

Saltwater intrusion in the northern reach of the AICW in the study area is caused by southerly movement of saltwater from the Atlantic Ocean via the Little River. Vertical stratification caused by density differences between the saltwater and freshwater generally results in a saltwater-freshwater interface when freshwater inflow is high, as shown in figure 3. Because of its greater density, saltwater moves along the channel bottom, whereas the less dense freshwater tends to flow over the saltwater. The interface between freshwater and saltwater may be well defined or may exist as a zone of gradual transition. Even where the interface is well defined, some mixing between freshwater and saltwater takes place because of turbulence caused by channel obstructions, wind, or other factors.

The extent of saltwater intrusion and the type of interface that exists depends on several factors. Among these are tides, currents, freshwater discharge, sea level, winds, depth, and configuration of the estuary. The primary factors affecting saltwater intrusion and type of interface in the northern reach of the AICW in the study area are freshwater inflow and tide stage. The first factor, downstream (northerly) flow of freshwater, tends to push intruding saltwater downstream. Saltwater encroachment is least during periods of high freshwater flow. The second factor affecting location of the saltwater wedge is the tide stage. When tide stage is higher than stream stage, the saltwater migrates upstream. After the peak of the tide cycle, upstream movement of the saltwater slows and eventually ceases. Saltwater movement reverses as the tide stage begins to fall. This pattern of movement of the saltwater is repeated with each tide cycle. As a result, salinity in the AICW fluctuates both vertically and longitudinally along the channel.

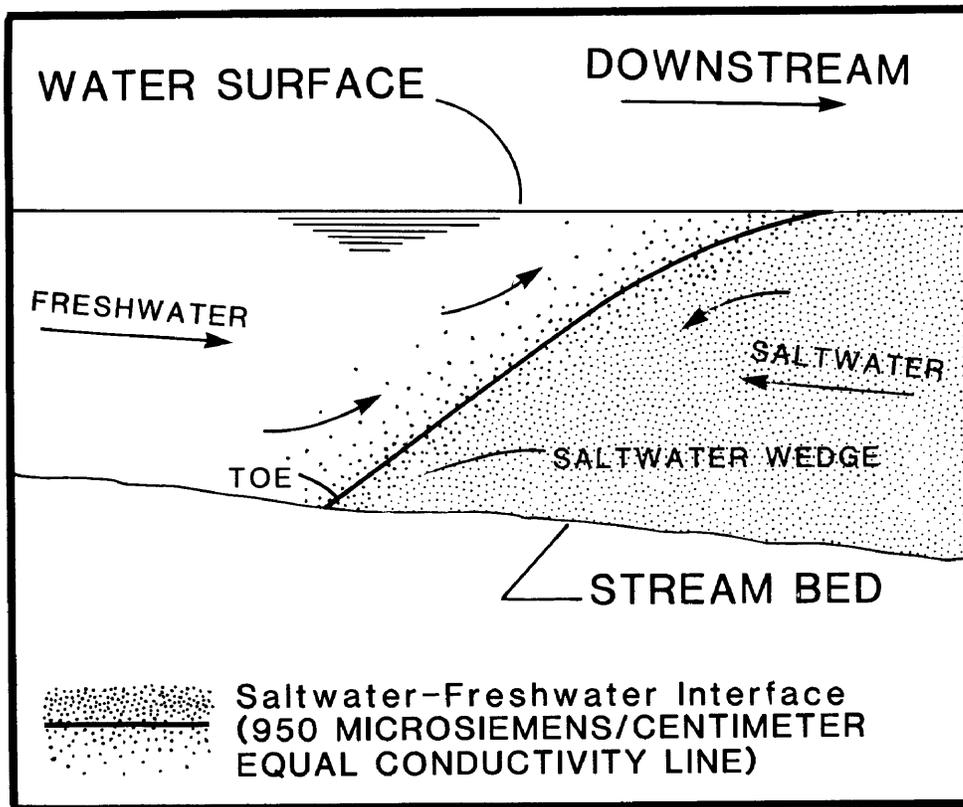


Figure. 3.--Vertical stratification between saltwater and freshwater.