Monterey Bay National Marine Sanctuary

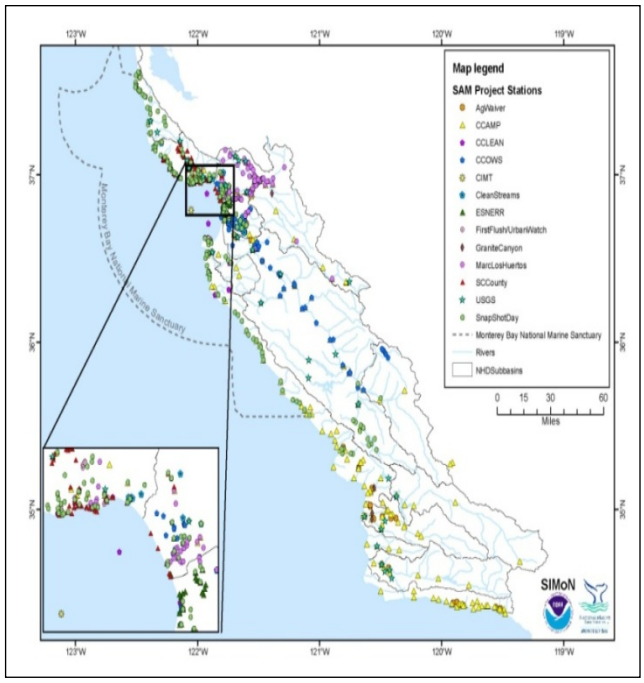
Water Quality Integrated Analyses

Management Issue

Management of Monterey Bay National Marine Sanctuary (MBNMS or Sanctuary) water quality demands sophisticated data integration, analysis, and reporting across a diverse group of institutions.

Description

Much of the long-term data collected by individual water quality monitoring programs in Sanctuary watersheds have been over a limited geographic range. This information, which includes physical, chemical, and biological measurements, is not stored in formats that are useful for analysis beyond the scope of the data generating organization. Presently, no method exists to effectively integrate, manage, and utilize the diverse data sets collected by regulatory agencies, academic institutions, businesses, and non-profit organizations. The Sanctuary and its partners have been developing a model for ongoing data integration, analysis, and reporting that encompasses the water quality data from coastal watersheds and marine environments. A limited implementation of this model is currently being tested; however, to effectively assess Sanctuary-wide water quality, the model needs to be applied over a wider geographic range and encompass a greater diversity of data types. An integrated water quality data system will be a tool for investigating interactions between anthropogenic changes in coastal watersheds and pollution levels in freshwater, estuarine, and marine environments; as well as facilitate monitoring coordination.



Location of water quality monitoring locations measured by various organizations within the Sanctuary and adjacent watersheds. Map Credit: Sophie De Beukelaer (MBNMS).

Questions and Information Needs

1) How have coastal wetlands and riparian environments changed over historic time in central California?

2) Where are present day coastal wetlands and riparian environments in central California, how healthy are they, and what are the potential impacts that could affect them?

3) What types of restoration methods are appropriate to central California?

4) What types of monitoring designs can be incorporated into wetland restoration projects to track long-term changes in water quality?

5) What are the potential sources and risks of emerging pollutants to surface waters and near shore environments?

6) Where and what types of improvements in land management have been made in coastal watersheds with the goal of improving water quality in watersheds and the near shore environment?

7) Determine and implement the necessary monitoring to assess the condition of water quality in the Sanctuary.

Scientific Approach and Actions

- Create a system for ongoing water quality data integration, and multi-tiered data dissemination that will be self-sustaining
- Develop methods of spatial and temporal data analysis; including a Geographic Information System (GIS) with data layers that will facilitate comparison of geographically referenced data with diverse water quality data sets at multiple watershed scales
- Initiate or maintain collaborations with water quality monitoring organizations and water quality investigators in the Central Coast region

Potential Key Partners and Information Sources

Central Coast Water Quality Data Synthesis Assessment and Management (SAM) Project, Central Coast Regional Water Quality Control Board, California Coastal Commission, California Environmental Protection Agency, California Surface Water Ambient Monitoring Program, Southern California Coastal Water Research Project, University of California Davis, California State University Monterey Bay, Applied Marine Sciences, California Environmental Protection Agency

Management Support Products

- A system for region-wide integration of information on implementation of land management practices
- A detailed model for integration, storage, and ongoing analysis of water quality and geographic data sets
- Analyses to detect water quality trends over time and understand relationships between water quality constituents and hydrologic conditions in watersheds
- Assessment of consistency among water quality problems monitoring effort, and levels of management practice implementation efforts

Planned Use of Products and Actions

- Provide support for determining placement of water bodies on the Regional Water Quality Control Board's List of Impaired Water Bodies
- Prioritize monitoring locations for specific management objectives
- Coordinate monitoring and data storage activities among organizations to optimize Central Coast monitoring resources
- Use integrated water quality data sets and data products (e.g., pollutant load calculations) to determine potential impacts from watershed based pollutants on the Sanctuary

Program References

MBNMS Management Plan

– Water Quality Protection Program Implementation Action Plan, Strategy WQPP-8, WQPP-9, WQPP-10, WQPP-22

MBNMS Condition Report

– Are specific or multiple stressors, including changing oceanographic and atmospheric conditions, affecting water quality? (Nearshore and Estuarine Environments - Question 1)
– What is the eutrophic condition of sanctuary waters and how is it changing? (Nearshore and Estuarine Environments – Question 2)
– Do sanctuary waters pose risks to human health? (Nearshore and Estuarine Environments – Question 3)
– What are the levels of human activities that may influence water quality and how are they changing? (Nearshore and Estuarine Environments – Question 4)

ONMS Performance Measures

– Reduce the concentrations of urban water quality contaminants
– Number of sites in which water quality, based on long-term monitoring data, is being maintained or improved