Data Engagement Initiatives at the Water Resources Board

California State Water Resources Control Board
Office of Information Management & Analysis
Overview

• CA Water Boards 101
• Build Capacity / Infrastructure at WB
  • Data Flows
  • Data Literacy
• Foster Engagement
• Create Data Products
• Open Data Resolution
CA Water Boards

• 10 Boards (9 Regional WQ, 1 State WR)
• 68 (7*9 + 5*1 = 68) Governor-appointed Board Members
• State Board has water quality, water rights, drinking water, funding and fiscal/administration duties
Water Boards by the Numbers

- Water Quality, Water Rights and Drinking Water number (as of June 30, 2018)
  - 10 Boards, 43 office locations
  - 18 drinking water offices, 25 State and Regional Board office locations
  - >45 programs, ~15 core regulatory programs
  - 2178 positions, 338 in supervisory / management positions
  - $736,000,000 annual operating budget
  - Regulate ~38,000 dischargers
  - Allocate ~34,000 water right holders
  - Plan/Assess $37,600,000 in monitoring
  - Fund $902,000,000 in local assistance funding and cleanup
  - Fund $10,600,000,000 in loans (as of June 30, 2018)
  - Fund $20,000,000 in penalties assessed in 2017
  - Fund $10,600,000,000 in loans (as of June 30, 2018)
Background

• September 2016 – **AB 1755: The Open and Transparent Water Data Act**
  • Develop an integrated platform for existing water and ecological data
  • Make water-related data, tools, and applications developed using state funds publicly accessible
  • Promote principles of openness and interoperability (“making information accessible, discoverable, and usable by the public can foster entrepreneurship, innovation, and scientific discovery”)

• July 2018 – **State Water Resources Control Board Resolution 2018-0032: Adopting Principles of Open Data as a Core Value and Directing Programs and Activities to Implement Strategic Actions to Improve Data Accessibility and Associated Innovation** ([link](#))
  • Make Data Accessible (“Open First”): make all critical public data available in machine readable datasets with metadata and data dictionaries
  • Understand Data Quality and Integrity: ensure data are of known and acceptable quality; deploy practices to protect its integrity with standards and protocols
Background

What is Open Data?

According to Project Open Data\(^1\):

- **Public** – presumption in favor of openness
- **Accessible** – available in convenient, modifiable, and open formats that can be retrieved, downloaded, indexed, and searched; format should be machine-readable (i.e., data are structured to allow automated processing)
- **Described** – provide sufficient information to understand strengths, weaknesses, analytical limitations, security requirements, as well as how to process (metadata and data dictionaries)
- **Reusable** – available under an open license with no restrictions on use
- **Complete** – published with the finest possible level of granularity that is practicable; aggregate data should reference the primary data
- **Timely** – made available as quickly as necessary to preserve the value of the data, accounting for key audiences and downstream needs
- **Managed Post-Release** – point of contact to assist with data use

\(^1\)project-open-data.cio.gov/principles/
Build Capacity

Improve Data Flows / Build Open Architecture and Infrastructure
Enhance organization-wide ‘data literacy’
Improve Data Flows

Databases → Flat Files
Improve Data Flows

Open Data Portal

• Tools to automate cleaning and loading data
Improve Data Flows

APIs

• Open Data Portal (dkan)
• Internal Databases
Build Capacity

Improve Data Flows / Build Open Architecture and Infrastructure
Enhance organization-wide ‘data literacy’
Build Capacity

Pilot assessment and training program:

• Reinforce basic concepts (how to engage with data)

• Apply best practices throughout the data life cycle (collecting, storing, managing, analyzing, reporting, ...)
CA Water Boards - Data Literacy Assessment (10 of 23)

Question 8:
Based on the plot on the left, which analyte did not have any samples that passed the Data Quality check?

A. Ammonia as N. Total
B. Enterococcus
C. Oxygen, Dissolved, Total
D. Salinity, Total
E. Specific Conductivity, Total
Let us focus our exploration on one specific analyte - Ammonia.

- Click on icon next to Analyte to access its metadata.
- Unselect all the analytes except Ammonia as N. Total to keep only the ammonia samples in our dataset.
- Now drag and drop Result on the x-axis.
- Click on Histogram so that we can better view the distribution of the results.
- From Stats, select Mean & Median so that it is displayed in our plot.

Question 7:
You will notice that the Mean is larger than the...
The dataset on the left contains 3403 samples from chemistry and field analyses of the Tijuana River.

- Drag Analyte to the y-axis
- Drag Unit to the x-axis

**Question 5:**

Based on the plot, which of the following analytes is measured in more than one unit.

- A. Ammonia as N. Total
- B. Oxygen, Dissolved, Total
- C. pH
- D. Salinity, Total
Foster Engagement With Data

Encourage data use and internal / external collaboration
Foster Engagement With Data

Community / Civic Engagement

• Water Board Data Fair – March every other year
• Watershed Health Indicator and Data Science Symposium – June every year
• California Water Data Challenges – Every year (most recent trash and drinking water)
• “Local” hackathons and brigades

Workforce Engagement

• WB Data Science Club
• CalData
• Recruitment Fairs / College Embed
California Safe Drinking Water Data Challenge
Submit your open data project by Oct. 1, 2018!

waterchallenge.data.ca.gov  #CAWaterDataChallenge
20 new datasets in machine-readable format

- Human Right to Water - Drinking Water Enforcement
- Drinking Water Watch - Public Water Systems Information
- Disadvantaged Communities Mapping and Land Use by Parcel

...in addition to over 1,000 datasets to explore!
California Safe Drinking Water Data Challenge
Foster Engagement With Data

Sharing and Collaborating

• Organizational GitHub
• Open source tools / projects
Open Data Services

California Open Data Portal: data.ca.gov
• Click on the Water icon to find State Water Board data
Open Data Services

California Open Data Portal: data.ca.gov

- Stormwater datasets
Open Data Services

California Open Data Portal: [data.ca.gov](http://data.ca.gov)

- Datasets available as .csv files
- Data dictionaries
- Data description and metadata

- Currently available stormwater datasets include:
  - Industrial stormwater discharges (monitoring data and facility information)
  - Inspections, violations, and enforcement actions
  - Notice of Intent records
Open Data Services

Industrial Discharge Data

- Updated regularly via an automated process
- Persistent link to the data file ([https://data.ca.gov/node/2176/download](https://data.ca.gov/node/2176/download))
- API enabled
Open Data Services

Other State Portals

• California Natural Resources Agency: data.cnra.ca.gov
• California Department of Health & Human Services: data.chhs.ca.gov
• Others
Data Driven Management

Water Quality Status Reports (2017, 2018 and 2019):

• https://www.waterboards.ca.gov/resources/data_databases/wq_status_report.html

FY2016/17 Water Boards Performance Report Story:

• https://arcg.is/z5Km1
This pilot dashboard shows inspection trends for 9 Regional Boards for all programs could replace almost 50 report cards currently posted as individual HTML pages.
Additionally, the tool encourages more interaction and allows users to see more granular data. All due to open data techniques.
Water Quality Report Card - Algae in the Ventura River

Regional Water Board: Los Angeles, Region 4
Beneficial Uses Affected: REC-1, REC-2, WARM, COLD, EST, WILD, RARE, MIGR, SPWN, WET, MUN
Implemented Through: NPDES Permits, MS4 Permits, Conditional Waivers

Effective Date: June 28, 2013
Attainment Date: 2023

Water Quality Improvement Strategy
The Ventura River watershed is in Ventura and Santa Barbara Counties in Southern California. The Ventura River, including its estuary and tributaries, is impaired due to algae, eutrophic conditions, low dissolved oxygen, and elevated nitrogen. The primary sources of these impairments are nutrients discharged from the municipal separate storm sewer system (MS4), agriculture operations, livestock facilities, onsite wastewater treatment systems (OWTS), and the Ojai Valley Waste Water Treatment Plant (WWTP). In 2013, USEPA approved the TMDL for Algae Eutrophic Conditions and Nutrients in the Ventura River and its Tributaries to restore water quality. The TMDL includes numeric targets for algal biomass, dissolved oxygen, and pH, and load allocations (LA) and waste load allocations (WLAs) for total nitrogen and total phosphorus. The TMDL assigns more stringent nitrogen and phosphorus allocations for dry weather than wet weather because dry weather (May 1 to September 30) is the growing season. The TMDL allows the Ojai WWTP 12 years, MS4 permits six years, agriculture operations six years, livestock facilities 10 years, and OWTS 10 years to attain allocations. The TMDL permits the Ojai WWTP to upgrade its nutrient removal processes. Agriculture operations will implement management practices to control nutrients in their discharges. The MS4 permits' compliance approach is to eliminate dry-weather discharges by implementing best management practices (BMPs). Horse facilities will implement manure management plans. Individual responsible parties are monitoring their discharges to demonstrate compliance with allocations and multiple responsible parties are jointly monitoring algal biomass, nutrients, and other constituents in receiving waters to assess watershed-wide conditions. The Board intends to adopt a Conditional Waiver for horse facilities in FY 18-19. Agriculture operations will implement nutrient management as required by the Conditional Waiver.

Comparison of MS4 Effluent to Dry Weather WLA

Water Quality Outcomes
- Monitoring data show that algal biomass continues to exceed the numeric target. Total nitrogen in MS4 outfalls exceeds the WLA when there is sufficient flow to sample. However, no flow and no sample in the outfalls amount to WLA attainment.
- WLAs have not been incorporated into the MS4 permits, but permits are implementing BMPs, including a bioreactor at the Happy Valley outfall in Reach 4, which has reduced dry-weather flow.
- The Ojai WWTP is on schedule to implement the nitrogen removal upgrades required by its permit to attain the WLAs. Ventura County is studying which OWTS will be upgraded to advanced treatment. The agriculture LA are incorporated into a Conditional Waiver.
- The TMDL is in the early stages of implementation. The multiple sources, complex interaction between groundwater and surface water, and variable flow make this a complicated TMDL.
- Responsible parties will continue implementation actions.

Stream Segment
- R2

Month of Date: July
- CHLOR A (mg/m²): 310.0
- Site: R2
- Year of Date: 2016

Chlorophyll-a (mg/m²)
TMDL target = 180mg/m²

2015 2016 2017
Water Quality Report Card - Pesticides in the Palo Verde Outfall Drain and Lagoon

Regional Water Board - Colorado River Basin, Region 7

**Beneficial Uses Affected** - Contact Water Recreation (REC-1); Non-Contact Water Recreation (REC-2); Warm Freshwater Habitat (WARM); Wildlife Habitat (WILD); Rare, Threatened, Endangered Species (RARE)

**Implemented Through** - Conditional Waiver of Waste Discharge Requirements (WDR)

**Pollutant Type**: Non-Point Source, Legacy **Pollutant Source**: Irrigated Crop Production

**Status**: Data Inconclusive

**Effective Date**: September 20, 2012 **Attainment Date**: 2036

The Palo Verde Outfall Drain (PVOD) and Lagoon is located in Palo Verde Valley and Mesa (approximately 131,000 acres of agricultural land) in Imperial and Riverside counties. Palo Verde Outfall Drain and Lagoon are impaired by the legacy pesticides, Dichloro-Diphenyl-Trichloroethane (DDT) and Toxicphene and listed on the
Water Quality Report Card - North Coastal Basin Rivers
Cyanobacteria

Regional Water Board - North Coast Region, Region 1

**Beneficial Uses Affected**: Cold Freshwater Habitat (COLD); Rare, Threatened, and Endangered Species (RARE); Migration of Aquatic Organisms (MIGR); Spawning, Reproduction, and/or Early Development (SPWN); Commercial and Sport Fishing (COMM); Tribal Tradition and Culture (CUL) Contact Water Recreation (REC-1); Non-Contact Water Recreation (REC-2)

**Implemented Through**: Restoration, Coordination efforts

**Pollutant Type**: Non-Point Source, Legacy

**Pollutant Source**: Irrigated Crop Production, Hydromodification, Non-Point Source Run-off, Naturally Occurring, Logging, Grazing

**Status**: Improvement Needed

**Effective Date**: December 28, 2012

**Attainment Date**: 2050 or longer
Extra URLs

TMDLs to be done: https://public.tableau.com/views/TMDL1718/Dashboard1?:embed=y&:display_count=yes

Safe to Swim: https://mywaterquality.ca.gov/safe_to_swim/interactive_map/

Rafa’s Tableau wonderland: https://public.tableau.com/profile/rafael.maestu#!/

WQ Story map: https://arcg.is/1LyS9

Github repo: https://github.com/CAWaterBoardDataCenter

Trash related data: https://cawaterboarddatacenter.github.io/Datathon-Resources/
Questions?

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https://www.waterboards.ca.gov/resources/oima/