SF ESTUARY
Wetlands Regional Monitoring Program

Vegetation Monitoring SOP Cover Letter

WRMP science framework context (Guiding and Management Questions):
At the request of the Technical Advisory Committee of the Wetland Regional Monitoring Program (WRMP), the Vegetation Workgroup was formed to identify standard operating procedures (SOPs) for monitoring wetland vegetation across the San Francisco Estuary (SFE). As illustrated in the WRMP conceptual models compiled in the WRMP Program Plan, vegetation is a foundational component of tidal wetland habitats, and a key indicator of tidal wetland distribution, abundance, and condition. Tidal wetland vegetation both responds to and influences fundamental physical drivers such as inundation, elevation, and salinity and is an important component of habitat structure for rare and native tidal wetland fish and wildlife. For these and related reasons, monitoring vegetation composition, distribution and dynamics is essential for answering questions of interest to the WRMP. Data collected in alignment with this SOP are intended to address the following WRMP Guiding and Management Questions:

- Guiding Question 1: ***Where are the region's tidal wetland ecosystems, including tidal marsh restoration projects, and what net landscape changes in area and condition are occurring?***
    - Management Question 1A: *What is the distribution, abundance, diversity, and condition of tidal marsh ecosystems, and how are they changing over time?*
- Guiding Question 2: ***How are external drivers, such as accelerated sea level rise, development pressure, and changes in runoff and sediment supply, impacting tidal wetlands?***
    - Management Question 2A: *How are tidal marshes and tidal flats, including restoration projects, changing in elevation and extent relative to local tidal datums?*
- ***Guiding Question 4: How do policies, programs, and projects to protect and restore tidal marshes affect the distribution, abundance, and health of plants and animals?***
    - Management Question 4A: *How are habitats for assemblages of resident species of fish and wildlife in tidal marsh ecosystems changing over time?*

SOP development process context:
Over the course of a year, the Vegetation Workgroup systematically reviewed different techniques for monitoring vegetation at various scales and built consensus around best approaches to answering the WRMP's monitoring questions related to vegetation. The group worked to balance the desire for fine-scale data collection, a regional scope, differing context for historic and recently restored wetlands and unknown funding constraints to recommend a suite of vegetation monitoring that can best address WRMP goals. The Vegetation SOP prioritizes monitoring activities in tiers and includes alternative approaches that can be implemented depending on available resources.

Scientific context:
Data collected using this SOP will provide information about:

- Distribution of dominant vegetation communities across elevational and estuarine salinity gradients and changes over time in the SFE.

- How vegetation develops in wetland restoration projects.
- How vegetation distribution in existing tidal wetlands changes across key transition zones as sea-levels rise.
- The overall ecological integrity of the SFE's ecosystem as the climate changes, because vegetation creates the wetland habitat itself and responds to many important physical (salinity, inundation, and temperature) and biotic (e.g. invasive species) factors.

Value of the SOP:
The Vegetation Monitoring SOP provides guidelines for collecting data that can be used to assess baseline and changes to the vegetation within the SFE. Such data are key for evaluating ecological responses to restoration, climate change, and other anthropogenic factors.
The Vegetation SOP is intended to facilitate:

- Collection of new data from remote-sensing of regional imagery to assess the distribution and track change of dominant vegetation alliances throughout the entire SFE.
- Standardized and comparable methods for vegetation monitoring at numerous sites.
- An improved understanding of how vegetation communities respond to wetland restoration and how they compare with historic and reference locations.
- Generation of robust baselines for assessing ecological change.

Regulatory context:
The data the WRMP collects with this SOP at WRMP monitoring sites are intended to provide long-term, regional context to support greater efficiencies and enhance the value of permit-driven monitoring of wetland restoration projects in several ways. Recommendations in the SOP are intended to serve as a guide for best practices to maximize the value of data produced by individual projects.

- Suggested standardized protocols provide a template for monitoring that can readily be adjusted to specific projects.
- The SOP includes tiers of monitoring approaches, including photo-documentation that is relatively low cost and could be integrated into existing regulatory requirements with a relatively low investment.
- Data collected can be analyzed and synthesized at the regional scale, provide relevant reference conditions, and enhance the inference from project monitoring.
- Permit-driven compliance monitoring is project-specific. As the WRMP grows, some individual restoration projects may be able to use data collected with this SOP to satisfy permit monitoring requirements.

WRMP Monitoring Plan Implementation context:
This SOP is a long-term vision for data collection that can help answer management questions identified in the WRMP Program Plan. This document can be used to help guide the development and implementation of the initial WRMP Monitoring Plan; however, the SOP itself was not intended to serve as a monitoring plan.

- This SOP is intended to guide the development and implementation of WRMP monitoring plans

- Recommendations in the SOP are not intended to be written directly into permits, but are intended to provide guidance regarding suitable sampling methods that will maximize the integration and value of permit-associated monitoring data.

Read the full SOP here