Water Quality

## Tab 1

## What is water quality?

Water quality is a measure of chemical, physical, and biological water conditions relative to the needs for aquatic life and human use. Water quality is not easily defined as “good” or “bad,” since it depends who is using it. People desire water that is clean for drinking and recreation, while aquatic organisms require enough dissolved oxygen and other conditions to survive. Typically, water quality is defined by regulated standards set by a regulatory agency like the State Water Resources Control Board (SWRCB). If water quality does not meet the regulated standards then it can be defined as poor.

## Why is water quality important?

Water is a vital natural resource. The quality of our water is closely linked to the surrounding ecosystem and land use. Poor water quality can negatively impact the environment and human health. For example, aquatic plants require enough light, nutrients and suitable water temperatures to survive. Aquatic organisms require dissolved oxygen to breathe, and rely on adequate water temperature, salinity, and pH to survive. Humans need fresh water for recreation, irrigation, and drinking water. Water quality monitoring is an important management tool to understand the health of our aquatic ecosystem.

## Tab 2

## How is it monitored?

### Department of Water Resources Discrete and Real-Time Water Quality Monitoring Programs

The Department of Water Resources (DWR) Division of Environmental Services’ (DES) water quality monitoring programs follow specific protocols that document long term water quality trends in the Sacramento-San Joaquin Delta. There are two monitoring programs in DES that measure water quality at different time scales. Discrete water quality monitoring involves collecting a large water sample on a monthly basis to be analyzed for numerous water quality tests. Real-time water quality monitoring measures fewer water quality parameters, but on a more frequent interval, like every 15 minutes. These two programs are mandated by the [Water Right Decision 1641](http://www.waterboards.ca.gov/waterrights/board_decisions/adopted_orders/decisions/d1600_d1649/wrd1641_1999dec29.pdf), and provide information for water resource managers. **Click here** to see a list of water quality parameters monitored by DES (see excel spreadsheet).

**Discrete water quality monitoring**

Discrete monitoring allows for a comprehensive snapshot of the water quality conditions at a given time. DWR’s discrete water quality monitoring program measures the environmental water quality conditions at a total of 24 monitoring stations ranging from San Pablo Bay to the mouths of the Sacramento, Mokelumne, and San Joaquin rivers (See Map). Discrete field and laboratory data are collected at each station and include parameters such as water temperature, specific conductance, dissolved oxygen, ammonia, organic carbon, and solids in the water. Monitoring stations are sampled monthly within approximately one hour of high tide slack and are accessed by the research vessel, *San Carlos*, or by vehicle for land-based stations. Field measurements are obtained through the use of a YSI multi-parameter water quality sonde and are taken at a depth of approximately one meter below the surface of the water. Physical water quality samples are collected at the same depth via a grab sample and are filtered and/or preserved immediately following collection depending on the laboratory test in question. **[Read more]**

Of the 24 monthly monitoring stations, 22 stations have fixed locations while two monitoring stations change location based on their salinity (or specific conductance values; stations EZ6 and EZ2).The salinities of these two floating stations indicate the upper and lower limits of the entrapment zone, which is a region of high biological productivity that moves with the flow dynamics of the Delta. Three of the 22 fixed stations (NZ002, NZ004, and NZ325) are sampled seasonally depending on the inflows and outflows of the estuary.

**Real-time water quality monitoring**

DWR’s real-time monitoring program complements the monthly discrete monitoring by providing 15-minute interval water quality data from automated sampling stations throughout the Delta. The data is collected 1-meter below the water surface using a float-mounted YSI multi-parameter water quality sonde at 15 fixed stations (See Map). For more information on the parameters measured, **click here**.

During routine station visits, equipment at each station is verified and exchanged. When sondes are exchanged, the current sonde is removed and a lab-calibrated sonde is installed. Data is downloaded from the extracted sonde, after which the sonde is cleaned, calibrated, and prepared for the next deployment. **[Read more]**

All stations have surface sondes collecting data 1-meter below the water surface. In addition, the Antioch, Mallard Island, Martinez, and Stockton stations also have sondes recording specific conductance at 1.5 meters above the channel bottom. These measurements, along with river stage data measured at the Mallard and Martinez stations, are needed to determine compliance with the salinity standard (also known as X2) mandated by the [Bay-Delta Plan (SWRCB 1995)](http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/wq_control_plans/1995wqcp/docs/1995wqcpb.pdf). Environmental data, such as air temperature, solar radiation, wind speed, and wind direction, are also measured every 15-minutes at Antioch, Hood, Rio Vista, Stockton, Mallard Island, Martinez, Mossdale, and Vernalis, as part of [Water Right Decision 1641’s Table 5 objectives (SWRCB 1999, p.192-193)](http://www.waterboards.ca.gov/waterrights/board_decisions/adopted_orders/decisions/d1600_d1649/wrd1641_1999dec29.pdf).