

# CONDUCTIVITY & TOTAL DISSOLVED SOLIDS

## What are conductivity & total dissolved solids?

Conductivity is a measure of the ability of water to pass an electrical current due to the presence of ions dissolved in the water. For example, when salt (NaCl) dissolves, it breaks into sodium (Na<sup>+</sup>) and chloride (Cl<sup>-</sup>) ions. Conductivity is related to total dissolved solids, which is the amount of solid substances dissolved in the water. All organisms need ions to survive.

## How are they measured?

**Conductivity** ( $\mu$ Siemens/cm) is measured using a conductivity probe. The probe measures how much the dissolved ions in the water interact with one another. In order for ions to interact, they need to have opposite (positive and negative) charges. The higher the interaction, the higher the water's conductivity. **Total dissolved solids** (mg/L) are also measured using a probe.

## What can conductivity & total dissolved solids tell us about the Bay?

Conductivity changes depending on the water's salinity. Since salt turns into ions when it dissolves, seawater naturally has higher conductivity than freshwater. However, unusually high conductivity can be an indicator of specific types of pollution. High conductivity and total dissolved solids are most often caused by road salts, mining, hydraulic fracturing, wastewater treatment plants, storm runoff, and human waste pollution. High amounts of conductivity or total dissolved solids lead to biological stress in organisms, including decreased reproduction and growth. Over time, this can cause shifts in the types and amounts of organisms that can survive in the region. Increases in conductivity and total dissolved solids also lower the pH of the water, making it acidic and hurting aquatic organisms such as plants and fish.

*Top: Conductivity ( $\mu$ S/cm) is measured using a conductivity probe (B. Fertig). Bottom: The higher the interactions between positive and negative ions in the water, the greater the water's electrical conductivity (A. Fries).*

