

Student Reading 1 - *An Introduction the Chesapeake Bay and the Patuxent River Estuary*

Calvert County is a peninsula in Southern Maryland that is bordered on the east by the Chesapeake Bay and on the west and south by the Patuxent River. Both the Bay and much of the river are considered estuaries – that is a body of water in which freshwater run-off from the land is diluted by seawater resulting in a mixing zone where the water is less salty than typical seawater. Since the Patuxent River flows into the Bay, the river estuary is considered a sub-estuary of the Chesapeake Bay.

Just as in the Chesapeake Bay, the Patuxent River estuary can be subdivided into an upper portion that is made up entirely of freshwater that drains into the river from its watershed. (Figure 1.) While this water is not salty, it rises and falls in height as tides enter and leave the mouth of the river further downstream. Below this tidal fresh portion of the river lies the truly estuarine part of the Patuxent. Mixing of saltwater and freshwater create a lower salinity zone and a moderate salinity zone nearer to the mouth of the river. The boundaries between these zones is not clear-cut, and the exact location of these boundaries varies with the seasonal variation of freshwater input from the watershed.

Over the next few weeks your class will consider the water quality and conditions for life in the Chesapeake Bay and the Patuxent River, the only Bay tributary that lies completely in Maryland. The estuaries encompass not only expanses of open water, but also salt marshes, tidal swamps, oyster bars, and sandy and rocky shores. The Bay watershed covers over 64,000 square miles



Figure 2. The Chesapeake Bay watershed covers portions of six states and covers over 64,000 square miles. (reproduced from the U.S. Geological Service <http://md.water.usgs.gov>)

(Figure 2); the watershed for the Patuxent sub-estuary is 932 square miles. The watershed was once primarily forested but has now been converted into many types of land-use (for example agricultural, commercial, and residential, to name a few).

The Bay is known for its scenic beauty and economic value. It also has a long history as a producer of both commercially and recreationally valuable fish and shellfish (oysters and crabs) for the region. Its submerged grass beds, marshes, and islands provide important habitat for a diversity of plants and animals, including migrating birds

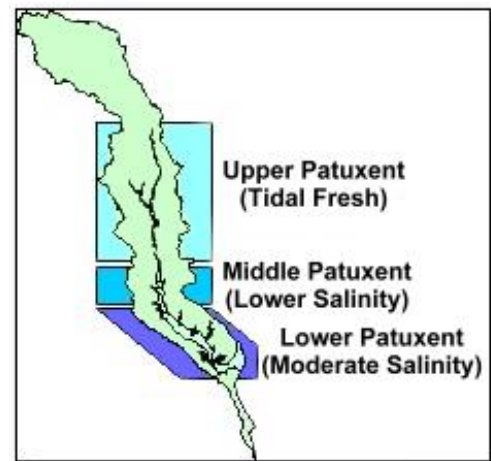


Figure 1. The upper portion of the Patuxent River is composed of tidally influenced freshwater. However, the Middle and Lower portions of the river are estuarine. (reproduced from MD Department of Natural Resources website <http://dnr.state.md.us>)

stopping along the Atlantic Coastal Flyway and coastal fish and shellfish that spend at least a portion of their lives in the waters of the Chesapeake.

Scientists have determined that over the last 35 years, changes in land-use in the Chesapeake Bay watershed have led to changes in the quality of water in the Bay and River. Those changes are primarily an increase in the input of nutrients (nitrogen and phosphorus) and sediments. Nutrients come from a variety of sources in the watershed such as wastewater treatment facilities and agricultural run-off, as well as run-off from urban and residential landscapes.

Estuaries are capable of processing moderate nutrient inputs effectively without large changes to the ecosystem. However, large inputs of nutrients can cause detrimental changes to the Bay. Nutrient enrichment of the Bay leads to a series of alterations in ecosystem function that result in the depletion of oxygen from the bottom waters of the Bay and a decline in fish, shellfish and sea grasses.