

Member Spotlight

Regional Monitoring Program (RMP) for Water Quality in San Francisco Bay

The Regional Monitoring Program (RMP), led by the San Francisco Estuary Institute (SFEI), was established in 1993 with the goal of defining, investigating, and providing the critical information that decision makers need in order to develop cost-effective regional management decisions for the San Francisco Bay. In particular, RMP is dedicated to determining spatial patterns and long-term trends in contamination and toxicity through the sampling of water, sediment, bivalves, bird eggs, and fish.

RMP is an innovative partnership between numerous and diverse stakeholders across the region, including 37 wastewater agencies (12 of which are NACWA member agencies), regulators, scientists, and non-governmental organizations. Administrative and technical oversight of RMP is continuously performed by the diverse stakeholders to ensure that the highest priority issues receive appropriate attention, and that RMP's \$1.3 million annual funding is as cost-effective as possible.

For over 25 years, detailed investigations have been performed for a range of contaminants and environmental issues. Accordingly, RMP has generated decades of robust data sets to inform regional management decisions concerning the Bay. When actions are recommended by RMP and subsequently implemented, RMP data are then used to track and evaluate how successful the actions are at achieving their respective goals. In this way, RMP is continuously monitored and improved.

In particular, three recent RMP investigations have been remarkable in their achievements: nutrients, microplastics, and per- and polyfluoroalkyl substances (PFAS). For nutrients, RMP data sets have been indispensable to answering the question: *Do wastewater agencies need to spend billions of dollars on new infrastructure to remove nutrients?* For microplastics, RMP pioneered new and more accurate laboratory methods that led to the conclusion that microplastic levels in stormwater are 300 times higher than that of wastewater. For PFAS, RMP has developed a unified approach to consolidate sampling efforts at 37 wastewater agencies, thereby reducing the staffing and cost burden, as well as generating more robust and accurate data.

RMP is an exceptional example of a regional collaboration between numerous and diverse stakeholders with a common goal of protecting the San Francisco Bay for over 25 years. Through sound science and technological evolution, RMP has informed decision making for how to best manage a critically important ecosystem. RMP is truly one-of-a-kind and serves as a model of collaboration nationwide.

What is the RMP?

Designated in 2012 as a “Wetland of International Importance,” San Francisco Bay (Bay) is the largest estuary on the west coast, spanning approximately 550 square miles across 9 counties and 40 cities. In addition to supporting biodiversity ranging from fish to migratory birds to endangered species, the Bay provides environmental benefits and supports over 7 million people.

Originally conceived in the mid-1980s, RMP, led by the San Francisco Estuary Institute, was established in 1993 with the goal of defining, investigating, and providing the critical information that regulators, dischargers, and other decision makers need to manage the Bay effectively. In particular, RMP is dedicated to determining spatial patterns and long-term trends in contamination and toxicity through the sampling of water, sediment, bivalves, bird eggs, and fish.

By establishing this partnership between Bay stakeholders, RMP laid the foundation for a program unlike any other in the United States, rooted in science, technological evolution, and regional collaboration. RMP has combined financial support, direction, and participation by diverse stakeholders. Through this model of collective responsibility, RMP has developed cost-effective regional management decisions for over 25 years.

How is RMP structured?

The success of RMP's regional-scale environmental stewardship lies in its ability to bring numerous and diverse stakeholders together: 37 wastewater agencies (including 12 NACWA member agencies), regulators, scientists, and non-governmental organizations ([Appendix A](#)). RMP structure is illustrated in [Appendix B](#), where both the Steering Committee and the Technical Review Committee oversee eight workgroups and four strategy teams. The Steering Committee determines the overall budget, allocates program funds, tracks progress, and provides direction to the program from a manager's perspective. The Technical Review Committee oversees the activities of the workgroups and technical content of the program as a whole. The heart of RMP's activities are planned and implemented by the workgroups and strategy teams, which cover specific focus areas such as emerging contaminants, PCBs and dioxins, microplastics, and nutrients. Administrative and technical oversight of the workgroups is continuously performed to ensure that the highest priority issues receive appropriate funding and staffing, and that RMP's \$1.3 million annual funding is as cost-effective as possible.

How is RMP so cost-effective and innovative for collaborative regional solutions?

For over 25 years, RMP has generated robust data sets to inform cost-effective regional management decisions. For example, data collected through this program are used to establish background contaminant conditions used in wastewater discharge permits and to estimate maximum discharge pollutant loading limits. When actions are recommended and implemented by RMP, data are used to track and evaluate how successful the actions are at achieving their respective goals, such as reducing contaminant loads or restoring ecosystem support functions. In this way, RMP is continuously monitored and improved.

The following examples illustrate how RMP has addressed several emerging high-priority water quality concerns for the Bay, including nutrients, microplastics, and per- and polyfluoroalkyl substances (PFAS).

Nutrients: Nutrient pollution caused by excess nitrogen and phosphorus in waterways is one of America's most widespread, costly, and challenging environmental problems. Although algal blooms, fish kills, and other nutrient-related environmental impacts have generally not been observed in the Bay, a growing body of scientific evidence suggests that the Bay's

assimilative capacity for nutrients could be weakening. To proactively address this emerging issue, Bay stakeholders are collaborating through a NACWA award-winning Nutrient Management Strategy (NMS) Program. RMP is a cornerstone of the NMS Program, and has provided decades of historical water quality data, recent nutrient-focused data from both sampling and in-situ monitoring, and an annual report called “The Pulse of the Bay” ([Appendix C](#)). Information provided by RMP has been critical to developing science-based, regionally-integrated solutions that cost-effectively protect the Bay from nutrient impairment. The consequences of developing nutrient plans without sound science would be dire; if nutrient limits were set arbitrarily, the environmental benefits could be minimal while the costs would be significant, at potentially \$9 billion in capital investment.

Microplastics: In 2019, RMP completed the first comprehensive regional study of microplastic pollution in a major estuary with the goal of establishing baseline microplastics concentrations in Bay water, fish tissue, stormwater, and wastewater effluent. The East Bay Municipal Utility District (EBMUD), a participating wastewater agency, played an important role in developing the study plan for wastewater. First, EBMUD laboratory staff established that spectroscopic confirmation was necessary to distinguish microplastics from other non-polymer microparticles, and published the findings in a peer-reviewed scientific journal. Following, the EBMUD team developed a technique for wastewater sampling of microplastics that improved the accuracy associated with extrapolating measured concentrations, which can be variable to daily loading rates. With improved accuracy, the study concluded that the annual discharge of microplastics via stormwater is 300 times greater than that of wastewater. By identifying the principal source of microplastics, future work can focus on stormwater to better inform data collection and decision making ([Appendix D](#)).

PFAS: In 2009, RMP was one of the first programs to begin collecting PFAS data in treated wastewater. As concern about PFAS has been growing, California regulators began requiring wastewater agencies to monitor PFAS in treated wastewater. Instead of all 37 wastewater agencies in the Bay individually conducting sampling, RMP developed an approach to consolidate agency efforts. RMP developed a sampling plan, organized laboratory analyses, will perform quality assurance on the data, and will summarizing the results in a technical report. This unified approach has reduced the staffing and cost burdens on individual wastewater agencies, improved the quality of the collected data, and consolidated the data into one source that can be easily shared with regulators.

Why does RMP deserve this award?

RMP is an exceptional example of regional collaboration between numerous and diverse stakeholders, including regulators, scientists, wastewater agencies, and environmental groups, with a common goal of protecting the Bay for over 25 years. By collecting robust data sets and performing detailed investigations, RMP has informed decision making for how to best manage a critically important ecosystem. RMP deserves recognition as a model of collaboration nationwide.

Appendix A: Regional Monitoring Program Members

- **San Francisco Estuary Institute**
- **Regulators**
 - San Francisco Bay Regional Water Quality Control Board
 - U.S. Environmental Protection Agency, Region IX
- **Dischargers**
 - Bay Area Clean Water Agencies (BACWA) representing 37 municipal wastewater dischargers that serve over 7 million people in the San Francisco Bay Area. 12 are NACWA members.
 - Bay Area Stormwater Management Agencies Association (BASMAA) • Industrial dischargers represented by the Western States Petroleum Association
 - Cooling Water dischargers
 - Refineries
 - Dredgers represented by the Bay Planning Coalition, Port of San Francisco
- **Scientists**
 - The U.S. Army Corps of Engineers
 - US Geological Survey
 - University of Minnesota
 - Duke University
 - Environment Canada
 - University of Toronto
 - USEPA Region 9, Superfund Division
 - University of Toronto
 - Simon Fraser University
 - University of Virginia
 - Romberg Tiburon Center
 - UC Berkeley
 - University of Georgia
 - UC Santa Cruz
- **Municipalities**
 - City and County of San Francisco
 - City of San Jose
- **Non-governmental organization that specializes in water quality in the Bay**
 - 37 Bay Area Wastewater Agencies (12 NACWA Members)

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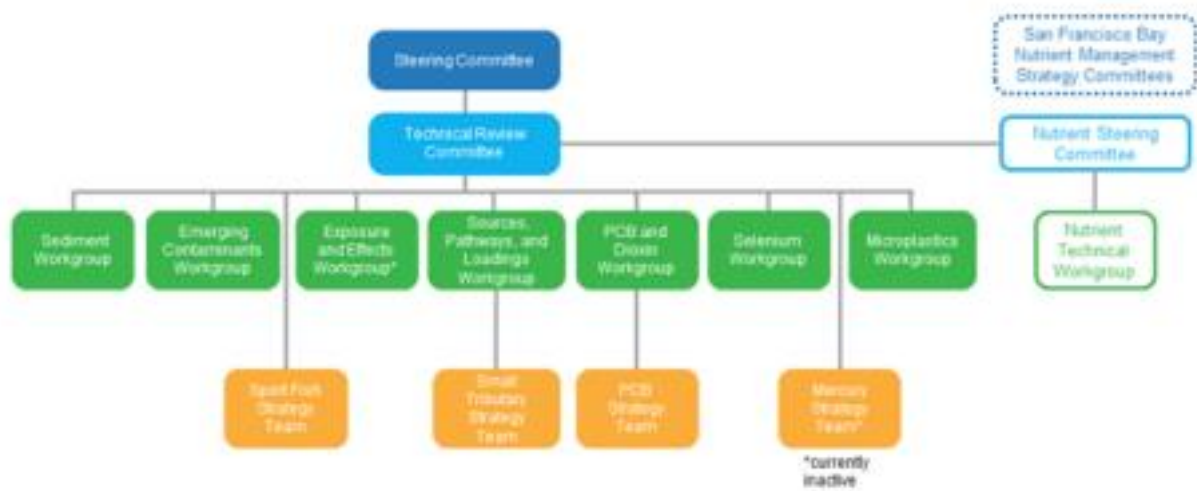
37 Bay Area Wastewater Agencies (12 NACWA Members)



37 ~450 MGD 7+ million

WWTPs Treated wastewater Service population

Appendix B: Regional Monitoring Program Structure



Appendix C: Pulse of the Bay Annual Reports

