

# Review of the Monitoring Enterprise in the Sacramento-San Joaquin Delta



Delta Independent Science Board

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## Background

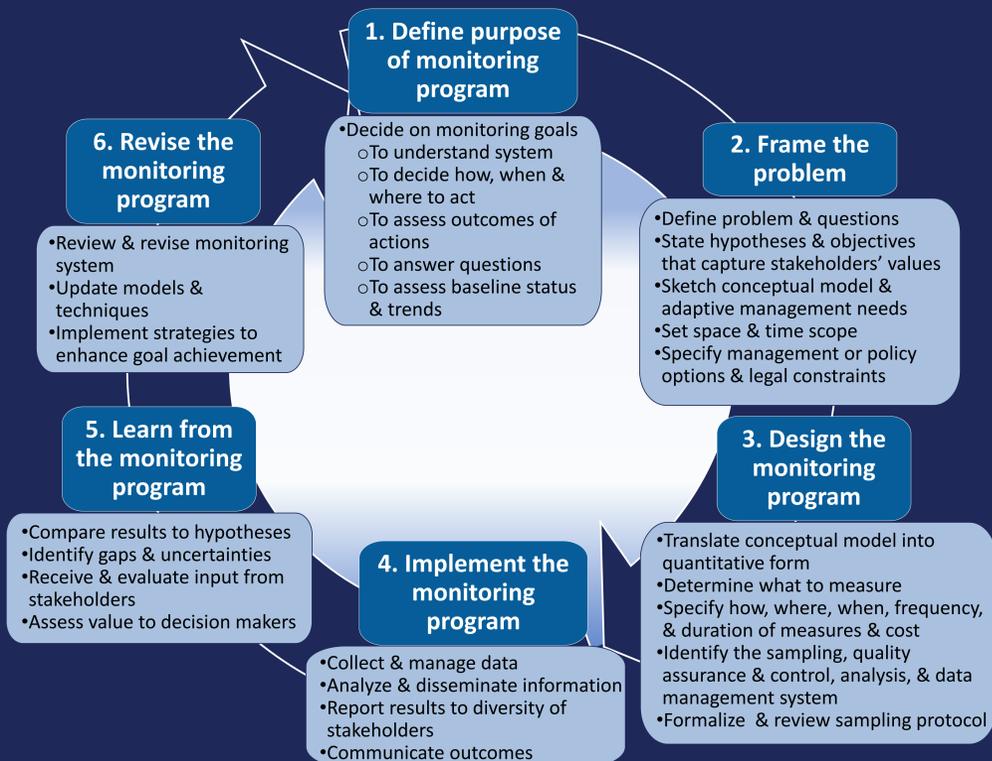
Monitoring is vital to understanding ecosystem status, functioning, and responses to management actions and changes in environmental drivers. As part of its legislative mandate, The Delta Independent Science Board (ISB) reviewed the suite of monitoring programs (i.e., the Monitoring Enterprise), which are often mandated by statute and regulation, in the Delta. The ISB assessed if information collected from monitoring meets the needs of management agencies and provides the information needed to respond to the Delta's many changing challenges and problems; if coordination, efficiencies, and data quality and accessibility can be improved; and how monitoring data can better support implementation of adaptive management.

## Methods

This is the largest review yet undertaken by the Delta ISB and employed a two prong approach: (i) a comprehensive inventory of the physical, chemical, biological, geological, and socio-economic drivers of monitoring activities (157 monitoring activities total) across the Delta and summarization of how these activities are addressing the needs of decision makers, and (ii) literature review, a monitoring workshop, a survey, scientific seminars and panels, interviews with experienced scientists and managers involved in Delta monitoring, and public comments.

## Adopt an Adaptive Management Framework for Monitoring

The Delta ISB advises that every monitoring program develop a monitoring plan or road map using an adaptive management framework to better define and address management needs and promote a rigorous setting of purpose, expectations, review, and communication.



## 5 Best Practices for Monitoring Programs

The Delta ISB identified five best practices that should be formally adopted into individual monitoring programs to help address challenges and issues with monitoring assessed in the review.



1. Be tied to the goals, objectives, and specific questions of interest to managers and decision makers, decision makers, scientists, and stakeholders.



2. Monitoring should be informed by stakeholder engagement and participation, when appropriate.



3. Have flexible plans that adapt by incorporating new information, techniques, and technologies become available.



4. Include adequate data management, quality control, analysis, and synthesis, and should strive to improve statistical validity.



5. Ensure data are accessible and shared with the public and other agencies.

## Three "Big Move" Recommendations

The Delta ISB recommends three "big moves" to better link monitoring to management and to begin to addressing gaps and opportunities to improve efficiencies identified in this report.

### Implementation Informed by the 6-step Monitoring Framework

**Recommendation A:** Develop management-informed priority science needs and questions

Brainstorm to identify stakeholders & organizations that need to be involved to develop needs and questions

Develop, synthesize, & standardize priority science & management needs & questions

Develop biennial reports, facilitated by monitoring summits, that synthesize & evaluate monitoring information & questions

**Recommendation B:** Reimagine monitoring designs to address priority needs and questions

Evaluate how much flexibility is available and needed to make programmatic changes to monitoring designs

Develop a conceptual model of the Delta informed by management questions & needs

Reimagine or redesign monitoring that is guided by the conceptual model.

**Recommendation C:** Strengthen organizational and funding structures

Adapt existing or create new entities to integrate & coordinate monitoring in the Delta and enhance communication

Expand venues for stakeholder involvement in decision making

With a strengthened organizational structure, conduct routine evaluation of monitoring, facilitated by independent peer reviews

### Implementation Informed by the 5 Best Practices

Link to report



The inventory for this review was developed by ESSA Technologies Ltd., cbec ECO engineering, and PAX Environmental Inc under the direction of the Delta ISB. The Delta Stewardship Council, Delta Science Program funded the work and provided staff assistance. Poster development was led by Jennica Moffat during her California Sea Grant State Fellowship under the direction of the Delta ISB.