

# Discrete Water Quality Standard Operating Procedures

USGS Western Ecological Research Station SFBE

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## **Purpose/Objective:**

Water quality controls the distribution of vegetation, benthic invertebrates, and fishes. Discrete water quality sampling can provide a “snapshot” of water quality parameters and is a useful, mobile tool for collecting water quality parameters at fish and invertebrate sampling stations.

Due to the different installation, download, and maintenance requirements of various water level logger brands, we present here general guidelines and tips that should apply to all loggers.

## **Water Quality Parameters:**

Depending on which water quality multi-probe you are using, water quality parameters will differ. Common water quality parameters include:

- Temperature
- Salinity
- Conductivity
- Dissolved Oxygen
- pH

## **Calibration:**

Use calibration instructions provided with multi-probe. Dissolved oxygen should be calibrated before each measurement. Calibration details should be recorded at the start and end of each day.

## **Field Equipment:**

Handheld water quality meter	Tap water
Water quality meter User Manual	Datasheet & Pencils
GPS	Map of study site and sampling locations

## **Field Methods:**

1. Turn on instrument approximately 5 - 15 minutes before use to let the unit warm up. This helps with the dissolved oxygen reading.
2. Take two water quality readings. One just below the surface of the water, and the second just above the sediment surface. If the water is too shallow (i.e. < 1 m), take a reading in the middle of the water column.
3. Immerse probe completely and give a quick shake to release air bubbles.
4. Allow temperature readings to stabilize.
5. Stir the probe in the water to overcome the stirring dependence of the dissolved oxygen sensor. This is unnecessary for probes with circulators or LDO sensors. Note: if placing the probe into fast flowing water, it is best to place it perpendicular to the flow and NOT facing into the flow.
6. May need to use a hydrometer in more saline environments (e.g. Hach probes do not read above 70 ppt).
7. Record water quality parameters on “Water Quality” datasheet (see below).
8. Rinse probe and wipe salt water off at end of day. Store and transport in a protected case.

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9. For making spatial and temporal comparisons, measurements should be collected at the same tide level (i.e. slack high water).

### Data Entry and Analysis:

Data can be used in multiple analyses. Examples include:

1. Seasonal changes at and between sites (Figure 1)
2. Correlation analysis between water quality variables and invertebrate or fish composition

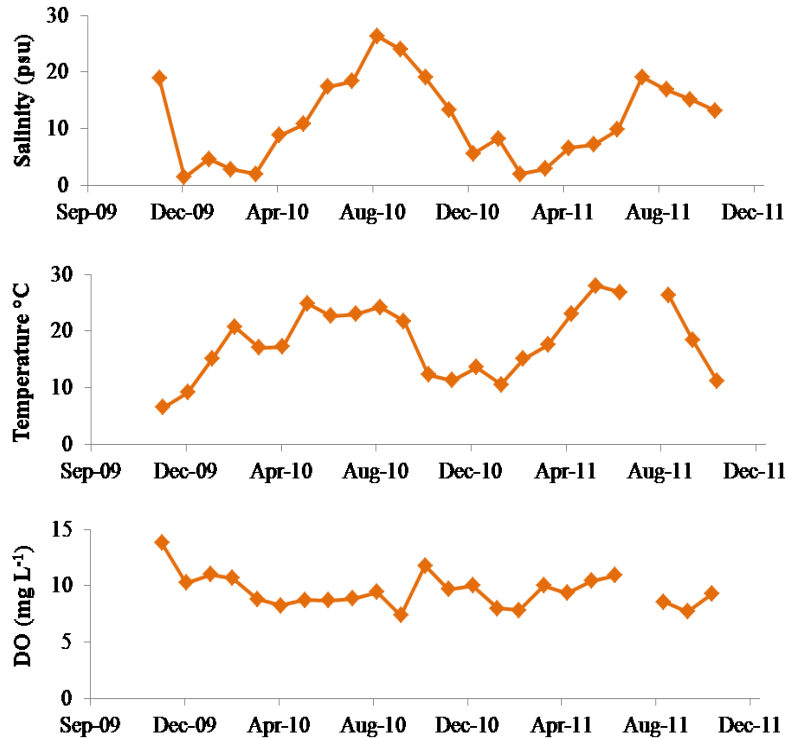


Figure 1. Water quality parameters from monthly minisonde sampling, Napa Sonoma Marshes Wildlife Unit. No samples were taken in August or December 2011 (Brand et al. 2012).

### References:

Brand, L. A., L. M. Smith, A. Smith, I. Woo, W. Chan, T. Graham, K. Taylor, and J. Y. Takekawa. 2012. Assessing early tidal marsh restoration at the Green Island Unit of the Napa Plant Site Restoration Project within the Napa-Sonoma Marshes Wildlife Area. Data Summary Report, U. S. Geological Survey, Western Ecological Research Center, Vallejo, CA. 133 pp.

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## Water Quality Datasheet

**Instructions:** Dissolved oxygen should be calibrated before each measurement as barometric pressure can change throughout the day. Record the dissolved oxygen reading of the instrument before and after the calibrations made at the start and end of the day. These data will serve as a quality control measure if there are problems found with the measurements.

Weather Conditions:			
Temp:	Wind (0=0-5mph; 1 = >5-15 mph; 2 = >15mph)	%Cloud Cover:	Precip. (0 = no rain, 1 = mist/drizzle, 2 = light rain, 3 = moderate to heavy rain):

Pre-Survey Dissolved Oxygen Calibration			
Date:	Time:	Obs:	
DO% Before:		DO% After:	

Location:  
Time:  
Circle one: surface/bottom/middle

Temp °C	
Barometric inHg	
DO%	
DO mg/L	
Spec. Cond µS	
Cond µS	
Salinity ppt	
pH	

Comments:

Post-Survey Dissolved Oxygen Calibration			
Date:	Time:	Obs:	
DO% Before:		DO% After:	

Location:  
Time:  
Circle one: surface/bottom/middle

Temp °C	
Barometric inHg	
DO%	
DO mg/L	
Spec. Cond µS	
Cond µS	
Salinity ppt	
pH	

Comments:

Location:  
Time:  
Circle one: surface/bottom/middle

Temp °C	
Barometric inHg	
DO%	
DO mg/L	
Spec. Cond µS	
Cond µS	
Salinity ppt	
pH	

Comments:

Location:  
Time:  
Circle one: surface/bottom/middle

Temp °C	
Barometric inHg	
DO%	
DO mg/L	
Spec. Cond µS	
Cond µS	
Salinity ppt	
pH	

Comments: