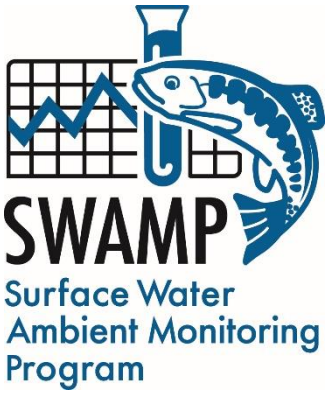

Surface Water Ambient Monitoring Program Bioaccumulation Monitoring Program Realignment Plan

December 2020

Foreword

The preservation, enhancement, and restoration of California's water resources is vital to the health and well-being of all Californians, Native American Tribes, the economy, and natural lands for present and future generations. The original mission of the State Water Resources Control Board and Regional Water Quality Control Boards (Water Boards) Bioaccumulation Monitoring Program (Program) was to provide statewide monitoring data and information that could be used to:

- Assess and contribute to the protection and restoration of fishing and aquatic life beneficial uses that are impacted by the bioaccumulation of pollutants in California's waterbodies, and
- Assess the human health risks associated with the consumption of contaminated fish and shellfish in California's freshwater and coastal ecosystems, and use that information to support the development of advisories that would inform consumers of significant health risks associated with the consumption of particular species.

The Program has realized several successes, such as forming the Bioaccumulation Oversight Group (BOG) and establishing comprehensive, statewide bioaccumulation monitoring methodologies and assessments that began to answer the question: "Is it safe to eat fish and shellfish from our waters?" since its inception in 2006. The Program also developed the Safe-To-Eat Portal on the My Water Quality website to display and interpret bioaccumulation data via interactive maps and data visualizations. The Portal was upgraded in 2019, and new datasets have been continuously added. Links to the California Environmental Data Exchange Network (CEDEN) on the Portal make the entire Program dataset available for public download. SWAMP is currently working with a California Sea Grant Fellow to modernize and update the Portal.

Since 2007, data from the Program have been the primary basis for the placement of 131 California lakes and reservoirs on the Clean Water Act Section 303(d) list of impaired waterbodies for mercury. These listings led to the Statewide Mercury Provisions (consisting of mercury water quality objectives and new beneficial use definitions) and a Statewide Mercury Control Program for Reservoirs. Since 2009, the Office of Environmental Health Hazard Assessment (OEHHA) has released over 70 fish consumption advisories based wholly, or in part, on data collected through the Program, including a statewide advisory for eating fish from California's lakes and reservoirs without site-specific advice, and a statewide advisory in 2016 for eating fish from California coastal locations without site-specific advice (Figure 1). Many updates of pre-existing advisories have also been made using Program data.

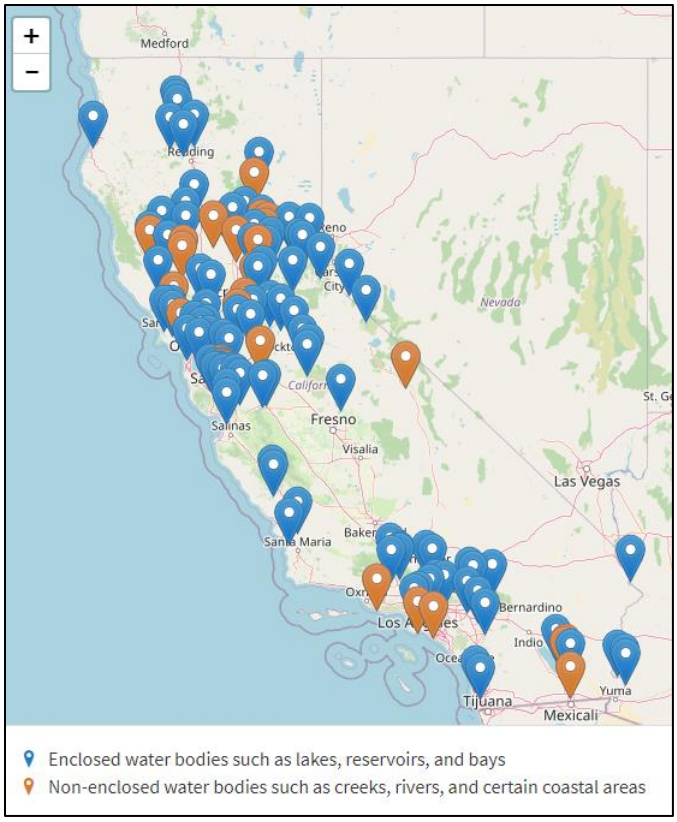

Figure 1. California Fish Advisory Map from the [OEHHA website](#).

Need for Program Realignment

A realignment is needed to realize the original mission of the Program. BOG members and Program staff recognize that the original Program plans were ambitious given the limited resources but addressing two key issues could better achieve the original mission. First, although data collected by the Program is sufficiently comprehensive to assess bioaccumulative pollutants at a statewide level, the connections, collaboration, and beneficial symbiotic relationships among the Program and other Water Boards Divisions, Regions, and programs are not fully realized. While some programs (e.g., Integrated Report) or regions (e.g., San Diego and Central Coast Regional Water Quality Control Boards) use some of the data produced by the Program to contribute to their specific efforts, the statewide data are complementary and are generally not robust enough to comprehensively assess conditions and fully inform management decisions. The data are valuable as a complementary dataset and help to identify issues for further study; however on their own the data do not consistently and substantially contribute to the protection and restoration of fishing and aquatic life beneficial uses that are impacted by the bioaccumulation of pollutants in California's waterbodies.

Second, while data have been generated and used to inform health advisories for fish throughout the state, significant data and information gaps remain regarding the question: "Is

it safe to eat fish and shellfish from our waters?" A particularly important information gap exists for waterbodies or species that are important for subsistence by traditionally underrepresented communities, as well as Tribal tradition, culture, and subsistence. For example, while we know shellfish have been and continue to be vital to these communities, limited resources have resulted in the Program focusing its monitoring on fish only.

Realigned Program Vision

In line with the overarching SWAMP 2020-2023 Strategic Action Plan (SWAMP SAP), and the SWAMP Bioaccumulation Monitoring Program Work Plan (Work Plan), Water Board monitoring data and information are used to inform decisions that help protect and restore California watersheds, and to provide California communities with easy to find, up-to-date information about the conditions of their local lakes, rivers and streams.

> **SWAMP Vision:** Water Board monitoring data and information are used to inform decisions that help protect and restore California watersheds, and to provide California communities with easy to find, up to date information about the conditions of their local lakes, rivers and streams.

The realigned Program vision is to realize the SWAMP vision (see inset to the right) in the context of the Program, through improved coordination, communication, and community engagement. That is, data generated by the realigned Program will:

1) Align and integrate with other Water Board programs to better assess and contribute to the protection and restoration of aquatic life and fishing beneficial uses impacted by bioaccumulative pollutants. The Water Boards and partners will adapt statewide, regional, and site-specific monitoring to inform and enhance each other through a nested design[1].

[1] SWAMP's monitoring programs and coordination activities are not mutually exclusive and as such have the potential to inform and enhance each other. That is, the monitoring design for a statewide or regional watershed assessment may be different than that of National Pollutant Discharge Elimination System (NPDES) discharger, but through coordination and appropriate monitoring design these types of programs can be nested. Nesting allows the information from the statewide/regional program to inform the NPDES assessment and vice versa. In addition, coordination of monitoring activities with other Water Board programs and partners allows opportunities for logistical and cost advantages such as leveraging resources, avoiding duplication and sharing data (SWAMP 2010 Strategy).

2) Provide a better basis for public health advisories for fish consumption for communities that rely on fishing for subsistence, sustenance, cultural, and Tribal purposes. The Water Boards and partners will work collaboratively with communities to ensure the species and waterbodies monitored encompass those most used for subsistence, sustenance, and cultural, and Tribal purposes.

Purpose of Plan

The purpose of this plan is to clearly articulate where the Program is now, the components we need to realign to better achieve the vision, and to serve as a guide during the Program realignment process. This realignment plan has been developed with the intention of being an adaptable and living document that will be revised and improved as we learn from the implementation process. Moreover, this plan is meant to be shared with others to communicate the realignment vision, and inform collaborations, partnerships, and actions during the implementation process.

This realignment plan complements the Work Plan, which describes current priorities and strategies to meet Program objectives and is consistent with the priorities and general approach outlined in the SWAMP SAP. The purpose of the Work Plan is to clearly assign tasks, manage workflow, and track the various program components and milestone deadlines. Work Plan implementation will help to articulate strategic actions to Program staff, management, and contractors and make the connections to Program priorities explicit. Statewide recommendations from this realignment effort will be incorporated into the Work Plan. Figure 2 illustrates the connections between SWAMP planning documents.

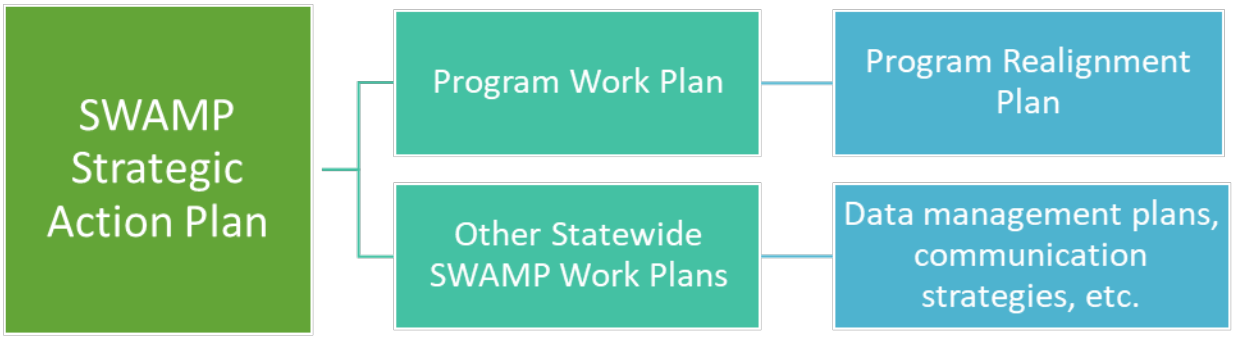

Figure 2. Representation of SWAMP planning documents and how this Program Realignment Plan relates to larger planning and adaptation efforts. The SWAMP Strategic Action Plan is the guiding plan that informs specific projects described in the BOG Program Work Plan, including realignment efforts. This Realignment Plan provides details about realignment efforts and plans.

This Program Realignment Plan was developed by the Program Realignment Team:

- Ali Dunn, Statewide SWAMP Coordinator and Unit Chief
- Anna Holder, Program Coordinator
- Melissa Daugherty, SWAMP Coordinator, Central Coast Regional Water Quality Control Board
- Chad Loflen, SWAMP Coordinator, San Diego Regional Water Quality Control Board
- Jay Davis, Program Science Lead, BOG Chair, San Francisco Estuary Institute

Table of Contents

Introduction

Bioaccumulation Monitoring Program Origins

From the late 1970s to the early 2000s, the California Water Boards conducted two long-term statewide bioaccumulation monitoring programs. The Toxic Substances Monitoring Program (TSMP; 1976 – 2003) monitored pollutants in fish and invertebrates in freshwater and estuarine systems (SWRCB 1986, Rasmussen 1995, 1997). The California State Mussel Watch Program (SMWP; 1977 – 2010) monitored pollutants in shellfish in coastal marine systems (Hayes et al. 1985, Hayes and Phillips 1986, Rasmussen 2000). In September 1999 the California legislature enacted Assembly Bill No. 982 (AB 982, Ducheny; Water Code § 13191 – 13192), which required the Water Boards to assess its existing surface water quality monitoring programs and produce a report for the legislature that included a proposal for a single comprehensive statewide surface water quality monitoring program. In July 2000, the California legislature enacted Assembly Bill No. 2872 (AB 2872, Shelley; Water Code § 13177.5 – 13177.6), which directed the Water Boards, in consultation with the Office of Environmental Health Hazard Assessment (OEHHA) to develop the Coastal Fish Contamination Program (CFCP). The CFCP was tasked with the identification and monitoring of chemical contamination in coastal fish and shellfish, and the assessment of health risks associated with their consumption.

In November 2000, the State Water Board Report to the Legislature proposed to restructure and integrate existing monitoring programs (e.g., TSMP, SMWP, CFCP) into a new Surface Water Ambient Monitoring Program (SWAMP). Implementation of SWAMP would establish a comprehensive statewide monitoring program focused on documenting ambient water quality conditions statewide, identify water quality issues preventing the public from realizing beneficial uses of state waters, and provide the data and information needed to evaluate the overall effectiveness of water quality regulatory programs in protecting beneficial uses of waters of the State. SWAMP was established in 2001 and began to implement its statewide ambient monitoring programs. However, the Bioaccumulation Monitoring Program (Program) was not established as a component of SWAMP until 2006 – one year after the CFCP was halted due to budget constraints.

The SWAMP formed a subcommittee, named the Bioaccumulation Oversight Group (BOG), in 2006 to help guide the implementation of the statewide Program. The question 'Is it safe to eat fish and shellfish from our waters?' was adopted by the Program, BOG, and the California Water Quality Monitoring Council to address the following core beneficial uses in the state: Commercial and Sport Fishing (COMM), Tribal Tradition and Culture (CUL), Tribal Subsistence Fishing (T-SUB), and Subsistence Fishing (SUB) (See the Tribal Beneficial Uses website for more information). Specific terms embedded in these beneficial uses that are related to this realignment and that also warrant defining include:

- **Commercial fishing** is the activity of catching, collecting, or taking fish, shellfish, or other seafood *for commercial profit* (referenced in COMM).
- **Recreational fishing** (also called sport fishing), is the activity of catching, collecting, or taking fish, shellfish, or other seafood *for pleasure or competition* (referenced in COMM).
- **Subsistence fishing** comprises uses of water involving the non-commercial catching or gathering of natural aquatic resources, including fish and shellfish, for consumption by individuals, households, communities (SUB), or communities of California Native American Tribes (T-SUB) to meet needs *for sustenance*.
- **Sustenance** refers to the food or drink which a person requires as a source of strength and nourishment needed to remain alive.

A second level of more specific assessment sub-questions about the status of core beneficial uses was developed that provides additional focus for the Program's monitoring design:

1. **Status:** What is the severity and extent of bioaccumulation of pollutants in California's waterbodies?
2. **Trends:** What is the pace and direction of change in the bioaccumulation of pollutants in California's waterbodies over time?
3. **Sources and pathways:** What are the causes of bioaccumulation of pollutants and where are the sources of those stressors?
4. **Effectiveness of management actions:** How effective are projects and programs at reducing the bioaccumulation of pollutants in California's waterbodies?

In 2008, the State Water Board contracted with the San Francisco Estuary Institute (SFEI) to write a report that would "recommend an organizational structure, process, and preliminary design for a statewide bioaccumulation monitoring and risk reduction program for California" (Davis 2008, hereafter referred to as the Recommendations Report). The objective of the Recommendations Report was to provide a vision and roadmap of how a more collaborative and integrated stakeholder process could be incorporated and implemented into the Program and BOG processes. Ultimately, due to resource and budget constraints, the Program was able to address only a small subset of the recommended objectives and assessment questions (i.e., monitoring of fish at 40 targeted sites per year to be used in assessment of status and trends). Given the level of funding provided to SWAMP, the Program did not pursue a comprehensive advisory development program, risk communication, a community engagement component, or shellfish monitoring.

General Program Process

The Program, with oversight by the BOG, collects and analyzes fish tissue for mercury, polychlorinated biphenyls (PCBs), selenium, and legacy pesticides in select lakes, reservoirs, rivers, streams and coastal areas, and assesses these data to provide insight into the safety of eating fish, and to characterize statewide conditions over time. Statewide characterization of conditions over time is used by some Regional Water Board monitoring programs, which build off the statewide information with region-specific studies that may include additional species, pollutants, or locations. Bioaccumulation monitoring efforts by the Central Coast and San Diego Regional Water Boards are prime examples of region-specific studies and are discussed in the following sections.

Program data are also used by some Water Board programs to inform Clean Water Act Section 303(d) impairment listings and Total Maximum Daily Load (TMDL) development. While not currently used in this way Program-wide, long-term trends data provide insight into how natural features and human activities have contributed to water quality changes over time in California's waterbodies.

Data generated by SWAMP's statewide and regional monitoring programs are currently used by OEHHA to develop and issue health advisories when they determine that consuming certain fish or shellfish presents a significant health risk, and to highlight which species are safe to eat. Once the health advisories have been developed, OEHHA notifies County health officials and urges them to conspicuously post the advisories in areas where contaminated fish or shellfish may be caught (e.g., on shore, piers, commercial passenger fishing vessels, etc.).

AB 762

In 2019 the California legislature enacted Assembly Bill No. 762 (AB 762, Quirk; Water Code § 13177.5). AB 762 requires:

1. OEHHA to notify County health officials and the Water Boards of health advisories
2. Local health officers to coordinate with OEHHA, California Department of Public Health, California Department of Fish and Wildlife, and the Water Boards to identify appropriate advisory posting locations and then to conspicuously post health warnings upon the issuance of a site-specific fish or shellfish health advisory
3. Authorizes the State Water Resources Control Board to provide grant funding to County health officials for posting health advisories when the Water Boards and OEHHA determine that consuming certain fish or shellfish presents a significant health risk.

The Water Boards and OEHHA have been tasked with developing and implementing a grant funding process to distribute AB 762 funding to County health officials for posting health advisories. Discussions are underway to determine how these processes can satisfy the

mandates of AB 762 *and* improve risk communication to communities most at risk of consuming contaminated fish and shellfish (i.e., fishing communities with high consumption rates).

Current SWAMP Bioaccumulation Monitoring

Statewide Program

What data are we collecting?

The Program, through the BOG, has focused its approach primarily on sampling and methodologies that address the issue of bioaccumulation in fish and impacts on human exposure and beneficial uses for fishing, which include Commercial and Sport Fishing (COMM), and to a lesser extent, Tribal Tradition and Culture (CUL), Tribal Subsistence Fishing (T-SUB), and Subsistence Fishing (SUB).

Monitoring efforts have focused on collecting and analyzing fish tissue for mercury, PCBs, legacy pesticides and other bioaccumulated pollutants (Table 1). Surveys also collect data on sampling locations (e.g., waterbody, latitude, longitude) and fish attributes (e.g., species, fish length, weight, sex, lipid content) to provide context for the pollutant data. The monitoring locations have been selected with input from the Regional Water Boards to include waterbodies with generally high fishing pressure, but not with a specific focus on locations frequented by subsistence and Tribal fishers.

Table 1. List of Analytes. Please note that not all pollutants listed below are measured in all surveys or in all locations. Rather, a suite of analytes is selected for each survey and location.

	Survey Type		
Analyte Class	Lake and Reservoir	Coastal	River and Stream
Methylmercury (measured as total mercury)	X	X	X
PCBs (polychlorinated biphenyls)	X	X	X
DDTs (dichlorodiphenyltrichloroethane)	X	X	X
Dieldrin	X	X	X
Chlordanes	X	X	X
Selenium	X	X	X
Arsenic		X	
Dioxins		X	
Biotoxins	X		

How are we collecting data?

The overall approach that has been taken to address some of the monitoring questions has been to conduct statewide surveys of bioaccumulation in fish in California waterbodies. The BOG meets annually to discuss waterbodies that will be sampled each year. Regional Water Board and OEHHA staff provide input on locations and species to be monitored. Data collection and analysis methodologies are described in detail in the Quality Assurance Program Plans (QAPPs).

When possible, surveys have coordinated with other programs to better leverage resources to achieve more thorough assessments than could be achieved with Program resources alone. Examples of such coordination include:

- Regional Board Monitoring Programs
- San Francisco Bay Regional Monitoring Program
- Southern California Bight Program
- Statewide and Regional Total Maximum Daily Load (TMDL) Programs

Where are we monitoring?

Surveys are conducted throughout California's freshwater and estuarine waterbodies. To streamline data collection and processing methodologies and efforts, surveys are grouped into three main waterbody types: lakes and reservoirs, coastal systems, and rivers and streams (Figure 3).

When do we monitor?

The first statewide screening surveys for lakes and reservoirs, coastal systems, and rivers and streams were conducted in 2007-2008, 2009-2010, and 2011, respectively. Long-term monitoring of black bass in lakes and reservoirs started in 2015 and occurs during odd-numbered years (i.e., 2015, 2017, 2019, 2021, etc.). Coastal surveys started in 2009-2010 and occur over a three- or five-year period every 10 years. River and stream surveys are conducted about every 10 years; the next survey is planned for 2022. 2024 monitoring has not been determined. 2026 monitoring is currently planned to target trout lakes (Figure 4).

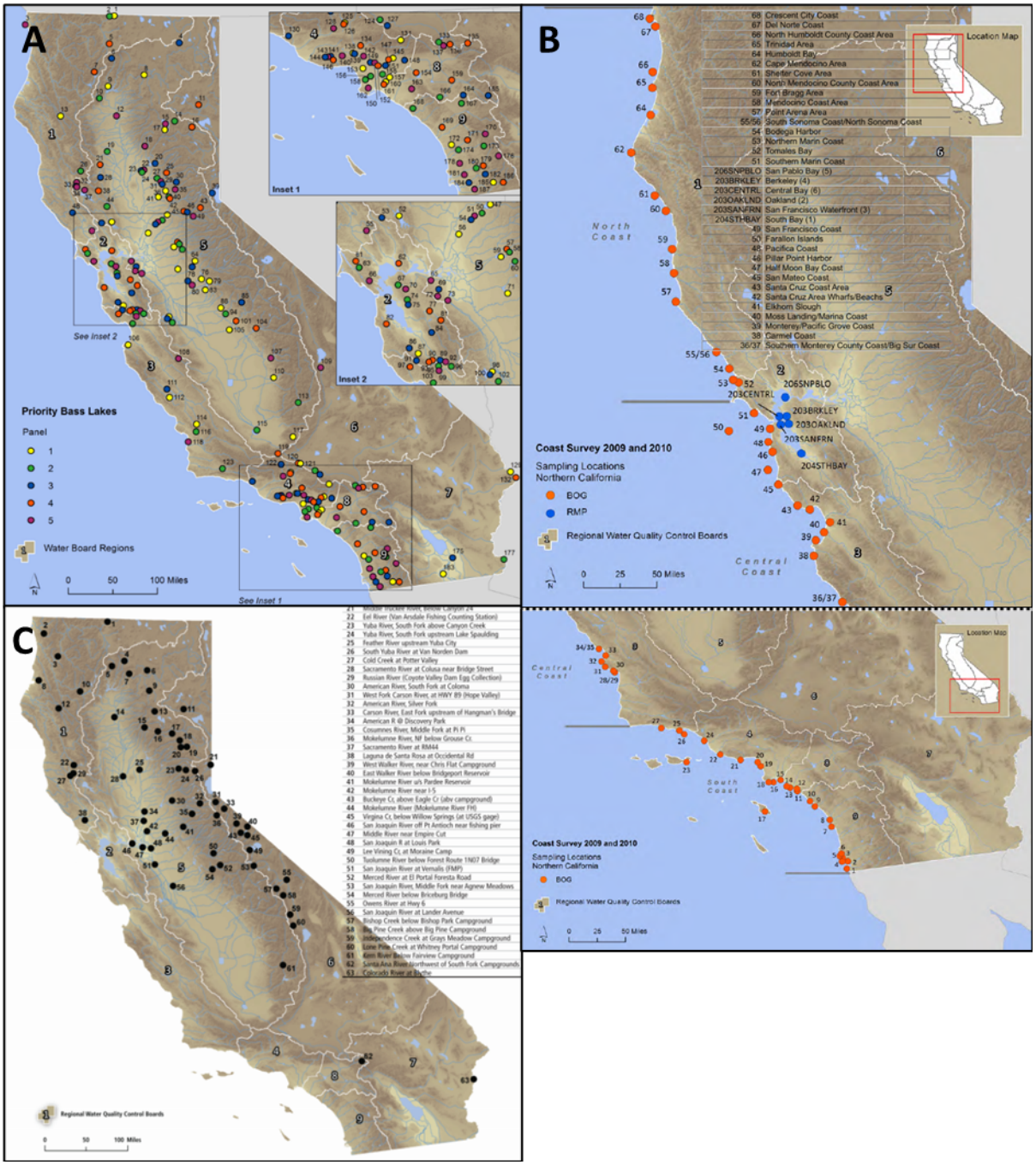

Figure 3. Sampling locations for the lake and reservoir (A, top left), coastal (B, right), and river and stream (C, bottom left) surveys.

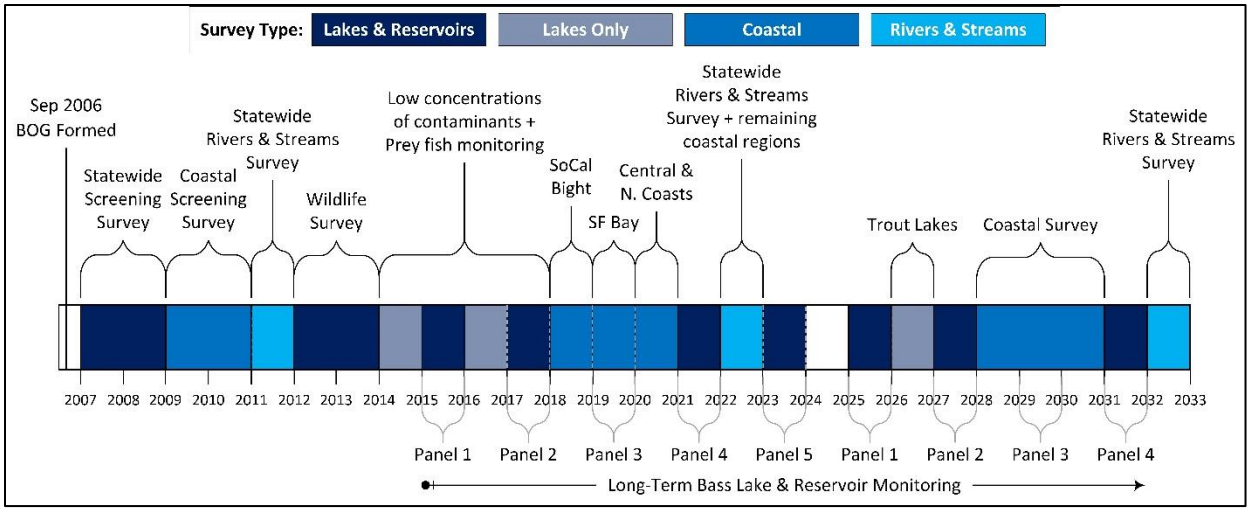

Figure 4. Timeline displaying previous and planned BOG surveys in lakes and reservoirs (dark blue), coastal systems (blue), and rivers and streams (light blue). For more details on each survey type, see the links provided in the beginning of the Where are we monitoring? section above.

Why are we monitoring?

The data collected have been and continue to be a crucial component of successful adaptive management strategies aimed at reducing the health risks and impacts caused by the bioaccumulation of pollutants in fish in waterbodies that the public relies on for consumption, subsistence, and/or cultural purposes. More specifically, Program data have informed Clean Water Act Section 303(d) impairment listings, TMDL development, and health advisories developed by OEHHA. In the future, Program staff would like to expand the use of the data to include waterbodies and species that communities rely on for fishing, consumption, subsistence, sustenance, cultural, and Tribal purposes, as described for the Program realignment.

Central Coast Program

What data are we collecting?

The Central Coast Regional Water Quality Control Board (Central Coast Water Board; Region 3) is using its Fiscal Year 2020-21 discretionary funds to augment the coastal sampling season to include additional tissue analysis of fish collected at a subset of piers and beaches that are potential or probable subsistence fishing locations along the central coast. This analysis will evaluate a broad spectrum of potential pollutants, including metals (methylmercury, selenium, etc.) and organic chemistry for organochlorine pesticides, PCBs, organophosphate pesticides, and polybrominated diethers.

How are we collecting data?

The Central Coast Water Board generally collects data by allocating funds directly to Program researchers and field crews. In addition, the Central Coast Water Board has also partnered with the California Collaborative Fisheries Research Program at California Polytechnic State University, San Luis Obispo.

Where are we monitoring?

In addition to the standard 2020 coastal zones, the Central Coast Water Board has requested additional samples to be collected at Port San Luis Beach, Avila Beach Pier, Oceano Dunes, Santa Maria River Beach, Toro Creek Beach, Goleta Pier, Moss Landing Harbor Beach, Pajaro River Mouth Beach, and Santa Cruz Pier.

When do we monitor?

The Central Coast Water Board study is specifically designed to occur when the Program is scheduled to collect data for sites contained within the boundaries of the Central Coast Water Board. The sampling seasons vary and depend on the specific study rotations (e.g., coasts, lake or reservoirs, rivers or streams). For the 2020-21 fiscal year, the focus will be on coastal waters. The intent is to align resources during the coastal study so that collections for the region's discretionary study can be leveraged during the Program's collection efforts along the coast to minimize travel costs.

Why are we monitoring?

The Central Coast Water Board prioritized this project concept in a 2019 Human Right to Water Work Plan to support environmental justice goals. These data will provide an evaluation of pollutants in fish in the region with a focus on areas utilized by underserved communities to inform OEHHA health advisories. Existing information suggests that underserved communities and individuals who rely on non-commercial catching or gathering of natural aquatic resources, including fish and shellfish, for consumption to meet needs for sustenance may be at higher risk of exposure to such pollutants. A previous assessment also found that a diversity of people in the region depend on subsistence fishing to increase their protein consumption, and many subsistence fishers sell some of the fish they catch to augment their income. The project will also provide important data and information to inform the newly established subsistence fishing beneficial use defined within the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California.

The data produced by this project will be used in waterbody assessments required under Clean Water Act Sections 305(b) and 303(d). The Central Coast Water Board will evaluate these data

for development of TMDLs and as part of its regulatory and permitting programs. Additional entities that will use these data include OEHHA and other local agencies.

The Central Coast Water Board would like relevant State and local agencies to use the data in their management of natural resources and regulation of activities. More importantly, the data should be available for and used by the public and communities using the related natural resources.

San Diego Program

What data are we collecting?

The San Diego Regional Water Quality Control Board (San Diego Water Board; Region 9) is collecting fish and shellfish tissue pollutant data on a waterbody-specific basis throughout the region. The San Diego Water Board has focused on three general monitoring areas:

1. Supplementing Program surveys for species or waterbody-specific concerns
2. Regional sampling of additional species of concern for specific waterbodies
3. Regional sampling to assess if specific additional pollutants are a concern (e.g., biotoxins)

The San Diego Water Board collaborates with State and local agencies and groups to target specific waterbodies, species, and pollutants to best address regional bioaccumulation concerns. In addition, the San Diego Water Board has prioritized and funded the collection of subsistence consumption information for waterbodies to conduct targeted monitoring to supplement traditional Program sampling as well as OEHHA health advisories for fish in the region.

How are we collecting data?

Generally, data are collected by supplementing Program surveys, or by San Diego Water Board staff doing collections. However, project partners also assist with sample collection (e.g., Local CDFW, Port of San Diego, City of San Diego).

Where are we monitoring?

A variety of waterbodies throughout the region are monitored, including reservoirs, bays, estuaries, lagoons, rivers, and the ocean. Supplemental monitoring primarily occurs in San Diego Bay, and the San Diego Water Board is working to set up a long-term bioaccumulation monitoring plan as an element of an ongoing San Diego Bay Ambient Monitoring Program to track improvement in fish tissue concentrations associated with cleanup activities.

When do we monitor?

Monitoring generally occurs in the summer to fall season, though monitoring can vary due to species-specific and research question needs. Monitoring is project-based and not done according to a set interannual schedule.

Why are we monitoring?

Data are collected to assist in the assessment of attainment and protection of consumption-based beneficial uses, as well as to track progress associated with cleanup actions for pollutants of concern. In addition, data are needed to help with assignment of waterbodies to new beneficial uses for Tribal and subsistence consumption. The San Diego Water Board is using the data in its regulatory programs. Other entities that use the data include OEHHA, local agencies, and non-governmental organizations.

The San Diego Water Board would like relevant state and local agencies to use the data in their management of natural resources and regulation of activities. More importantly, however, the data should be available for and used by the public.

Historical External Recommendations

The 2008 Recommendations Report's overarching recommendation for incorporating a more collaborative and integrated stakeholder process into the Program and BOG was to implement an "integrated monitoring" approach, which would closely and consistently integrate stakeholders and communities reliant on fish for nutrition, subsistence, sustenance, cultural, and Tribal purposes into the process of monitoring, public health advisory development, and risk communication (Figure 5).

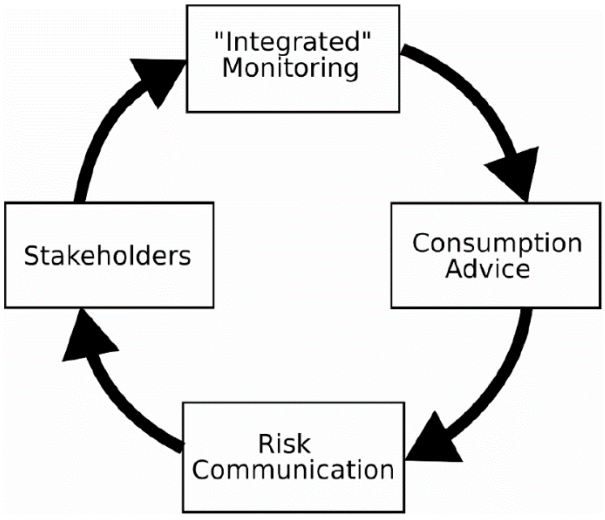

Figure 5. "Integrated" fish monitoring combines stakeholder involvement, monitoring, development of consumption advice, and risk communication with the goal of achieving near-term reductions in human exposure in a manner that incorporates environmental justice principles. (Figure 3 from the 2008 Recommendations Report)

More specific recommendations from the report that will be considered during this realignment process are summarized below. While recommendations 1-3 directly address the above stated reasons for realignment, recommendation 4 does so indirectly. For example, additional indicator species may be added based on feedback from stakeholders.

1) **Increase and incorporate stakeholder involvement into all aspects of the program**
    - Include community-based organizations as stakeholders through the development of a Community Advisory Committee, which would act as a hub for coordinating involvement, engagement, and feedback with the program.
    - Communicate with and engage with the Community Advisory Committee, early, often, clearly, and consistently.
    - Use the Community Advisory Committee to get feedback on and improve the efficacy of risk communication efforts, such as refining communication products and training community members to deliver messages to target audiences.
    - Allocate funding to compensate representatives of community-based organizations represented on the Community Advisory Committee for their participation.
    - The Community Advisory Committee would be composed of representatives from the following groups:
        - Community-based organizations
        - Organizations involved in protecting water quality
        - Organizations involved in habitat restoration (due to the possible influence on bioaccumulation of mercury and possibly other pollutants)
        - Organizations involved in resource (i.e., water and fisheries) management
        - Organizations involved in protecting human health
        - Organizations involved in communicating information on health risks to affected communities
2) **Develop a stepwise program for developing consumption advice** that would result in complete coverage of the State within a 10-year period.
3) **Coordinate with and leverage partnerships** with other bioaccumulation monitoring programs, considering:
    - Sampling design (to avoid duplication and maximize cost-effectiveness)
    - Quality assurance (to promote generation of directly comparable data across the State)
    - Sharing of results and information, including informal sharing of recent unpublished findings
    - Reporting of available data from the various programs

4) **Implement a monitoring design that includes fish and other indicator species**.

- Monitoring of fish at 70 sites per year, integrated into a statewide randomized design[2], in one of ten Focal Areas established to facilitate stakeholder involvement, advisory development, and risk communication.
- Monitoring of fish at 35 sites per year with a Statewide randomized design that would determine the status of the fishing beneficial use throughout the State without bias to known impairment. After five years, the precision of estimates of the areas or miles of each category of waterbody (large rivers, lakes, coastal waters, and bays and estuaries) falling into each designated level of support of the fishing beneficial use would be better than ± 14%.
- Monitoring of fish at 35 targeted sites per year to be used in assessment of long-term trends and effectiveness of management actions.
- Monitoring of bivalves at 5 targeted sites per year to supplement bivalve monitoring performed by other programs.
- Monitoring of small fish at 50 targeted sites per year to be used in assessment of long-term trends in food web mercury, sources and pathways of mercury, and effectiveness of actions to manage mercury contamination.
- Monitoring of bird eggs at 15 targeted sites once every three years to provide information on regional long-term trends in bioaccumulative pollutants, including emerging pollutants and expensive analytes such as dioxins.

The Recommendations Report proposed a timeline for initiating and implementing these recommendations (Appendix 1). The SWAMP statewide Program and the BOG processes have been developed and implemented since the publication of the Recommendations Report, so some aspects of the suggested timeline are irrelevant now. However, some elements of the timeline may inform this realignment process.

Realignment Vision

The impetus behind this realignment effort stems from the discrepancy between the Program vision and its current design. The vision of this realignment is to remedy that discrepancy through the intentional and systematic incorporation and inclusion of community perspectives

[2] The Recommendations Report called for a randomized design to address an objective to assess "the status of the fishing beneficial use throughout the State without bias to known impairment." The Recommendations Report also stated that objectives relating to advisory development and environmental justice would call for a design with targeted sampling.

into the Program and BOG processes. Moreover, the Program and BOG will actively build off of environmental justice and racial equity efforts currently underway, and engage with Water Board programs to ensure the data generated by the Program are aligned and integrated (as detailed in the Work Plan). Funding and other resource limitations make overhauling the entire Program all at once logistically impossible.

Fortunately, there are aspects of the current statewide Program and some regional bioaccumulation monitoring efforts that offer opportunities for a phased realignment approach, including:

- The current dedication of the Central Coast and San Diego Regional Water Boards to regional bioaccumulation monitoring programs that complement the statewide Program and vision.
- AB 762 mandates and funding that can support improved risk communication efforts.
- Recent funding for the statewide Program to support community engagement, which will be critical to the success of this realignment.

With this plan as a guide, this realignment process will focus on incorporating community perspectives and needs into Program efforts with the aim of improving the Program's monitoring efforts and ensuring those data and information are useful and used by the Water Boards, OEHHA, the public, subsistence-dependent communities, and Tribes.

Realignment Implementation

Successful implementation of the realignment requires intentional actions that balance maintaining core aspects of the current statewide and regional program efforts, implementing realignment efforts, and the reality of limited Program and implementation resources (e.g., staff time, funding). To maintain this balance, the realignment will be implemented through a phased approach. Tasks related to alignment and integration with other Water Board programs are detailed in the Work Plan and have been summarized below for reference.

We expect Phase I to take three months, Phase II to be completed in three years, and Phase III to be determined based on the experience and lessons learned from Phase II (Figure 6). We recommend revisiting this plan after the completion of each phase and annually to make sure the implementation is on track.

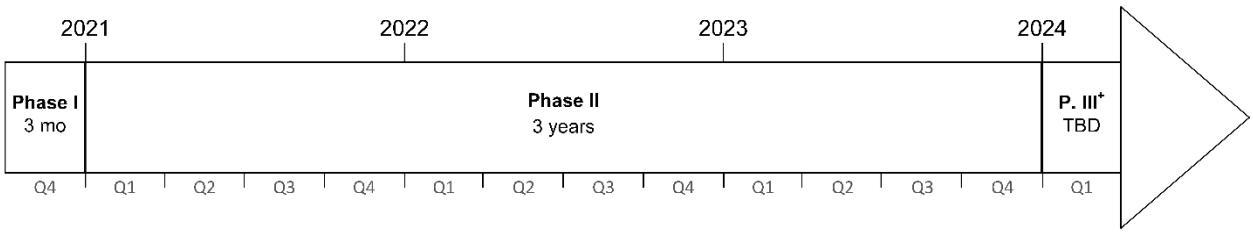

Figure 6. Program realignment timeline.

The implementation of this realignment will be led by a Water Board Committee. The Water Board Committee will include:

- Bioaccumulation Monitoring Program staff
- Regional Board SWAMP Coordinators
- Regional/Divisional Tribal Coordinators
- Other Regional Board staff, managers, and/or executives who will be intimately involved in the pilot realignment process
- Staff, managers, and/or executives from other State Board divisions (e.g., Division of Water Quality) or programs (e.g., Integrated Report) may also be included in the Water Board Committee, as appropriate

The Water Board Committee will conduct most of the work related to coordinating the realignment implementation process, including recruiting and engaging with the pilot region's Community Advisory Committee as well as providing updates on the realignment implementation progress or soliciting recommendations from the BOG, as needed. Members of the Water Board Committee will also be responsible for providing updates or developing presentations, reports, or similar products on the realignment implementation to State Board and Regional Board executives and board members, as appropriate.

The systematic incorporation and inclusion of community perspectives will be achieved through the development of a region-specific Community Advisory Committee. Following the first recommendation in the Recommendations Report, the Community Advisory Committee will act as a hub for documenting the community needs of the region, coordinating involvement, engagement, and feedback with the Program. The Community Advisory Committee will be composed of representatives from:

- Tribes
- Community-based organizations
- Organizations involved in protecting water quality
- Organizations involved in habitat restoration (due to the possible influence on bioaccumulation of mercury and possibly other pollutants)

- Organizations involved in resource (i.e., water and fisheries) management
- Organizations involved in protecting human health
- Organizations involved in communicating information on health risks to affected communities

Tribal engagement will be guided by the State Water Board's Office of Public Participation (OPP) Tribal Affairs staff (e.g. State Board Tribal Liaisons, Regional Tribal Coordinators). To prevent redundant or duplicated work by Tribal representatives, the Water Board Committee will work with the Tribal Liaisons and Regional Tribal Coordinators to collaborate, streamline, and leverage ongoing Tribal engagement of related efforts elsewhere in the Water Boards (e.g. Tribal Beneficial Use Designations, Harmful Algal Blooms, etc.).

Depending on the extent of participation and preferences of the different Tribal, agency, and organization representatives in the Community Advisory Committee, the Committee may develop sub-committees with targeted focus (e.g., Tribes, community-based organizations, agencies). While some discussion can be done on the sub-committee level, it will be critical to bring insights, ideas, needs, etc. back to the Committee level where final recommendations will be made. Finally, to keep discussions focused and productive, meetings held by the Community Advisory Committee or any sub-committee will only be attended by Community Advisory Committee members, invited guests, and the members of the Water Board Committee. Bioaccumulation Monitoring Program staff will provide regular updates on discussions, progress, and recommendations from the Community Advisory or Water Board Committees during regular BOG and California Water Quality Monitoring Council meetings, both of which are open to the public.

Phase I

October – December 2020

During this phase, Program staff will work with regional programs to determine which region will be selected as the pilot for Phase II and begin internal coordination and preparation for Phase II (Table 2).

Table 2. Specific tasks to be completed during Phase I.

	2020 Q4		
Task	Oct	Nov	Dec
Program staff send out a call to all Regional Boards to gauge interest and availability to participate as the pilot region	X		
Program staff to conduct a review of previous fish consumption surveys to get an understanding of what has been done and where	X	X	X
Program Realignment Team to review Regional Board interest, select pilot region		X	
Select Water Board representatives for the Water Board Committee, to inform and guide the pilot (e.g., regional BOG/SWAMP coordinator, Tribal liaison and coordinators, basin plan unit)		X	X
Draft list of items, questions, needs specific to the regional Community Advisory Committee; to be used to help focus Committee recruitment			X

Phase II

January 2021 – December 2023

During this phase, the Water Board Committee will recruit and coordinate the Community Advisory Committee, which will oversee the regional realignment pilot (Table 3).

Table 3. Specific tasks to be completed during Phase II.

	Calendar Year											
	2021				2022				2023			
Task	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Establish Pilot Organizational Structure												
Convene Water Board Committee - initial decisions on scope and funding strategy for pilot	X											

	Calendar Year											
	2021				2022				2023			
Task	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Finalize list of items/questions/needs specific to regional Community Advisory Committee; to be used to help focus Committee recruitment	X											
Recruit Community Advisory Committee members	X											
Convene and sustain Community Advisory Committee		X	X	X	X	X	X	X	X	X	X	X
Identify Gaps and Develop Recommendations												
Conduct in-depth workshops with Water Board program staff and management		X	X									
Facilitate engagement and document needs in the region		X	X									
Identify consumption data and information gaps			X									
Identify species and sampling designs (Sites, Frequencies) required to fill gaps			X									
Develop regional realignment recommendations based on current program efforts and needs				X								

	Calendar Year											
	2021				2022				2023			
Task	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Review and finalize Realignment Recommendation Document				X								
Document Plans for Realignment Sampling and Analysis												
Draft Realignment Monitoring and Analysis Workplan				X								
Final Realignment Monitoring and Analysis Workplan				X								
Draft Realignment QAPP				X								
Final Realignment QAPP				X								
Sampling Year 1 of Realignment						X	X	X				
Year 1 Data Analysis, Interpretation & Presentation(s)										X		
Develop and Communicate Realignment Consumption Advice												
Develop consumption advice										X	X	
Support risk communication activities											X	X
Debrief Realignment Pilot Process												
Identify Successes and Gaps; Develop Recommendations for Improvement				X				X				X
Discuss Next Steps & recommendations for scaling up efforts statewide												X

Phase III+

January 2024 – TBD

During this phase, the Water Board Committee will debrief on Phase II (to include a compilation of lessons learned from the previous phases), and map out how the long-term realignment of the entire Program, in all regions, could be achieved. Program staff will update this plan to reflect a long-term Program realignment implementation plan.

Specific tasks to be completed during this phase will be determined after the Water Board Committee completes their Phase II debrief.

Future Program Needs

As stated in the Foreword, the original mission of the Water Boards Bioaccumulation Program was to provide statewide monitoring data and information that could be used to:

1) Assess and contribute to the protection and restoration of fishing and aquatic life beneficial uses that are impacted by the bioaccumulation of pollutants in California's waterbodies, and
2) Assess the human health risks associated with the consumption of contaminated fish and shellfish in California's freshwater and coastal ecosystems, and use that information to support the development of advisories that would inform consumers of significant health risks associated with the consumption of particular species.

While not part of this alignment, a future Program need is to incorporate a state-wide assessment of bioaccumulation on aquatic life beneficial uses. The bulk of efforts to date, and associated with this realignment, are focused on human beneficial uses (e.g. fishing and human health risk). Less effort by the Program has been directed toward the assessment and contribution of bioaccumulative pollutants to the impairment of aquatic life beneficial uses, which is a result of resource constraints. Many small-scale local studies, often conducted by Program partners, have identified impacts to aquatic life beneficial uses, especially for threatened and endangered species (e.g. sea otters, condors, sea turtles, amphibians). Impacts to these species, which are often considered keystone or sentinel species, can have cascading impact on aquatic ecosystems. Should resources become available, the Program would endeavor to address the aquatic life impacts from bioaccumulation on a statewide basis, consistent with the mission.

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Appendix 1: Proposed Timeline from the 2008 Recommendations Report

Proposed timeline for initiating and implementing the Program at the full funding level from the 2008 Recommendations Report, Table 3 (Davis 2008).

	Year 1				Year 2				Year 3			
Task	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Establish Organizational Structure												
Convene Preliminary Community Advisory Committee - initial decisions on scope and funding strategy	X											
Convene Peer Review Panel	X											
Review and revise recommendations report	X											
Obtain initial agreement on goals and objectives	X											
Develop workplan for the monitoring program	X											
Select contractors to design and implement the program	X											
Convene and sustain Community Advisory Committee		X	X	X	X	X	X	X	X	X	X	X
Obtain agreement on objectives and assessment questions		X										
Identify long-term bioaccumulation monitoring plans of other programs in California and develop plans for coordination		X										
Identify Focal Area #1 for first year sampling			X									
Solicit CBO participation in Focal Area #1			X									

	Year 1				Year 2				Year 3			
Task	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Interim Monitoring Measures												
Identify and sample targeted sites for long-term time series - fish	X											
Fill fishing activity information gaps for Focal Area #1				X								
Develop Probabilistic Sampling Frame												
Compile fishing activity information		X	X									
Develop spatial statistical models to summarize historic data and define data gaps and estimate expected risk across the State		X	X									
Obtain GIS layers needed for sampling frame: base maps, land use, fishing activity, historic data, discharge locations		X	X									
Draw Probabilistic Sampling Points				X								
Develop Targeted Sampling Designs (Sites, Frequencies)												
Fish				X								
Bivalves			X									
Small Fish			X									
Avian Eggs			X									
Document Plans for Year 1 Sampling and Analysis												
Draft QAPP				X								
Final QAPP				X								
Draft Sampling and Analysis Workplan				X								

	Year 1				Year 2				Year 3			
Task	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Final Sampling and Analysis Workplan				X								
Begin Sampling Year 1 and Focal Area #1					X							
Develop and Communicate Consumption Advice												
Develop consumption advice for Focal Area #1									X	X		
Conduct risk communication activities in Focal Area #1											X	X
Identify Focal Area #2 for second year sampling					X							
Solicit CBO participation in Focal Area #2					X							
Fill fishing activity information gaps for Focal Area #2						X	X					