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Recommendations for the Bay-Delta Water Quality Control Plan Update

A report by the 2022 Water Leaders

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2022 Water Leader Cohort on the Water Education Foundation's Bay-Delta Tour in May 2022.

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Acronyms and Abbreviations

Bay-Delta	San Francisco Bay/Sacramento-San Joaquin River Delta
Bay-Delta Plan	Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary
CVP	Central Valley Project
CWA	Clean Water Act
CWC	California Water Code
DWR	Department of Water Resources
EPA	U.S. Environmental Protection Agency
MOU	Memorandum of Understanding
Phase 1	Lower San Joaquin River Update to the Bay-Delta Plan
Phase 2	Sacramento/Delta Update to the Bay-Delta Plan
Plan	Water Quality Control Plan
SED	Substitute Environmental Document
State Water Board	State Water Resources Control Board (SWRCB)
SWP	State Water Project
USBR	Bureau of Reclamation
USGS	United States Geological Survey
VA	Voluntary Agreements

Introduction and Topic Background

The San Francisco Bay/Sacramento-San Joaquin River Delta (Bay-Delta) estuary is an inland river delta in Northern California where the Sacramento River and San Joaquin River converge and flow west through San Francisco Bay to the Pacific Ocean (Figure 1). The Bay-Delta estuary is the largest on the West Coast of North America, providing habitat to more than 750 animal and plant species, including more than forty (40) aquatic species. The Bay-Delta also contains more than 700 miles of sloughs, channels, and rivers that, coupled with a large statewide water infrastructure system, funnel water from Northern California to the San Joaquin Valley, the San Francisco Bay area, Southern California and parts of the Central Coast. That system provides drinking water to 27 million residents and irrigation water to 4 million acres of farmland. The Bay-Delta has exhibited degraded water quality over time due to diversions of water within and upstream of the Bay-Delta watershed (mainly by cities and irrigation districts), levee construction, development of land for human use, wastewater discharges and introduction of non-native species (SWRCB 2018c). In recent years, this degradation has led to significant declines in the population of many biological resources (SWRCB 2017), and renewed calls for greater regulation of water quality.

Definition of a Water Quality Control Plan

The State Water Resources Control Board (State Water Board) is responsible for regulating water quality in the Bay-Delta through the Bay-Delta Water Quality Control Plan (Bay-Delta Plan). A water quality control plan (Plan) is a management document that contains three main sections:

- **Beneficial Uses:** Defines and establishes the beneficial uses – or the resources, services and qualities – of the aquatic system that are to be protected by the Plan. Typical beneficial uses are municipal and domestic supply, agricultural supply, and fish and wildlife habitat.
- **Water Quality Objectives:** Lists numeric or narrative water quality standards that, when met, will ensure reasonable protection of defined beneficial uses and prevent nuisance. Numeric objectives state the precise, measurable value of a particular chemical or condition that must be met at a specific time and location. Narrative objectives are used to express a condition in a qualitative form when it cannot be precisely measured.
- **Program of Implementation:** Describes the nature of actions that are necessary to achieve the objectives, including recommendations for action by the State Water Board and any other relevant entities, a time schedule for the actions and a description of the monitoring needed to determine compliance with objectives. Three implementation pathways are typically used by the State Water Board: hold adjudicative water rights hearings and adopt a water rights decision; conduct rulemaking proceedings to adopt a new regulation; or regulate discharge through water quality certifications. A combination of all three pathways may also be used.

The California Water Code (CWC) requires such plans to be reviewed at least every three (3) years and updated as appropriate. Amendments containing new or revised water quality objectives also require the approval of the U.S. Environmental Protection Agency (EPA).

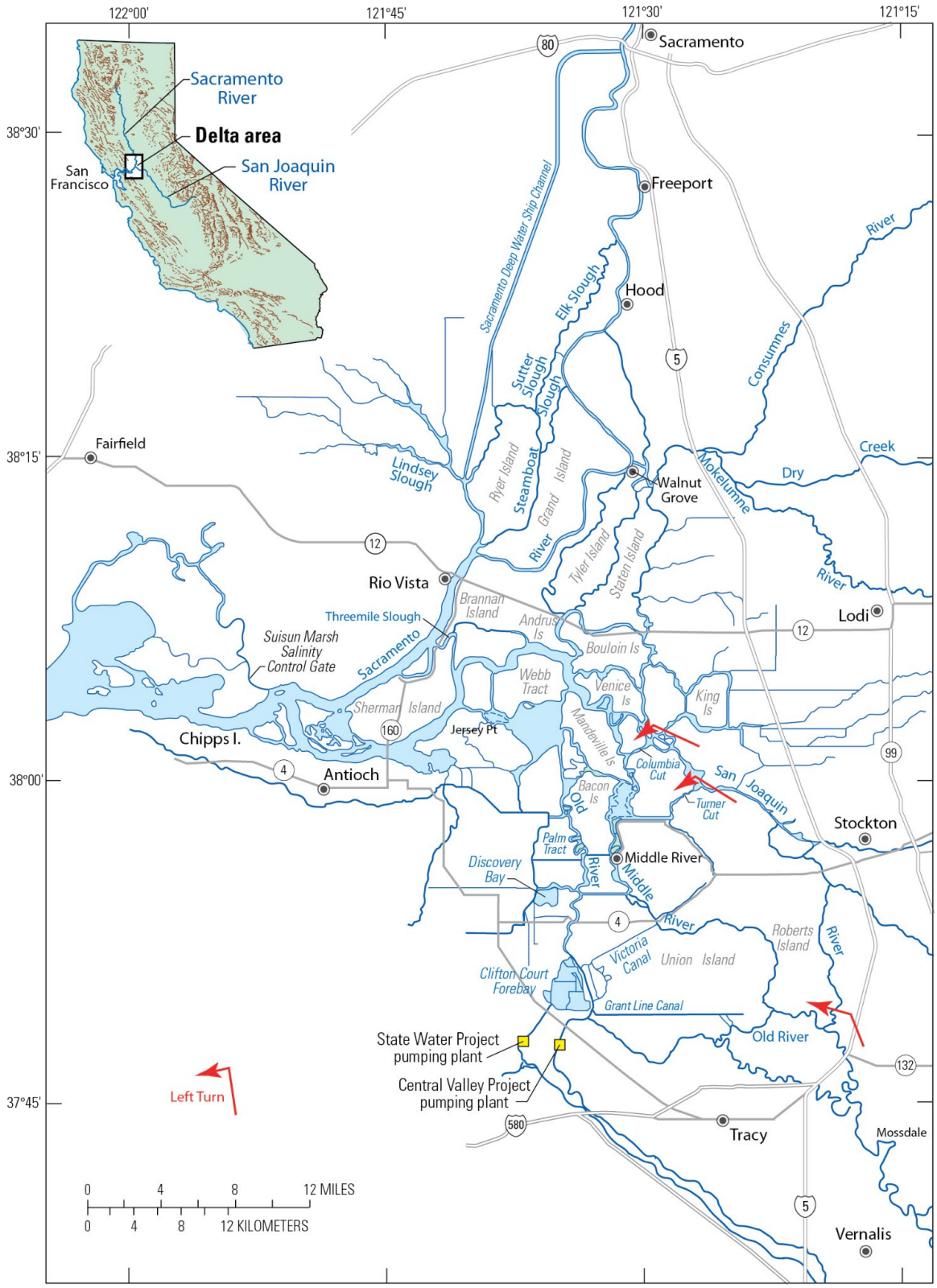


Figure 1. Map of the San Francisco Bay/Sacramento-San Joaquin River Delta Estuary (USGS 2022).

History of the Bay-Delta Plan

The California Porter Cologne Water Quality Control Act (1969) and the federal Clean Water Act (CWA) (1972) gave the State Water Board and nine Regional Water Quality Control Boards responsibility to prepare and implement water quality control plans for each region of California, including the Bay-Delta. The first Bay-Delta Plan established in 1978 provided a comprehensive set of water quality standards to protect beneficial uses of the Bay-Delta estuary. The standard consisted primarily of numeric limits on salinity at multiple locations through the Bay-Delta, and requirements for minimum flows at certain locations and times. The program of implementation included an adjudicative water rights hearing to amend the terms and conditions for water rights permits issued for the Central Valley Project (CVP) and the State Water Project (SWP) since these projects had the largest influence on flow in the Bay-Delta. The 1978 plan was adopted concurrently with Water Right Decision 1485 (D-1485), and together they revised existing standards for flow and salinity in the Delta's channels. They also ordered the Bureau of Reclamation (USBR) and the Department of Water Resources (DWR) to meet these standards by either reducing pumping, releasing water stored in upstream reservoirs, or both.

In 1987, the EPA notified California that water quality standards in the Bay-Delta estuary were not in compliance with the CWA, and the State Water Board began proceedings to develop plan amendments. An updated Bay-Delta Plan was adopted by the State Water Board in 1991 but was not fully approved by the EPA. A joint federal and California agreement signed in 1994, the Bay-Delta Accord, provided a framework for new and updated water quality standards, which led to a 1995 Bay-Delta Plan that was adopted by the State Water Board and approved by the EPA. An adjudicative water rights proceeding followed, and in 2000, the State Water Board Decision 1641 (D-1641) was issued, amending the water rights permits and licenses for the SWP and CVP to meet flow, water quality and monitoring requirements.

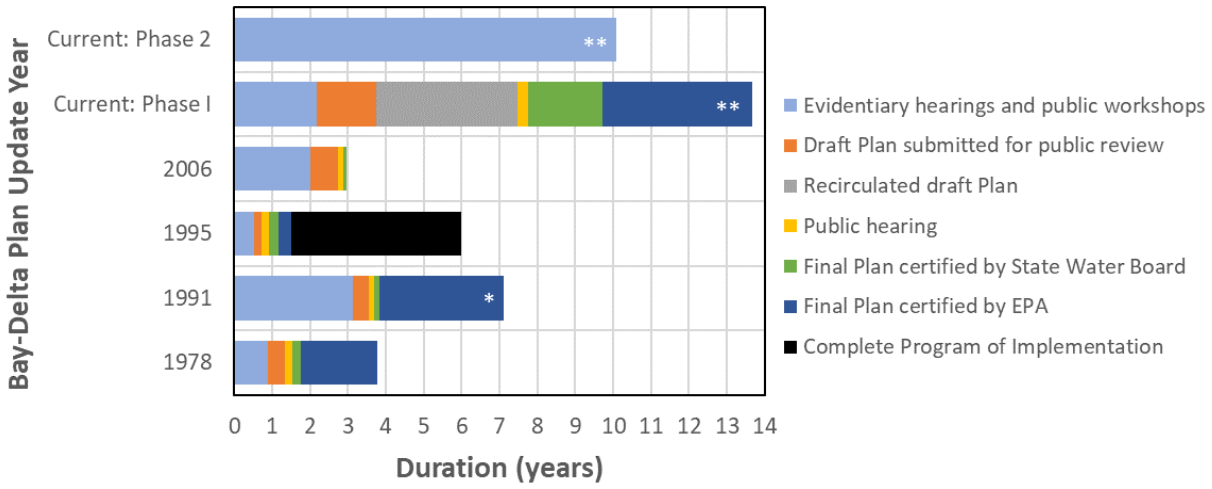
A 2006 updated Bay-Delta Plan was adopted by the State Water Board but did not include substantive amendments to any water quality standards and did not require EPA approval (SWRCB 2006). In 2009, the State Water Board began scoping meetings and workshops to discuss potential Bay-Delta Plan amendments focused on emerging issues identified in the 2006 update. A decision was made to develop a Bay-Delta Plan update in two phases: **Phase 1** would focus on southern Delta salinity and flow objectives on the San Joaquin River and three tributaries (Stanislaus, Merced, and Tuolumne Rivers), while **Phase 2** would focus on flow and water quality objectives in the Sacramento-San Joaquin Delta, its tributaries, and Suisun Bay. Additional information regarding the history of the Bay-Delta Plan update is provided in Exhibit A.

Status of the Phase 1 and Phase 2 Bay-Delta Plans

The State Water Board approved the 2018 Phase 1 Plan update in December 2018 and is currently developing the program of implementation. Phase 2 public workshops began in 2012, and in 2018 the State Water Board released a framework for Phase 2 updates. These updates included new proposed flow objectives and two potential programs of implementation: a default path of an adjudicative water rights hearing and/or a rulemaking proceeding, or a path that could be implemented through voluntary agreements (VAs). In lieu of traditional implementation pathways for both Phase 1 and Phase 2, the State Water Board is considering accepting VAs, or negotiated terms and conditions that are entered into by the water rights holders of each water system, signed by state agencies and approved by the State Water Board. VAs contain a mixture of flow and non-flow metrics to achieve water quality objectives of the Bay-Delta Plan, allowing the State Water Board to exercise authority beyond what explicitly exists in the CWC (i.e., implementing non-flow measures).

In March 2022, a Memorandum of Understanding (MOU) was signed by state and federal agencies, municipal and agricultural water suppliers, and others to advance a term sheet for Phase 2 VAs. The MOU described new terms and conditions related to flow and other measures, including habitat restoration, that could satisfy water quality objectives related to protection of native fishes.

The current Phase 1 and Phase 2 updates were initiated almost 14 years and 10 years ago, respectively, but have yet to produce or implement updated Bay-Delta Plans that are EPA-certified and enforceable. Though each Bay-Delta Plan update has been complex and contentious, the time spent developing current updates has nearly doubled any previous efforts (Figure 2), including the last substantive update in 1995 that arguably took a combined 13-years from evidentiary hearings in 1987 to implementation of the revised water right decision known as D-1641 in 2000.



* = EPA adopted their own water quality standards, ** = ongoing

Figure 2. Duration of key steps within each Bay-Delta Plan update.

In the meantime, the Bay-Delta estuary ecosystem has experienced significant declines in nearly all species of native fish and other native species that depend on the aquatic ecosystem (SWRCB 2017). These declines are attributed in part to flow modifications due to dams, water diversions and related operations, contributing factors for which the State Water Board has regulatory responsibility to address through Bay-Delta Plan updates.

Key challenges to updating the Bay-Delta Plan include: knowledge and data gaps in the complexity of the interconnected physical, biological and chemical systems of the Bay-Delta estuary; dynamic and unpredictable flows due to operations of the CVP, SWP, and other diverters; natural hydrologic variability and climate change impacts to precipitation and snowpack; changes to land use; differing opinions on how best to improve water quality; and contention around setting water quality objectives in an environment of high uncertainty.

The Water Leaders have spent the past year studying the Bay-Delta Plan, interviewing mentors and other invested parties, visiting the Delta firsthand, and watching the Phase 1 and Phase 2 updates progress in real time. This document summarizes our key findings and provides four specific policy recommendations to improve current and future Bay-Delta Plan updates.

Figure 3. Aerial Image of the Bay-Delta from the Department of Water Resources.

Key Findings

Recommendation 1: Process and Planning

Improving the existing Bay-Delta Plan review and update processes is critical to timely evaluation of water quality standards. The last update to the Bay-Delta Plan occurred in 2006, but the same flow criteria have been in place since 1995. Reducing process and timeline ambiguities will establish accountability for timely updates of the Bay-Delta Plan and give stakeholders a clear opportunity to engage in the process. Ambiguities can be reduced by increasing transparency in the State Water Board's triennial review, integrating VAs into the Bay-Delta Plan update process earlier, and codifying update and implementation processes.

Recommendation 2: Flow Objectives and Non-flow Measures

The goals of the Bay-Delta Plan are best achieved through a mix of flow and non-flow measures that can only be accomplished through VAs. Increasing the collective understanding of how non-flow measures can supplement flow measures to achieve the goals of the Bay-Delta Plan will increase the efficiency of the VA process and facilitate the ultimate implementation of the Bay-Delta Plan. This can be accomplished by integrating non-flow metrics into the State Water Board's technical analyses, developing explicit criteria for substituting non-flow measures for flow measures, and expediting research that advances the understanding of how flow and non-flow measures interact and can be leveraged to achieve the goals of the Bay-Delta Plan.

Recommendation 3: Adaptive Management

Strong implementation of adaptive management is critical to meeting water quality objectives amid uncertainty associated with climate change and ecological responses to management. The Bay-Delta Plan includes monitoring metrics for how well management meets water quality objectives and provides reasonable protection of defined beneficial uses. However, if monitoring and management is fragmented within implementation, it could lead to lack of synthesis, agreement, or weakened ability to inform management. To prevent this, adaptive management and how it is implemented needs to be clearly defined, including roles and timelines. It also needs to consistently close the loop from monitoring back to management, and a committee should be established to coordinate monitoring and evaluation across all watersheds.

Recommendation 4: Interested Parties and Tribal Engagement

As prefaced under Process and Planning, the Bay-Delta Plan update process is hard to understand and follow. Various interested parties have also expressed concerns about access to information and decision-making during the process. Creating clear opportunities for interested party engagement and enhancing information accessibility will lead to a more equitable Bay-Delta Plan update, such as including Native American tribes through government-to-government consultation. Ensuring that the data and information necessary are clear and understandable will also ensure essential buy-in with the final update and ultimate implementation of the Bay-Delta Plan.

Recommendation 1: Process and Planning

Improve transparency through the use of legislative code updates and public postings.

In contrast to the adjudicative water right hearings that preceded the water right decision in 2000 and earlier implementations of the Bay-Delta Plan, the State Water Board proposes to implement the 2018 Bay-Delta Plan Update through quasi-legislative rulemaking (State Water Board, July 2018 Framework). The regulation will broadly assign flow obligations to water users as the "default" implementation path, while VAs that include non-flow measures could provide an alternative path. A comprehensive statewide water right hearing is not contemplated, though the State Water Board may still consider smaller hearings for individual tributaries or objections based on specific water rights.

Such an open-ended range of possible implementation pathways affords the State Water Board more flexibility but reduces certainty for members of the public. Implementation of the Bay-Delta Plan should proceed in a staged and transparent manner to ensure that the public is afforded adequate opportunities to engage in the process, keep the State Water Board accountable to its own timelines and protect the due process rights of affected parties.

Specifically, the State Water Board should:

1) **Publish a public bulletin following the State Water Board's triennial Bay-Delta Plan review.** The Clean Water Act requires the State Water Board to review the Bay-Delta plan every 3 years and update the plan as necessary. As such, the State Water Board should consider increasing transparency of its timelines by posting an informational bulletin every 3 years that describes the results of its Bay-Delta Plan review and its efforts to engage stakeholders on a regular basis to discuss potential updates. The previous Bay-Delta plan updates occurred in 2006 and 1995, with 1995 being the last substantial update. In its 2018 resolution to adopt the current Phase I Update, the Board committed that "[t]he Bay-Delta Plan will be reviewed every three years" but the manner in which that review would be conducted and the level of public engagement during that review process was left undefined. (Resolution 2018-0059) The timelines for review and updates are therefore unclear, in spite of the seemingly straight-forward three-year requirement.

2) **Release the staff report to integrate non-flow options earlier in the Bay-Delta Plan process.** The 2018 Bay-Delta Framework recognizes VAs as an "efficient and effective route to durable solutions to ensure the reasonable protection of fish and wildlife…" However, non-flow options integral to VAs were not included in the State Board's Scientific Basis Report. While the anticipated staff report (currently unreleased) and the Phase 1 Lower San Joaquin River Substitute Environmental Document (SED) refer to non-flow options and seek to compare them

with benefits of unimpaired flows, these documents are incorporating non-flow options on the latter half of the Bay-Delta Plan development rather than during the initial technical analysis period. The Scientific Basis Report was relied on to set updated objectives, thus underscoring the importance of including non-flow and unimpaired flow combinations in the report's technical analysis. During the current Bay-Delta Plan process, the State Water Board should release the draft staff report as soon as possible to increase transparency in the technical comparisons between flow measures utilized during determination of Phase 2 Sacramento/Delta Bay-Delta Plan updates and during VA development (see table below). In the future, the State Water Board should consider including unimpaired flow and combinations of non-flow and unimpaired flow approaches during initial technical analysis and draft objective amendments.

Percent Unimpaired Flow	Change in Species Abundance Indices Using Analysis from Science Report (Unimpaired Flow)**	Change in Species Abundance Indices Using Unimpaired Flow + Other Flows***
35%	0%	+5-15%
55%	+10-20%	+20-40%
75%	+30-80%	+35-85%

*Illustrates the difference in modeled species responses between the Science Report, which utilized a straight calculation of percent of unimpaired flow, versus the forthcoming draft Staff Report that will include consideration of other regulatory flows, uncontrolled flows, systems operations, and other factors.
** See Table 5.3-4 in the Science Report
*** Analyses will be included in the forthcoming draft Staff Report
******Table included in the 2018 Framework that shares limited results from the unreleased draft Staff Report.**

Table 1. Approximate change in species abundance relative to existing conditions.

3) **Codify the update implementation process (either through the Legislature, SWRCB, etc.) so it is consistent each time.**

Under current law, a water quality control plan generally must include a program of implementation to achieve water quality objectives, but the methods and timing of that implementation are largely left to the State and Regional Water Boards' discretion. The Legislature should amend Section 13242 of the Porter-Cologne Act – or the State Water Board should formally adopt regulations – to incorporate substantive requirements that ensure certainty of due process in implementation, regardless of whether a water quality control plan is implemented through adjudicatory or legislative means. Likewise, there should be more explicit deadlines for the development and execution of a program of implementation, beyond simply requiring a schedule. Firmer deadlines will enhance transparency and provide the public opportunities to engage on the various potential implementation pathways along the way.

Recommendation 2: Flow Objectives and Non-flow Measures

Proactively address how non-flow measures can supplement flow measures in achieving Bay-Delta Plan goals.

In the 2018 Framework for the Sacramento/Delta Update to the Bay-Delta Plan, the VAs were introduced as one of the two proposed implementation pathways. While not set as the default implementation pathway, the VA pathway was recognized as an encouraged approach to achieve "tailored, timely, and more durable ecosystem and fishery benefits at the least cost to water supply." (State Water Board, July 2018 Framework). While the 2018 Bay Delta Framework provides general expectations related to acceptable VAs, such as providing resource protection equivalent to 55% unimpaired flow through non-flow measures, the inability to reach any VA agreements during the Phase 1 Lower San Joaquin River negotiations speaks to the need for improved transparency. The following policy recommendations aim to increase the collective understanding of how non-flow measures can supplement flow measures in achieving Plan goals.

1) **Integrate non-flow metrics into the technical analyses that underpin the State Water Board's decision-making process around Plan updates.**
   The Scientific Basis Report and Substitute Environmental Document (SED) should incorporate analyses of non-flow measures to account for opportunities within the VAs. The Scientific Basis Report includes substantial discussion of 'flow effects on fish survival and abundance' but does not give the same treatment to how non-flow measures affect fish survival and abundance. The SED provides a menu of recommended non-flow measures, but these measures are not explicitly included in the alternatives analysis. To provide an objective basis for VA discussions, the Scientific Basis Report should incorporate an analysis of how non-flow measures impact fish survival and abundance, and the SED should evaluate a range of alternatives that include a mix of flow and non-flow measures.

2) **Develop explicit criteria for substituting non-flow measures for flow measures.**
   Currently, the State Water Board's (the Board's) authority to regulate flow inherently limits the implementation pathways the Board may pursue. To advance efficient adoption of VAs, the Board should establish criteria that explicitly define how non-flow measures can be incorporated into implementation of the Plan in a way that the Board would accept and ultimately endorse. It is important for the Board to make these criteria publicly available to: (1) provide transparency; (2) hold the Board and responsible parties accountable; and (3) allow for meaningful involvement by interested parties. Any criteria should include specific scientific

metrics to support habitat restoration and development and be supported by the best available science. The VAs should use an adaptive management model that integrates flow and non-flow metrics to inform management decisions.

3) **Expedite research that advances the understanding of how flow and non-flow measures interact and can be leveraged to achieve the goals of the Plan.**
Expediting research to advance understanding of how flow and non-flow measures interact can supplement adaptive management and efficient implementation of the Plan. Targeted funding should be funneled to research to quantify the benefits of non-flow mitigation measures, such as habitat restoration efforts including instream and floodplain projects. New funding opportunities should be explored across eligible sources to further advance research and the Board should set aside funds from existing funding to prioritize best scientific approaches in the near and long term. Benchmarking funding is the first step to strengthening viability of non-flow options moving forward. Likewise, existing funding programs have synergy with the Plan and thus offer the most straightforward path to strengthening and incentivizing needed research.

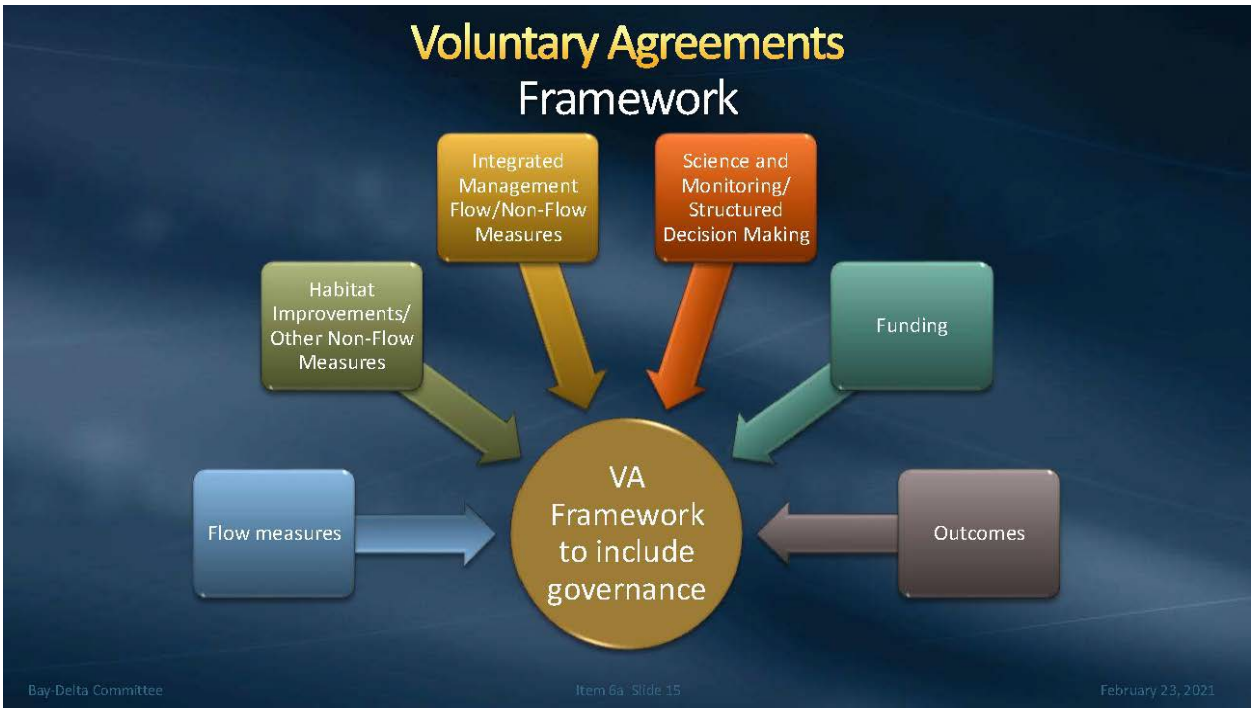


Figure 4. Voluntary Agreements Framework including non-flow measures[1].

[1] https://mavensnotebook.com/2021/03/02/met-bay-delta-committee-update-on-the-voluntary-agreements-delta-conveyance-project/

Recommendation 3: Adaptive Management

Improve the use of adaptive management within Bay-Delta Plan implementation.

Adaptive management is a 'learning-by-doing' approach often adopted to manage natural resources in the face of uncertainty (Holling, 1978; Walters, 1986). The Bay-Delta Plan includes some elements of adaptive management; however, differing definitions and lack of coordination among agencies and interested parties can lead to difficulties closing the adaptive management loop by adjusting management actions according to monitoring results. The Delta Stewardship Council defines adaptive management as "a science-based, structured approach to improving our understanding of the problems and uncertainties of environmental and water management" (Delta Stewardship Council, 2022). Figure 1 illustrates the adaptive management cycle, showing how goal establishment and project planning lead to the development of monitoring programs to determine if those goals are reached, and then evaluation based on monitored ecosystem responses is used to adapt further management actions accordingly.

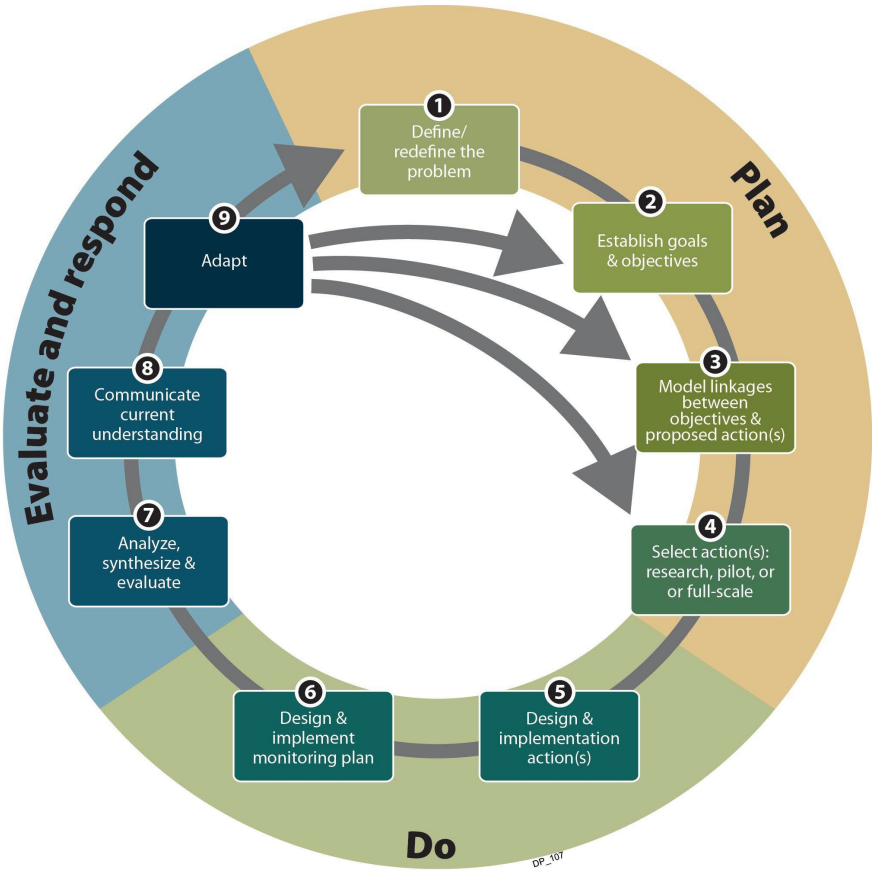


Figure 5. Delta Stewardship Council. 2013. The Delta Plan, Appendix 1B Adaptive Management.

While there are elements of adaptive management within the Bay-Delta Plan, there is no comprehensive program-level adaptive management effort that integrates all tributaries and management actions (flow and non-flow measures) which our recommendations focus on.

1) **Clarify adaptive management definition, timeline, roles and responsibilities, and geographic extent within the Bay-Delta Plan.**
   The Bay-Delta Plan currently includes a Comprehensive Reporting section that describes a review process, every 3-5 years, to determine if progress is being made towards biological goals and to determine any recommendations for change to the implementation of the flow objectives. The Comprehensive Reporting section of the Bay-Delta Plan should be expanded to include a clear definition of adaptive management, which should include: a timeline for when potential changes to implementation of flow objectives would occur; the roles and responsibilities of agencies and interested parties involved, including the oversight role of the State Water Board; and should include the broad geographic extent of the Bay-Delta and its tributaries. The Bay-Delta Plan should explain how each individual management action (including both flow-related operational changes and non-flow projects) will be evaluated in terms of both its project-specific objectives and in terms of helping meet Bay-Delta Plan water quality management objectives and consider how longer timeframes for ecological responses will be taken into account.

2) **Close the adaptive management loop by tying monitoring to management questions and performance metrics and by changing management actions based on monitoring results.**
   Management questions stemming from the water quality objectives set in the Bay-Delta Plan must be developed to guide the direction of monitoring and performance assessment programs and to tie them back to management actions occurring in the Bay-Delta and its watershed. These management questions should be aimed at filling current knowledge gaps regarding how management actions progress (or not) toward more effectively managing the Bay-Delta and its watershed to meet BDP water quality objectives. Every management action undertaken should include a monitoring and performance assessment element to gauge the impacts of that action. A critical component of monitoring and performance assessment programs should be establishing metrics for success that clearly define initial objectives as well as decision points to allow for updating or changing the management action if success thresholds are not reached. Where multiple entities are involved in meeting objectives for a specific tributary, the entities should initially consider and agree upon when, how and through what decision-making process management actions will be changed to reflect what is learned through monitoring. Front loading decision-making in this way can help ensure that management actions are adapted according to the results identified through monitoring.

3) **Convene an unbiased committee to develop management questions, coordinate monitoring activities and assess program performance to continue the cycle of adaptive management.** Currently, coordination between various monitoring groups exists, but efficiency could be improved. We recommend a committee be formed with the purpose of tracking and coordinating the monitoring and performance assessment activities within the Bay-Delta and its watershed. Ideally, this committee will act as a conduit of information between the scientific community, project managers and regulators. This committee should be part of an existing, non-project-based group, such as the State Water Board or Delta Stewardship Council, and should have a dedicated funding source. Regardless of the entity chosen to lead this effort, the committee should consider all beneficial uses of the Bay-Delta and tributaries, identify the knowledge gaps that exist in managing the Delta watershed, and ask for targeted studies to be implemented to fill the gaps. The committee would then review all new and existing monitoring efforts to ensure progress is being made, to answer the management-level questions and adjust monitoring if needed. This should be done with regular updates to the management, monitoring and regulatory groups and should include routinely reviewing the value of ongoing research. Currently, the Stanislaus, Tuolumne and Merced Working Group covers many of the proposed committee roles for the San Joaquin watershed that should be assumed in a committee that encompasses the entire Bay-Delta and its tributaries (SWRCB 2018).

Figure 6. Image of Dutch Slough Restoration Project Site from the Department of Water Resources.

Recommendation 4: Interested Parties and Tribal Engagement

Improve interested party and tribal engagement by ensuring clarity and equitable access.

Currently trust surrounding the Bay-Delta Plan development process is at a low. Various interested parties have expressed concerns about the transparency of decision making, accessibility of information, and their ability to be involved in the process. California Native American tribal governments have also stated that government-to-government tribal consultation, which they are entitled to under law, has been lacking if not non-existent. Ensuring and establishing trust with interested parties and tribes is key to the development of a Bay-Delta Plan Update that gathers buy-in and support for implementation. To that end, we offer three strategies that should improve interested-party engagement in the Bay-Delta Plan update process by ensuring clarity of information and equitable access to engagement opportunities.

1) **Establish an easy-to-understand process with clear opportunities for engagement.**
   Tied to Recommendation 1, the State Water Board should look to improve outreach strategies that ensure all interested parties have the opportunity to be engaged and fully understand their role in the Bay-Delta Plan Update process. The Bay-Delta Plan Update should use a "one size **does not** fit all" strategy that allows for different levels of participation for different parts of the process, as well as catering to the differing needs of the various interested parties. For example, interested parties should be more involved early on in the Bay-Delta Plan process, but it may be more appropriate to shift to a consulting approach as the State Water Board approaches the ultimate decision on the Bay-Delta Plan. Measures should be taken to involve interested parties in the VA process as well. To initiate more participation, the State Water Board should procure a professional facilitator, with appropriate experience working with diverse interests, for appropriate interested-party engagement opportunities to encourage engagement and establish trust with a neutral third party. The facilitator could then establish ground rules (i.e., focus of interests rather than positions) and clear process-mapping that outlines the process that will be taken to complete the Bay-Delta Plan Update. The process map needs to be clear to all interested parties and highlight exactly where they are able to get involved. The process map and ground rules should then be made accessible to all interested parties through the State Water Board's website under the Bay-Delta Program, as well as the encouragement of all interested parties to link to them on their respective websites.

2) **Ensure all data is accessible and information is in plain language.**
   To that end, all information and data used in the Bay-Delta Plan should be accessible through the State Water Board's website and easy to understand and follow for all interested parties. This needs to include tactics such as using effective and inclusive data visualization, plain

language and timelines that all interested parties can reference when engaging in the Bay-Delta Plan Update. The information and data could also be broken down into easy-to-follow categories with links to original, more detailed reports as needed.

3) **Initiate government-to-government consultation with Native American tribes.**
The State Water Board should establish a clear process for government-to-government consultation with Native American tribes, through its Tribal Consultation Policy, throughout the rest of the Bay-Delta Plan amendment process. This should be similar to the consultation and progress tracking set-up that the State Water Board currently employs through its tribal beneficial use process for regional basin plan amendments. The establishment of a tribal working group or committee that can evaluate and make recommendations for the process for tribal inclusion may also be warranted.

Figure 7. Image of the Flood Forum from the Department of Water Resources.

Conclusion

Since 2008, the State Water Board has been developing a comprehensive update to the water quality objectives and other key elements of the Bay-Delta Plan. The current update has taken longer than any previous update and is highly contentious due to the many interested parties, the complexity of the Bay-Delta water system and the continued decline of the Bay-Delta ecosystem. For this update, the State Water Board is also considering a novel program of implementation that relies on negotiated terms and conditions (i.e., VAs) to achieve water quality objectives. While these VAs provide increased flexibility for water diverters, the approach is untested and after many years of negotiations there are still no finalized terms and conditions to update the Bay-Delta Plan.

The four specific policy recommendations offered by this paper are aimed at improving the current and future Bay-Delta Plan updates. The recommendations are broadly targeted towards the State Water Board, and focus on improving process transparency, filling knowledge and data gaps in the science of coupled flow and non-flow measures, improving the use of adaptive management and building trust through more equitable access for tribes and interested parties. The goal in preparing these recommendations is to direct meaningful action by the respective parties to ensure an efficient and engaging Bay-Delta Plan update process.

Glossary

Beneficial Uses - Beneficial uses serve as a basis for establishing water quality objectives. Beneficial uses protected by the Bay Delta Plan include municipal and domestic supply; industrial service supply; industrial process supply; agricultural supply; groundwater recharge; navigation; water contact recreation; non-contact water recreation; shellfish harvesting; commercial and sport fishing; warm freshwater habitat; cold freshwater habitat; migration of aquatic organisms; spawning, reproduction, and/or early development; estuarine habitat; wildlife habitat; rare, threatened or endangered species.

Biological Goals - Quantitative metrics that describe desired biological outcomes of flow and non-flow management actions to protect fish and wildlife beneficial uses.

Interested Parties - Any member of the public, interest group, trade organization, non-governmental organization, community-based organization, or Native American tribe interested in the Bay-Delta Plan process.

Management Action - Something done within the Bay-Delta watershed that could impact beneficial uses, typically with the aim to meet biological goals and/or water quality objectives. Examples include management of reservoir storage and associated temperature control devices and efforts to establish cold water refugia like riparian revegetation.

Plain Language - Language that ensures interested parties can find what they need, understand what they find, and use what they find to meet their needs. Based on the U.S. General Services Administration's plain language guidelines (see references).

Program of Implementation - A broad strategy outlining the actions the State Water Board can take to achieve water quality objectives.

Project - Could refer specifically to the State Water Project (SWP) or Central Valley Project (CVP) or more generally to a physical management action implemented within the Bay-Delta watershed, such as habitat restoration actions taken within a defined area.

Water Quality Objectives - Objectives established by the State Water Board in the water quality control plan ensure the reasonable protection of beneficial uses and the prevention of nuisance. Flow and water project operations are within the scope of objectives.

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Exhibit A

The first Bay-Delta Plan established in 1978 provided a single comprehensive set of water quality standards to protect beneficial uses of the waters of the Bay-Delta. The program of implementation directed the State Water Board to, among other actions, adopt a corresponding water right decision amending the terms and conditions for water rights permits issued for the Central Valley Project (CVP) and the State Water Project (SWP) since these projects had the largest influence on flow in the Bay-Delta. The 1978 Plan was adopted concurrently with Water Right Decision 1485 (D-1485), and together they revised existing standards for flow and salinity in the Delta's channels and ordered the Bureau of Reclamation (USBR) and the Department of Water Resources (DWR) to meet these standards by either reducing pumping, releasing water stored in upstream reservoirs, or both.

In 1987, the EPA notified the state of California that state surface water quality standards were not in compliance with the CWA, and in July 1987, the State Water Board began proceedings to reexamine water quality objectives for the Bay-Delta Estuary. This resulted in a 1991 update to the Bay-Delta Plan that was adopted by the State Water Board. The EPA approved some objectives but disapproved specific fish and wildlife objectives that failed to protect estuarine habitat and other fish and wildlife beneficial uses.

In 1994, driven in part by a severe six-year drought in the late 1980s and early 1990s and contentious debate over water quality objectives, state and federal officials established the Bay-Delta Accord, an agreement to develop updated water quality standards to protect the Bay-Delta Estuary, coordinate operations of the CVP and SWP, and implement other measures to improve environmental conditions. The agreement led to CALFED, a joint federal and California program tasked with developing and implementing the framework of the Bay-Delta Accord. At this same time, the State Water Board began proceedings to review the 1978 and 1991 Bay-Delta Plans and seek comments and recommendations for an update. Through CALFED, a Principles of Agreement was formulated that proposed new Bay-Delta water quality objectives and funding for non-flow related measures, among other measures. The State Water Board prepared a draft Plan, and after public review and hearings, the 1995 Plan was adopted by the State Water Board in May 1995 and approved by the EPA in September 1995. The program of implementation relied primarily on a water rights proceeding that reallocated responsibility for meeting the water quality objectives to DWR and USBR. Finalized in 1999 with a final revision in 2000, the State Water Board Decision 1641 (D-1641) amended the water right license and permits for the SWP and CVP to meet flow, water quality and monitoring requirements established in the 1995 Plan.

A 2006 Plan was adopted by the State Water Board but did not include substantive amendments to any water quality standards and did not require EPA approval (SWRCB 2006). The 2006 Plan did identify emerging issues that required immediate action, including objectives related to San Joaquin River flows and southern Delta salinity.

In 2008, the State Water Board committed to reviewing these objectives (SWRCB 2018), and in 2009 they began scoping meetings and workshops to discuss potential Plan amendments. A decision was made to develop Plan updates in two phases: Phase 1 would focus on southern Delta salinity objectives and flow objectives on the San Joaquin River and three tributaries (Stanislaus, Merced and Tuolumne rivers), while Phase 2 would focus on flow and water quality objectives in the Sacramento-San Joaquin Delta, its tributaries and Suisun Bay. A Phase 1 Substitute Environmental Document (SED) was released for public review in 2012. Following a large number of public comments, new information learned during the drought of 2012 to 2014, and passage of the Sustainable Groundwater Management Act (SGMA) in 2014, the State Water Board revised the SED and recirculated it for public review in 2016. Workshops and additional public reviews occurred until a Final SED was released in October 2018. The State Water Board approved the 2018 Phase 1 Plan update in December 2018, and is currently developing the program of implementation.

Phase 2 public workshops began in 2012, culminating in a Final Scientific Basis Report developed by the State Water Board in 2017 that outlined new and revised flow requirements on the Sacramento River, major tributaries and the Delta. The State Water Board then released a framework for Phase 2 updates in July 2018 that included details about the proposed Plan amendments, including proposed flow levels and two potential programs of implementation: a default path of an adjudicative water rights hearing and/or a rulemaking proceeding, or a path that could be implemented through VAs.

In lieu of traditional implementation pathways for both Phase 1 and Phase 2, the State Water Board is considering accepting VAs, or negotiated terms and conditions that are entered into by the water rights holders of each water system, signed by state agencies, and approved by the State Water Board. VAs contain a mixture of flow and non-flow metrics to achieve water quality objectives of the Plan, allowing the State Water Board to exercise authority beyond what explicitly exists in the CWC. In March 2022, a Memorandum of Understanding was signed by state and federal agencies, municipal and agricultural water suppliers and others to advance a term sheet for Phase 2 VAs. The MOU described new terms and conditions related to flow and other measures, including habitat restoration that, if provided, would meet two water quality objectives related to protection of native fishes. State Water Board staff plans to develop a Scientific Basis Report for any VAs by summer of 2022 and a draft staff report in fall 2022, with consideration of adoption in fall 2023.

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