



Linking Science to Decision-Making
Synthesis & Communication
in California's
Sacramento-San Joaquin Delta

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Delta Stewardship Council

Where is California's Delta?

Also known as:

The Delta

Upper San Francisco Estuary

Sacramento and San Joaquin (Rivers) Delta



What is California's Delta?

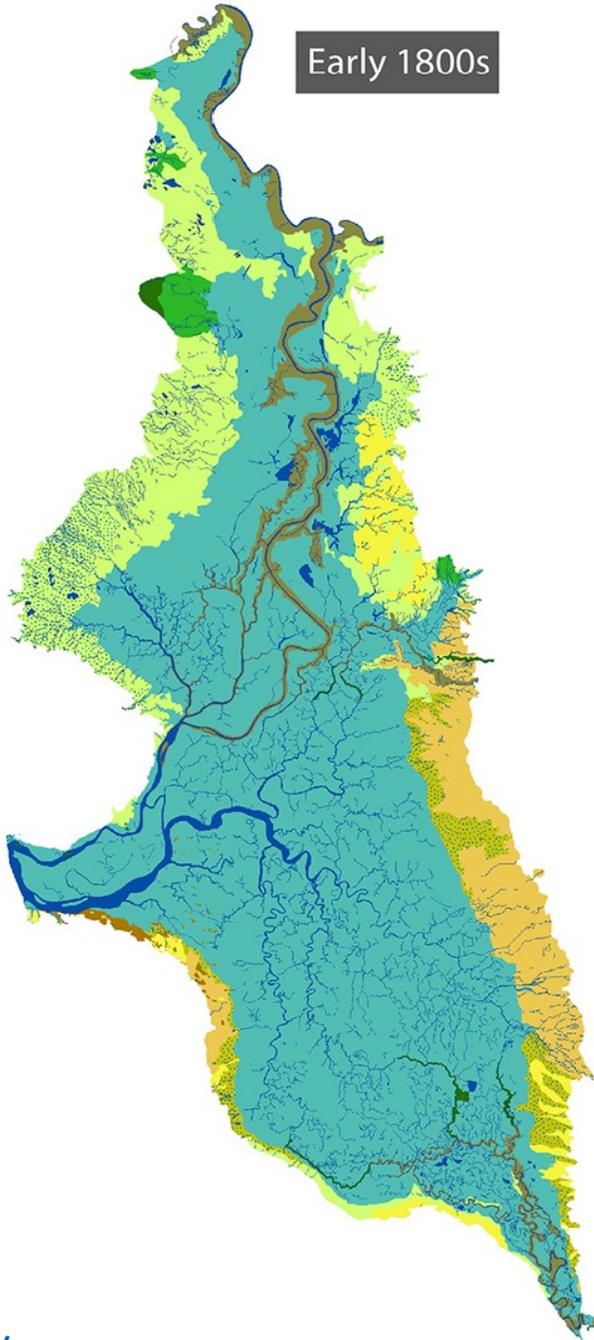
An aerial photograph of the California Delta, showing a complex network of waterways, levees, and agricultural fields. The water is a deep blue, and the surrounding land is a mix of yellow and green, indicating different types of crops and vegetation. The Delta is a central hub for water supply in California.

Hub of the state's water supply

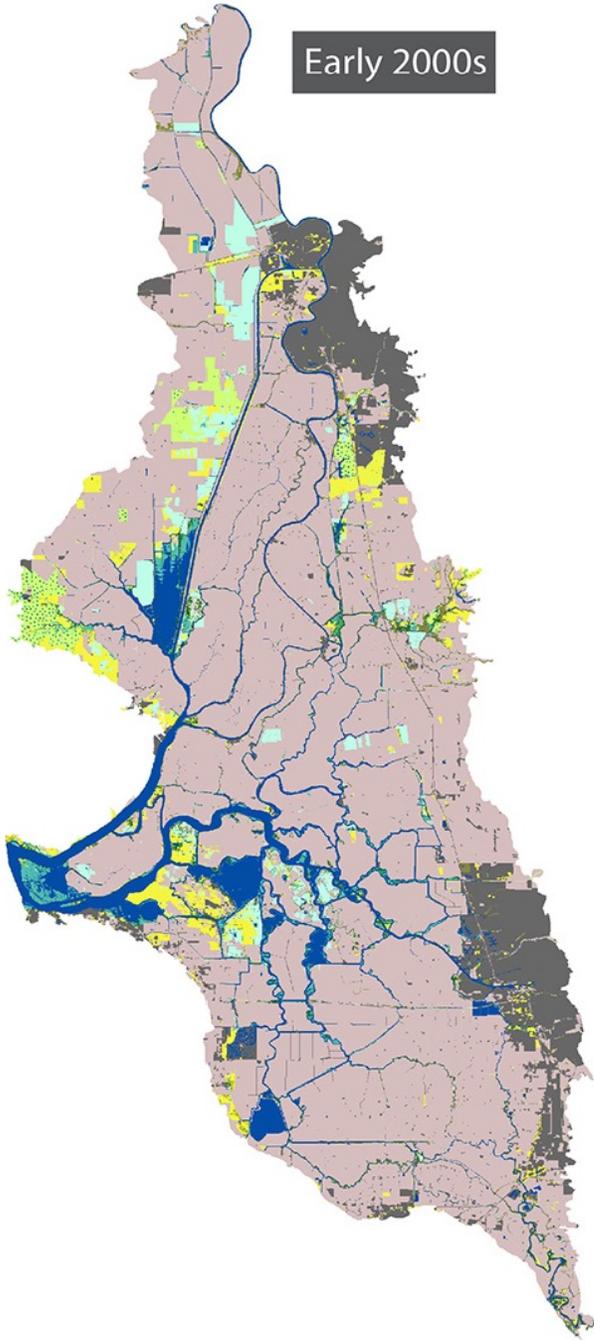
A unique place where people live, work, farm, and recreate

Important habitat for many species

California's Delta is also a transformed landscape



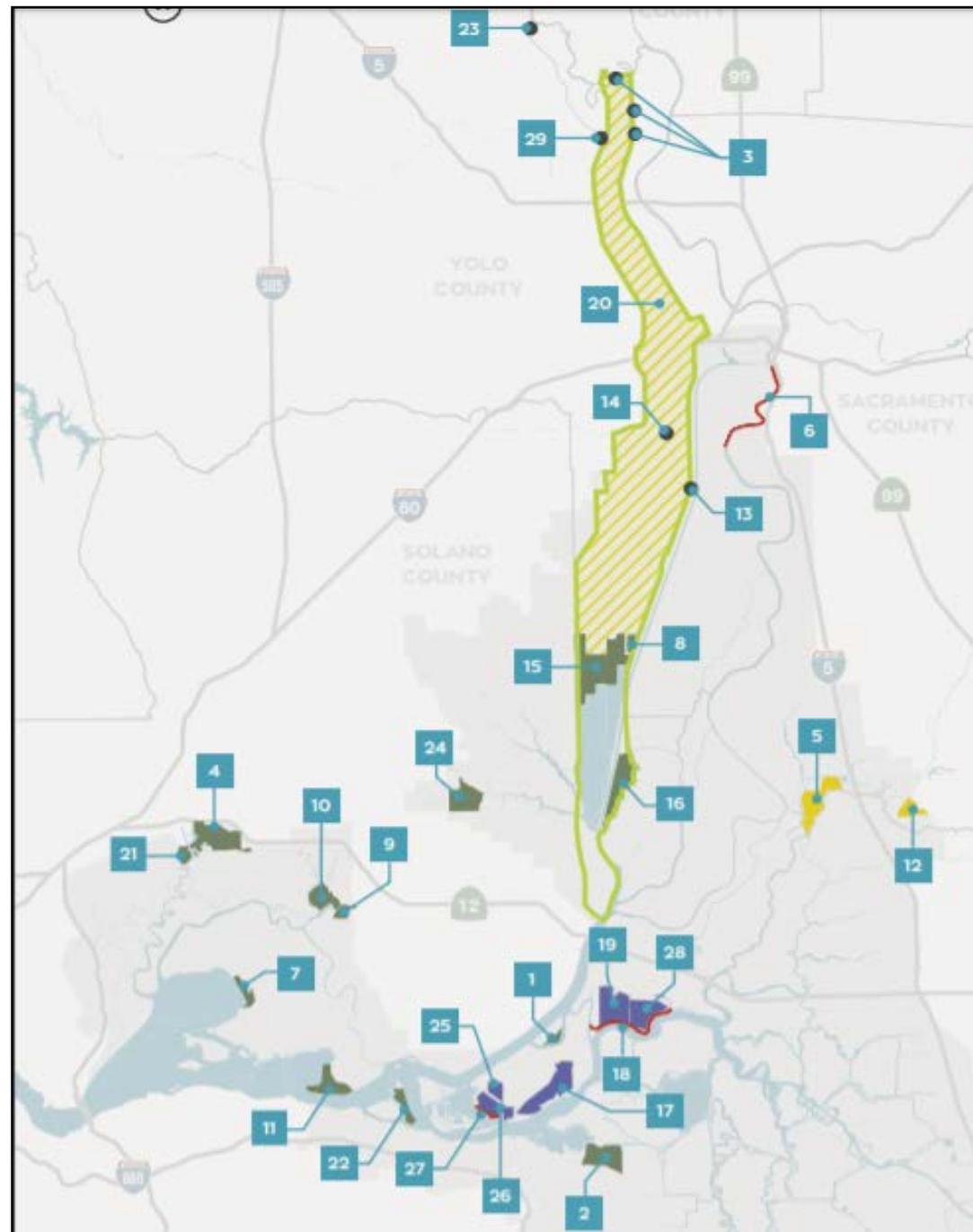
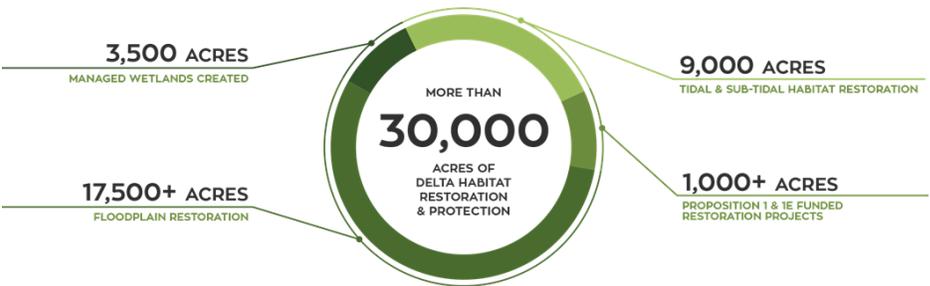
- Water
- Freshwater wetland
- Willow thicket
- Riparian scrub or shrub
- Riparian forest
- Seasonal wetland
- Vernal pool complex
- Alkali seasonal wetland complex
- Dune scrub
- Grassland
- Oak woodland
- Agriculture
- Managed wetland
- Urban



EcoRestore

A California Natural Resources Agency initiative

Implemented in coordination with state and federal agencies



- LEGEND**
- Fish Passage Improvements
 - Floodplain Restoration
 - Setback Levee
 - Subsidence Reversal and Carbon Storage
 - Tidal Restoration
 - Yolo Bypass Boundary
 - Legal Delta and Suisun Marsh Boundaries
 - ☪ Water Bodies

Delta Science Program



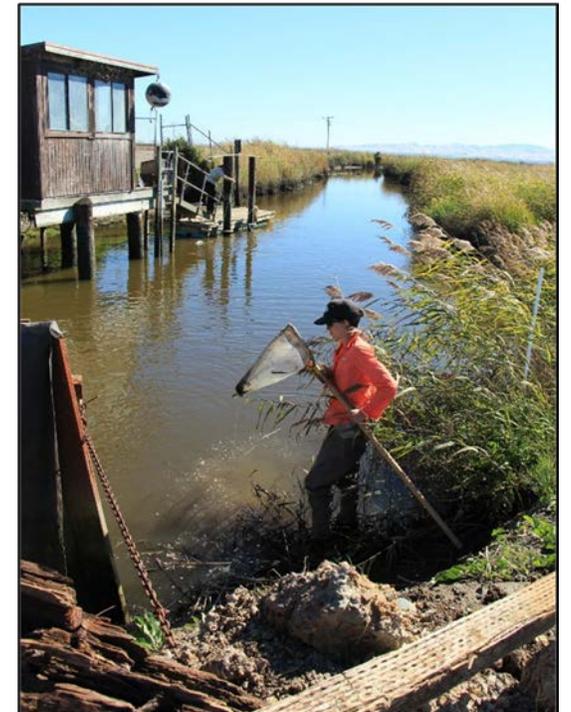
Mission Statement

The mission of the Delta Science Program shall be to provide the best possible unbiased scientific information to inform water and environmental decision-making in the Delta.

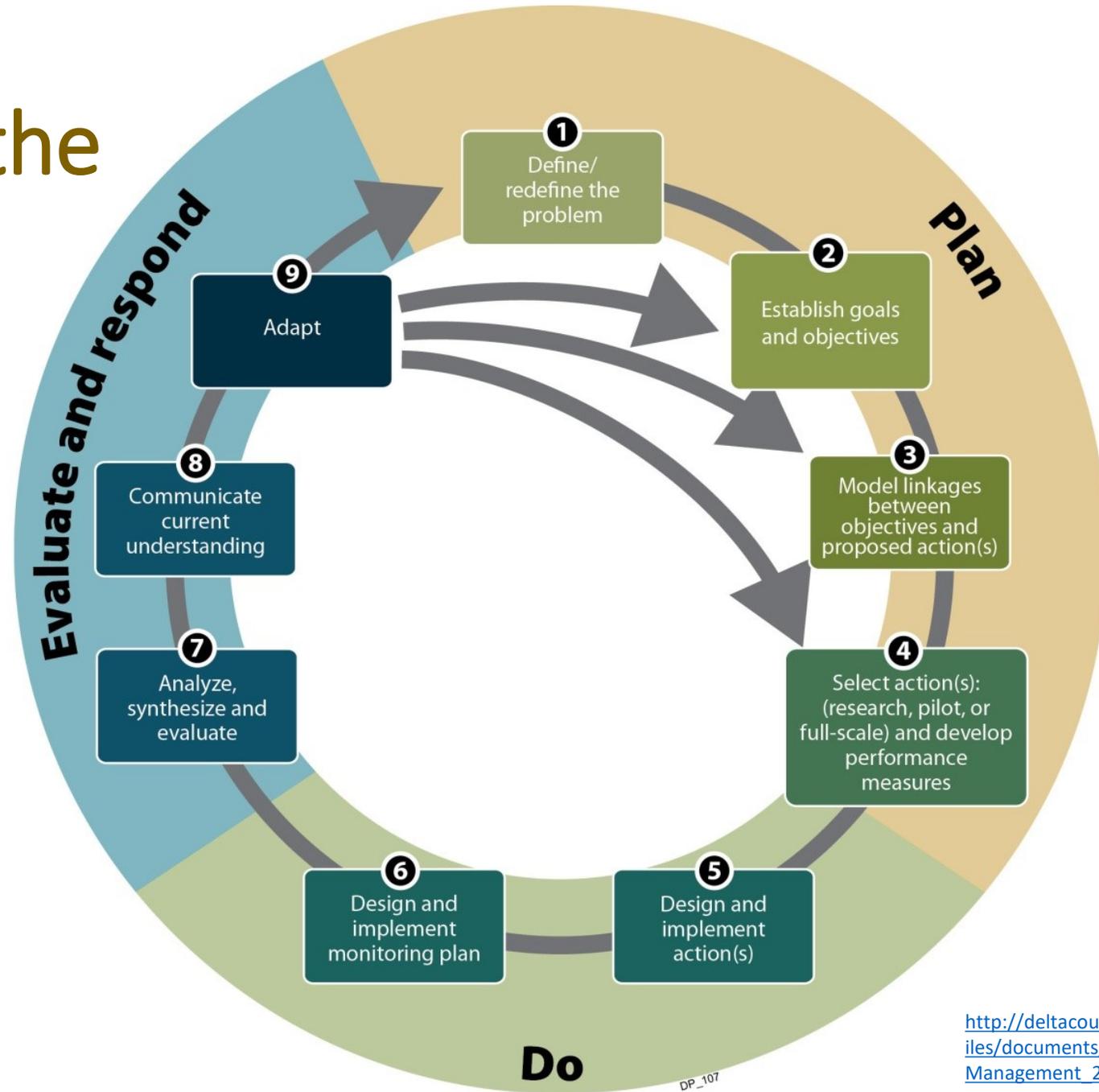
Delta Reform Act 2009, Water Code section 85280(b)(4)

Objectives

- 1: **Support Research** Aligned with the Science Action Agenda
- 2: Facilitate and Participate in **Analysis and Synthesis** of Scientific Information
- 3: Facilitate Independent Scientific **Peer Review**
- 4: Catalyze Activities that **Build the Community** of Delta Science
- 5: Lead **Science-Based Adaptive Management**
- 6: **Communicate** Science
- 7: Support the **Delta Independent Science Board**
- 8: Achieve **Program Sustainability**



Adaptive Management in the California Delta

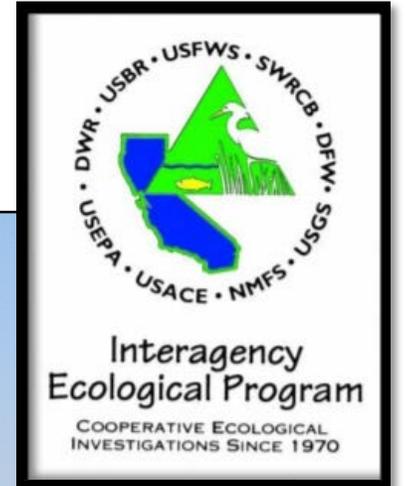


Goal: Promote understanding of estuary and water management issues

Develop and update conceptual models

Inform policy and management decisions

Share information with both technical and non-technical audiences



Synthesis

Credible, policy-neutral, and well-informed syntheses concerning key scientific issues benefit the Delta community and inform management decisions.



Primary functions:

1. Topical synthesis workshops – e.g., Mercury
2. *The State of Bay-Delta Science*
3. Coordination of scientific analysis and synthesis efforts in partnership with other entities
4. Creation of summaries for policy-maker and other non-technical audiences

Revisiting the 2003 Mercury Strategy for the Bay-Delta

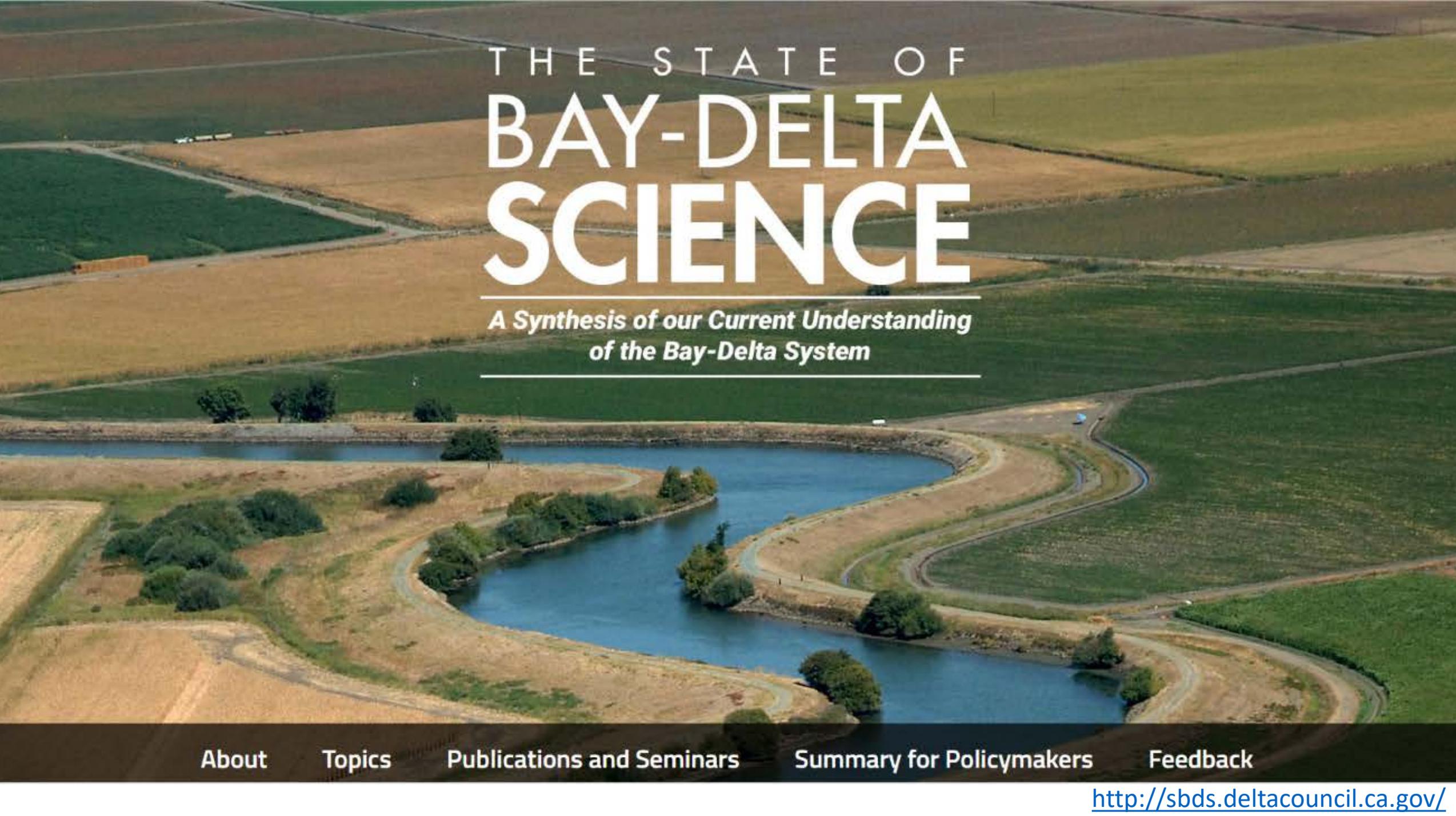


In 2016, workshops were convened to synthesize the current state of scientific knowledge with respect to mercury dynamics in the Bay-Delta (USGS, DSP, DC, CDFW)

This effort is the first in over a decade to present the most up to date scientific information regarding mercury while also identifying crucial gaps in knowledge.

Publication is in preparation for submittal to a scientific journal

For more information, contact Yumiko Henneberry (yumiko.henneberry@deltacouncil.ca.gov)

An aerial photograph of a winding canal or irrigation system cutting through a patchwork of agricultural fields. The fields are in various stages of growth, with some appearing golden-brown and others green. The canal is a prominent blue line that curves through the landscape. The text is overlaid on the upper portion of the image.

THE STATE OF BAY-DELTA SCIENCE

*A Synthesis of our Current Understanding
of the Bay-Delta System*

About

Topics

Publications and Seminars

Summary for Policymakers

Feedback

<http://sbds.deltacouncil.ca.gov/>

TOPICS

Introduction

Delta Challenges

Delta Smelt

Anadromous Salmonids

Predation

Landscapes

Food Webs

Climate Change

Water Supply Reliability

Sediments

Models

Levees

Nutrients

Contaminants

Synthesis

The State of Bay Delta Science 2016 - An Introduction

Michael Healey, Peter Goodwin, Michael Dettinger, Richard Norgaard

Full article



Key points:

- The State of Bay-Delta Science 2016 (SBDS) is a collection of papers that summarizes the scientific understanding of the Sacramento-San Joaquin Delta.
- Paper topics for this edition address the most relevant scientific issues in the Delta identified by senior scientists and managers, emphasizing progress made during the past decade and building on the first SBDS edition in 2008 ([Healey et al. 2008](#)).

2008 PERSPECTIVES State of Bay Delta Science 2008	
1	The Delta is a continually changing ecosystem . Uncontrolled drivers of change (e.g., population growth, changing climate, land subsidence, seismicity) mean that the Delta of the future will be very different from the Delta of today.
2	Because the Delta is continually changing, we cannot predict all the important consequences of management solutions. The best solutions will be robust but provisional, and will need to be responsive and adaptive to future changes.
3	It is neither possible nor desirable to freeze the structure of the Delta in its present or any other form. Strengthening levees is only one element of a sustainable solution and is not applicable everywhere.
4	The problems of water and environmental management are interlinked . Piecemeal solutions will not work. Science, knowledge, and management methods all need to be strongly integrated.
5	The capacity of the Sacramento-San Joaquin water system to deliver human, economic, and environmental services is likely at its limit . To fulfill more of one water-using service we must accept less of another.
6	Good science provides a reliable knowledge base for decision-making, but for complex environmental problems, even as we learn from science, new areas of uncertainty arise.
7	Accelerated climate change means that species conservation is becoming more than a local habitat problem. Conservation approaches need to include a broad range of choices other than habitat protection.

2016 PERSPECTIVES State of Bay Delta Science 2016	
1	Nutrients are important. Whereas in the past we considered nutrients to be relatively unimportant in Delta productivity, we now understand that the absolute and relative concentrations of different nutrients in the Delta can be drivers of Delta ecology, including inhibition of phytoplankton growth by ammonium and promotion of the expansion of invasive <i>Microcystis</i> and waterweeds.
2	Delta waters are contaminated. The complex cocktail of contaminants that enters the Delta from agriculture, urban, and industrial discharges has the potential to cause serious damage to the ecosystem and human health.
3	Aquatic food webs no longer sustain native species. Food webs in the Delta now bear little resemblance to those that supported communities of native organisms prior to European colonization. Driven by physical and chemical changes in the Delta and invasions by alien species, the aquatic ecosystem has gone through a regime shift that probably cannot be reversed. The present food web appears stable but is much less able to support native fishes than in the past.
4	Species declines are a result of multiple stressors acting together. There are few instances in which a single stressor can be identified as the primary cause of any species' decline. Effective conservation of aquatic species requires a holistic approach to improve habitat quantity and quality.
5	Future water management will be driven more by extreme events (of all types) than by long-term averages, even as those averages change. As California's climate changes due to global greenhouse gas emissions, more frequent and more extreme storms and droughts will occur. Management will have to restructure to respond to these changes.
6	Delta habitats work together as a landscape scale mosaic. The success of local restoration is dependent on what happens in adjacent habitats and vice versa. Any habitat restoration, therefore, has cascading effects that propagate far beyond the restored habitat. Landscape ecology provides a set of tools and concepts for identifying and taking account of these cascading effects.
7	The situation for native species is dire . The ecological regime shift coupled with the emerging effects of climate change in the Delta are creating conditions that will likely accelerate the current downward spiral of native species. This situation makes it urgent that the scientific foundations for new management responses be developed.

Communicate Science

Effective exchange of information provides a wide range of stakeholders access to useable scientific information.

Primary functions:

1. Organization of seminars, conferences, symposia, workshops, and interagency forums
2. Direct engagement with the public and science community
3. Support for science communication media:
 - *San Francisco Estuary and Watershed Science*
 - ESTUARY News
 - Maven's Notebook





Up next...

Bay-Delta Science Conference

September 10-12, 2018

Salinization Symposium

September 26, 2018

Adaptive Management Forum

February 5-6, 2019

Emerging Technologies Summit

May 21-22, 2019

Adaptive Management Forum

February 5-6, 2019



1. Provide training to build capacity for planning and implementing adaptive management
2. Share lessons learned from the Delta and elsewhere
3. Foster connections to build a network of scientists, project proponents, regulators, managers, and decision-makers working together to support adaptive management



DELTA STEWARDSHIP COUNCIL
DELTA SCIENCE PROGRAM

Thank
you!



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