diversion fish screens, water supply effects of environmental flows, climate change, long term changes in water demands, water quality effects on water supply, integration of water supply portfolios, etc.

This initial review of science for water supply reliability might better focus on reviewing scientific efforts to estimate and evaluate water supply reliability might include:

- Inventory of long-term and seasonal estimation efforts by various federal, state, and local agencies.
- An evaluation of the methods, data, and uncertainty involved in making such estimations.
- Management responses available when reliability is imperfect, and their costs.
- Approaches being taken to estimate changes in reliability with changes in climate, endangered species conditions, and alternative water supply and conservation infrastructure and management.
- Opportunities to jointly manage water for both water supply and ecosystem purposes.
- Relative roles of surface water, groundwater, and water demand management
- Other items?

This probably can be a short initial review that might suggest some areas for further work, agency coordination, and perhaps reporting back.

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Review Process Ideas

- Panel presentations, interviews, surveys
- Informal discussion and presentation workshop – Like earlier levee workshop

Tentative outline

1. Delta water supply reliability estimation problem and relevance (long-term, seasonal estimates)
2. Inventory of estimations of water supply reliability
3. Approaches to estimating Delta water supply reliability
4. Discussion
5. Conclusions and Recommendations

b) Ecosystems (Resh, Brandt, Wiens)

The ecosystem review could focus on the following:

1. Fish and food webs – What are the top down and bottom up factors affecting fish abundances?
2. Invasive species – Impact of invasive species on native species (through food web interactions).
3. Spatial aspects of ecosystem connectivity including links of the Delta to upstream and downstream (Bay, Pacific Ocean) areas, and disruptions to these (dams, seasonal and annual differences in conditions and movements and population dynamics of species); and
4. Linkages and interactions between aquatic ecosystems and the adjacent wetland and terrestrial landscapes.

When planning a prospectus, the Delta ISB will meet with stakeholders to help ensure the review is useful to the Delta community and the Delta Plan Ecosystem Amendment.

c) Restoration (Zedler, Norgaard, Wiens)

Science for restoring the Delta in a landscape context for a century

We will expand the scale and the time horizon of the Delta ISB's 2013 review of science available to support habitat restoration projects in the Delta. Specifically: (1) We will investigate how science can better support achieving integrated, long-term targets in highly modified sites and landscapes in an uncertain climate. (2) Within the Delta, we will assess how science can help planners prioritize the restoration of multiple ecosystem services; e.g., by matching functions to suitable sites at the landscape/watershed scale. (3) We will ask how well science predicts and can be applied to predict restorability of biodiversity and ecosystem functions, emphasizing the role of adaptive restoration based on field experimentation. (4) We will assess how science can guide restoration efforts to serve human well-being within and beyond this "Evolving Place."

Our review will involve a literature review coupled with discussions with scientists,

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agency leaders, practitioners, and stakeholders. We will aim for completion by late 2019.

d) Water Quality II (Collier, Canuel, Atwater)

The Delta ISB will conduct the second phase of its review of the science supporting water quality policy, actions and adaptive management in the Delta. In the first phase, the Delta ISB focused on chemical contaminants, nutrients, drinking water constituents of concern, and harmful algal toxins. In this second phase, the Delta ISB will focus on salinity, dissolved oxygen, and temperature. There have been several recent reviews of salinity issues in the Delta, and the science basis for managing both dissolved oxygen and temperature is robust. Thus, the Delta ISB expects that this next phase will focus on a limited set of issues concerning these attributes of water quality in the Delta.

e) Review of IEP (Resh, Canuel)

A review of this program was one of the first topics that we brought up for a review before we switched to thematic reviews.

Concurrent with our Monitoring Enterprise Review (MER), it may be useful to do a review of the IEP. Because the IEP is a major coordinator of monitoring in the Delta, there are several points that we are considering for the MER that would be enhanced by doing an IEP review. The role of IEP in water quality and biological monitoring will clearly be covered in the former, but there are specific issues that could be examined in a specific review of this program.

For example:

- What is the coordination within IEP and between IEP and other agencies/programs?
- What is the extent of data quality, sharing and accessibility?
- What components of IEP are working optimally and are there others that may need improvement?
- Are there outside influences that could affect IEP's future effectiveness?
- How could the infrastructural and institutional arrangements that support the interagency investment in IEP be made more effective?
- What would be needed to have IEP play the role of synthesizer of information about the Delta and its environment? This is clearly something that is needed throughout the Delta and has been mentioned as a need in several of our past reports.
- There is a need for "science narratives" about the needs of the Delta that goes beyond what is in technical reports. Could the IEP, given that they are involved in collecting most of the data be a body to produce these narratives?

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- We need a mechanism to have regulations be flexible enough to anticipate environmental changes, or at least react to them before the environment changes too quickly. Given the breadth of IEP's involvement with diverse agencies, could they do this better than individual agencies operating alone?
- IEP has a 40 year history of collaboration but still faces logistical and coordination issues and difficulties, from a lack of coordination of fleet use to working with agencies and water contractors with different goals and agendas. As outsiders, can we propose ways to make this easier and more effective?
- Perhaps most importantly, how effective is IEP in the decision making process, which is the basic question we asked in the water quality review?
- Finally, the IEP has a Director that has been in place for only 8 months. A review by the Delta ISB could be very helpful to him at this point.