



Sediment and Turbidity

Sediment is material that is broken up and deposited on the bottom of a body of water. It is often made up of loose particles of clay, silt and sand.

Why is there sediment in the Bay?

Weathering is an important natural process in which rocks and soils are broken down by wind and water. Erosion is the transport of the weathered material by wind or water. Weathering and erosion combine to transport sediment (often by streams and tributaries) into the Chesapeake Bay.

There are two major sources of sediment in the Bay: *watershed* sources and *tidal* sources.

- Sediment which results from the erosion of the land and stream banks is sediment from *watershed sources*. Watershed erosion increases when land is cleared for agriculture and development—the building of homes, businesses and roads.
- Sediment which results from the erosion of shorelines and nearshore waters (the shallow waters between the shoreline and deeper, open waters) is sediment from *tidal sources*. In addition, sediments that have sunk to the bottom of the Bay can be stirred up and suspended again. Tidal erosion increases when shoreline vegetation is removed and there are not enough bay grasses growing in the shallows to soften wave action against the shoreline.
- More than 18.7 billion pounds of sediment are believed to enter the Chesapeake Bay each year. Scientists believe that most of the sediment in the Chesapeake Bay comes from watershed sources.

How does sediment affect the Bay ecosystem?

Because of their small size, the tiny clay- and silt-sized particles in sediment often are suspended (float) in the water, rather than settling to the bottom. When there is too much sediment, the water can become cloudy or turbid. Cloudy water does not allow sunlight to reach the bay grasses which, like other plants, cannot survive without enough sunlight. Photosynthesis will decrease because less light is reaching the plants. Photosynthesis produces oxygen, so the less photosynthesis, the less dissolved oxygen in the water. The fish, crabs and other animals which depend on the grasses for oxygen, shelter and food may die as well.



Large amounts of sediment can have other harmful effects on the ecosystem of the Chesapeake Bay. Sediment can:

- Smother bottom-dwelling plants and animals, such as oysters, mussels, and clams;
- Cover oyster beds, which limits the ability of the young oysters to attach to the hard surface of the reef where they have the best chance of growing to maturity.
- Change the habitat so that the small spaces between rocks and gravel, where mussels settle, are filled in.
- Carry high concentrations of certain poisonous chemicals that may contaminate the water and poison organisms.
- Carry nutrients which increase nutrient pollution in the Bay and cause more algae to grow.
- Increase water temperature because the sediment particles absorb heat; warmer water can hold less dissolved oxygen making it harder for many organisms, like fish, crabs, and even worms to survive.

How can you measure the amount of sediment?

A Secchi Disk is often used to measure turbidity. Turbidity measures how much all the particles that are suspended in the water decreases the amount of light that can pass through the water. The particles in the water include not only sediment, but algae, other phytoplankton, and microorganisms as well.

There are many different ways of measuring turbidity, but using a Secchi Disk is a simple and inexpensive method. Secchi Depth measurements in centimeters can be converted into NTUs (nephelometric turbidity units) so they can be easily compared with the buoy data.

How to measure turbidity with a Secchi Disk:

A Secchi Disk is an 8-inch diameter disk with alternating black and white quadrants that is lowered into the water column until it can no longer be seen from the surface. The point at which the disk disappears indicates the turbidity of the water.

Secchi Disk Reading

- When outdoors, stand so that the Secchi Disk will be shaded or use an umbrella or piece of cardboard to shade the area where the measurement will be made.
- Lower the disk slowly into the water until it just disappears.



- Mark the rope with a clothespin at the water surface.
- Lower the disk another 10 cm (centimeters) into the water, then raise the disk until it reappears.
- Mark the rope with a clothespin at the water surface.
- There should now be two points marked on the rope. If the points differ by more than 10 cm, repeat the measurement and record the new measurements.
- Record the length of the rope between the marks and the Secchi Disk to the nearest centimeter.
- Repeat the measurement two more times. Average the three readings. This is the Secchi Depth in centimeters.