SALINITY

What is salinity?

Salinity measures how much salt is dissolved in water. In an estuary like the Chesapeake Bay, salinity forms a natural gradient: waters near the mouth of the Bay are as salty as the ocean (around 35 parts per thousand or ppt), and the water becomes less salty as you move upstream, eventually reaching freshwater (close to 0 ppt). At any given site, salinity levels can naturally change based on factors like flow, depth, and tides. Salinity can also increase when salt is added from human sources such as road salt and de-icing agents.

How do we measure it?

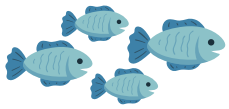
Salinity is measured in parts per thousand (ppt) using a few different tools. One common method is a handheld device called a refractometer, which uses light to measure salt concentrations. Salinity can also be estimated using a water quality probe that measures conductivity, since salty water conducts electricity more easily. In tidal areas, salinity often changes with depth, so taking readings at both the surface and deeper in the water can give a more complete picture of the conditions.

Equipment	Cost	Monitoring Time
Refractometer	$	3 mins per site
Individual probe	$$	10 mins per site
Multi-parameter probe	$$$	10-20 mins per site

PLEASE NOTE:
This fact sheet provides general information about salinity, but water monitoring in specific locations may require more detailed methods and considerations.

Why do we care?

Aquatic Life



Many aquatic plants and animals are adapted for specific salinity concentrations, and changes in those conditions can harm the species that live there. For example, largemouth bass and wild celery need freshwater to live, and oysters and eelgrass need salt water.

Pollution

An influx of salt into a freshwater stream can indicate pollution sources, such as road salt or mining activities. Many of these streams are sources of drinking water, and most drinking water facilities cannot filter out salt.

Bay Health

Salinity and water temperature measure how water is moving and mixing in the Bay. In some cases, they cause the water to form layers, a process called stratification. Understanding these patterns helps us track water quality and ecosystem health.

How is my water?

Salinity naturally varies along the estuary, from salty ocean water near the mouth of the Bay (around 35 ppt) to nearly salt-free freshwater streams (less than 0.5 ppt). What counts as a typical reading depends on where you're monitoring. For example, freshwater streams should stay below 0.5 ppt, while brackish waters in tidal rivers often range between 0.5 and 18 ppt. Near the mouth of the Bay, salinity is usually higher, closer to 20–35 ppt. Sudden changes from your usual reading could reflect natural events or human-related impacts.