



UTILIZING NASA AND ESA EARTH OBSERVATIONS WITHIN THE BAYDELTA LIVE CONSTITUENT TRACKER DECISION SUPPORT TOOL TO MONITOR TURBIDITY, WATER TEMPERATURE, AND CHLOROPHYLL-A CONDITIONS FOR REAL-TIME WATER OPERATIONS IN THE SAN FRANCISCO-BAY DELTA

Utilizing NASA and ESA Earth Observations to Monitor Water Quality Conditions in the San Francisco-Bay Delta

WATER QUALITY DECISION SUPPORT TOOLS FOR DELTA OPERATIONS

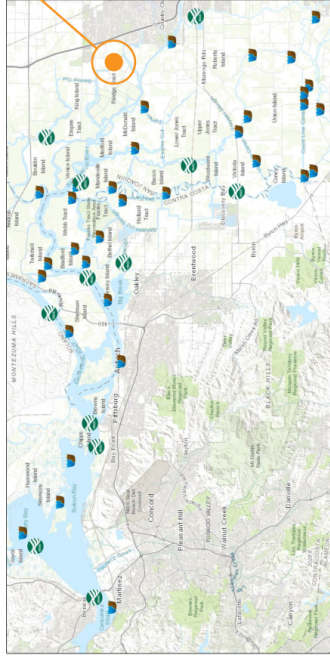
The Bay Delta Live water quality data portal is a collaborative effort to integrate NASA Earth Science Data with water quality, environmental data and decision support tools for the State of California. Water quality is a critical element of freshwater supply, particularly in times and areas of drought. Water quality monitoring is typically reliant on physical water samples and fixed station data, both of which have gaps in spatial and temporal coverage of water quality conditions. Remotely sensed information can help supplement existing data, supporting more informed water management practices and representing a wealth of information that has yet to be fully leveraged.

This project's major objective is to make NASA Earth Science Data available to water resource managers and decision makers in an easy to use web-based application. To do this, we propose building on existing tools so that this data is added to current workflows and can be easily synthesized with other key operations, monitoring data and models. This product will be used for improved monitoring and management strategies for pumping facilities, such as pumping restrictions, periodic closure, or Delta smelt salvage at pumping facilities in the southern Bay-Delta.



DATA AVAILABLE:

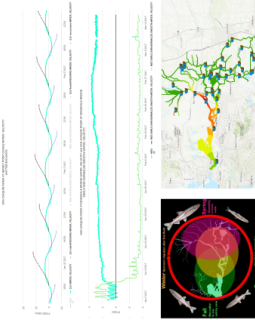
Remote Sensing Imagery	Sentinel 2 and 2A Landsat 8	Aerial Surveys	Flights over the Bay-Delta Water Quality Snapshots
Boat Cruises	DWR Turbidity Boat Transects USCS Boat Cruises	Sensor Network	In-situ data provided from USCS sensors CDEC, USCS and DWR
Fisheries Monitoring	Salvage USFWS EDSM CDFW Seasonal Trawls	Real Time Operations	X2 NOOI Sensors Delta Inflow
Software Utilization	Post Processing of Remote Sensing Imagery Constituent Tracker Algorithm		



TURBIDITY MONITORING USE CASE

The decline of the Delta Smelt reinforces our need for effective Operational Management in the Bay-Delta. Turbidity conditions in the winter months are a signal of Delta Smelt movement for spawning and often lead to curtailing of exports from the South Delta Pumping Facilities. This project aims to add additional data to the decision-making tool box to ensure that Delta Smelt are protected while also maximizing export operations. In this project we are adding two additional resources to for managers:

- High Resolution Remote Sensing Imagery
- Post-Processed for Turbidity
- Constituent Tracker Output Values for Turbidity Without Tidal Influence

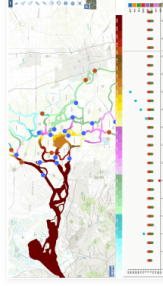


DATA PROVIDERS AND COLLABORATORS



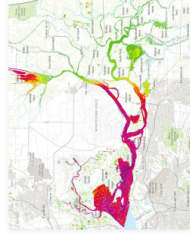
CONTRIBUTING TURBIDITY DATA

Constituent Tracker



The constituent tracker project currently underway aims use advanced data modeling algorithms, implement precise error handling techniques, introduce new data constituents (including remote sensing data), improve regional granularity, develop data visualization techniques, and add data dashboards to view and report these data.

Satellite Imagery



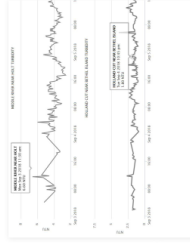
Landsat Imagery from March 7, 2017
Imagery is processed by a team at Oregon State University

DWR Turbidity Transects



Mapped turbidity values for boat surveys of turbidity on Jan 4, 2016
These surveys are operated by DWR to provide supplemental turbidity information to the Smelt Working Group.

In Situ Turbidity Monitoring



Real-time turbidity data is delivered to Bay Delta Live via web services. Data tools allow for the creation of visualizations.