

WHAT IS CONDUCTIVITY?

Conductivity, or specific conductance, tells us about the water's ability to conduct an electrical current. Electricity passes more easily through water with more ions (charged particles) in it.

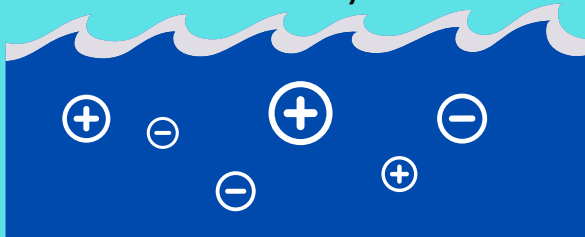
By measuring conductivity, we measure the presence of ions dissolved in the water. Changes in conductivity can be an indicator of other issues facing a water body.

WHY DO WE MEASURE CONDUCTIVITY?

Ions in the water can have many different sources. Most come from underground minerals like chloride, sulfate, or calcium, that dissolve in groundwater on its way to a stream. For example, when salt (NaCl) dissolves in water, it becomes two ions: Na^+ (sodium) and Cl^- (chloride).

Because there are multiple possible sources of ions in water, conductivity is related to other water quality indicators like total dissolved solids and chloride. Conductivity gives a snapshot of water quality and can help us decide whether we should also measure total dissolved solids and chloride, which are more specific indicators. Conductivity is a useful tool for quickly identifying broad-level changes or potential issues in a waterbody!

The impacts of conductivity on aquatic species are not usually studied on their own. Conductivity is an indicator of multiple possible contaminants in water, so each of these contaminants is more likely to be investigated independently. Instead, significant changes in conductivity levels can indicate that there may be other issues.



HOW DO WE MEASURE CONDUCTIVITY?

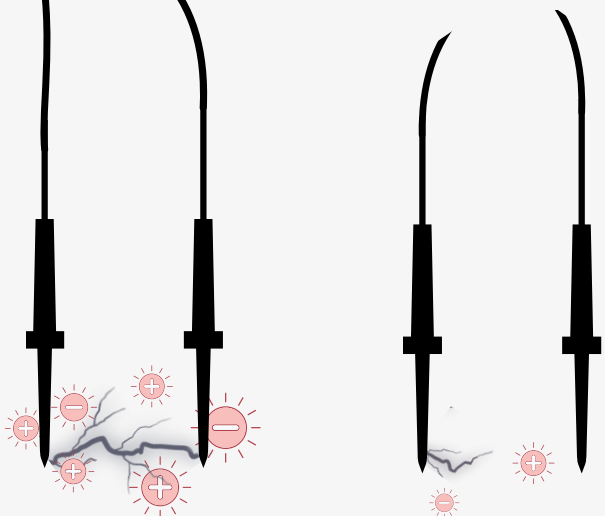
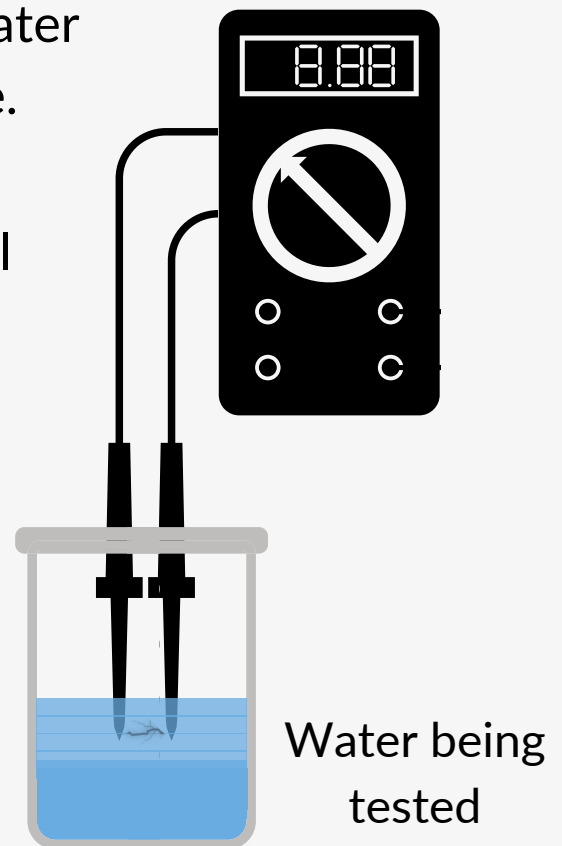
Conductivity is measured using a conductivity probe. There are multiple ways these instruments can function, depending on the model being used. The basic principles are illustrated below.

A device with two or four electrodes (the "conductivity probe") is placed into the water sample to test for specific conductance.

When the device is turned on, an electrical current runs between the electrodes.

In water with a **high ion** concentration, the electrical current flows **easily** between electrodes. In water with a **low ion** concentration, the electrical current faces more **resistance** and does not flow as easily.

Conductivity probe



Lots of ions

Few ions

The conductivity probe measures the **resistance** met by the electrical current.

There is a mathematical relationship between **conductivity** (how easily a current passes through water) and **resistance**, allowing one to be calculated from the other.