

The Chesapeake Bay

The very words, Chesapeake Bay, evoke a kaleidoscope of images, place names, and folklore. It is the nation's largest estuary, a place where salt water from the ocean meets fresh water from rivers, and its impressive stature is reflected in the early names that paid the Bay tribute: "Great Waters," "Mother of Waters" and "Great Shellfish Bay." Throughout history, the Chesapeake has played an integral role in the lives of its people. If you were a Susquehannock Indian living in the early 1600's, the Bay was a mystery - both a source of edible delights and a pathway for your adversary, the Piscataways. If you were a soldier in the War of 1812, you might have fought some bloody battles on its waters. And if you were a coffee merchant in Baltimore in the early 1900's, you very likely depended on the arrival of "The Josephine" for your livelihood.

Indeed, the Chesapeake Bay and its complex ecosystem defy easy description and understanding. From its origins at Cooperstown, New York to its mouth in Southern Virginia, one can witness geographical and biological diversity to match the wide spectrum of cultures that exist here: Amish farmers, government workers in the Nation's Capital, sailors on a weekend excursion in Norfolk, sixth-generation watermen whose trace of Elizabethan accent confirms their Cornish heritage. This fact sheet can only give you a taste of the Bay's history, ecology and challenges. Consider it an invitation to learn more and as you learn, to take an active role in Bay restoration.

Chesapeake Bay Geology and Geography

Geologically speaking, Chesapeake Bay is very young. It was created by the death of the last Ice Age, some 12-18,000 years ago. As the glaciers retreated and the polar ice caps shrank, the huge volume of melting ice caused sea levels to rise. The rising ocean in turn engulfed the coast and flooded the river valley of the ancient Susquehanna river, creating the Chesapeake Bay. The Bay we know today is nearly 200 miles long, fed by 48 major rivers and 100 small tributaries draining a 64,000 square mile basin. Earth and water continue to compete for this territory, redrawing the shoreline as land is built up in some areas and lost beneath waves in other places. People have also redrawn shorelines, often on a much faster scale than nature. Excessive clearing and poor land management have increased upland erosion, sending tons of sediment downstream. As a result, communities that were once important ports are now landlocked. On the other side, the construction of seawalls and breakwaters has interfered with the natural flow of sand, causing beaches to rapidly erode.

Saltwater mixes into the Bay from the Atlantic Ocean. Freshwater flows from the Bay's tributary rivers, with about 50 percent coming from the Susquehanna. Saltwater is heavier than freshwater, so it tends to "creep" up the Bay along the bottom while the freshwater flows down from the tributaries on the surface. As a result the Chesapeake ranges from totally freshwater areas in the North and upstream in its rivers, to areas near the Bay's mouth that are about as salty as the ocean. Thus the Bay can support both fresh and marine life forms, plus those that can tolerate fluctuating salinity levels.

The variety of conditions supports some 2,700 species. All are linked in a complex, interdependent web of producers and consumers. From the eagle's huge nest high in a wetland tree to the worms in the Bay's bottom sediments, from the microscopic free-floating plants to the pine trees along the Shenandoah, all have a part in maintaining this system's balance.

The Bay's physical nature as an estuary is both the source of its richness and the

source of its vulnerability. The overall proportion of fresh and salt water in the Bay depends largely on the amount of rainfall that is carried to the Bay from the Chesapeake's major rivers. During a wet year, the entire Bay will be somewhat fresher than normal, and conversely a dry year will result in higher than average salinities. The Bay is also dependent on the quality of freshwater flowing from the tributaries. Pollution flowing to the Chesapeake tends to stay there - either in the water column, the bottom sediments or the Bay's living resources.

Chesapeake History

In our concern over today's pollution headlines and our apprehension for the Bay's future, we sometimes forget the hundreds of years of human events that combine to set the stage for the Chesapeake's current dilemma. Where did it all begin? Historians disagree on who was the first European to travel into the Bay's mouth. Some accounts credit the Viking explorer, Thorfinn Karlsfennias early as the 11th Century. Others claim that the Italian, Giovanni da Verrazano, set foot on its shores when he sailed along the coast from the Carolinas to Maine in 1524. And yet a third group credits Pedro Menendez de Aviles, the Spaniard who founded St. Augustine in 1566. Regardless of who was first, it was the start of big changes for the Bay as Europeans came in search of treasure, conquest and resources to fuel expanding commercial ventures and burgeoning colonial empires.

Of course, the Europeans did not find the Bay region uninhabited - Native Americans had been in residence since 8000 B.C. The Native Americans had already cleared fields, established large towns, and were managing woodlands for hunting. Archaeology provides evidence of the extent of the Indians' use of Bay resources. Every year, empty oyster shells were stacked on top of the past year's discarded shells to form piles known as "midden heaps." The largest recorded midden heap was between 18 and 20 feet deep and covered 30 acres near Popes Creek on the Potomac River.

Still, the Bay the Europeans found was so rich and productive it seemed boundless and inexhaustible. The early colonists adopted some Native American ways, (like eating oysters and smoking tobacco) and from the Indian word "Tschiswapeki" derived the name "Chesapeake." They took over the ready made fields, and established their own towns on the old Indian sites. The town of Crisfield, Maryland, for example, was built atop old oyster shells in 1663.

As the European settlements grew, more and more land was cleared in the effort to "tame the wilderness." By 1675, all of Virginia's Eastern Shore had been parceled out. Over time, new technologies like the gun and the moldboard plow began to reshape the Bay system in ways we are only now beginning to comprehend. And from the earliest days of colonial history to modern times runs a constant thread - conflict over ownership of the Chesapeake's riches. Warfare, piracy, forced labor, and bloody disputes over boundaries and oyster bars have all left their marks. Many of today's debates are rooted in such past conflicts.

What ails the Chesapeake?

For people working to restore the Bay, this is a commonly heard question and one that defies simple explanation. Depending on where you are in the Chesapeake, the problem is different.

Highly

industrialized areas such as the ports of Baltimore and Hampton Roads have suffered from years of toxic heavy metals and dangerous chemical compounds dumped by neighboring industries. In other urban areas, such as the Anacostia and Potomac rivers, runoff from the land, huge flows of treated wastewater, and contaminated sediments are to blame. In the northern and inland reaches of the watershed, runoff from agricultural lands bringing sediments, nutrients and pesticides is the culprit. In short, the answer to "What ails the Bay?" is "you and me." Each one of us contributes to the Bay's woes by the activities that we undertake each day. From driving our cars, to flushing our toilets, to using toxic chemicals, we represent the source of the Bay's problems.

A particularly difficult pollution problem in the Bay and its rivers is excess nutrients - nitrogen and phosphorus. Nutrients wash off the land in sediments and fertilizers, and enter the Bay from sewage treatment plants. In overabundance, they set off a chain reaction, causing phytoplankton to grow explosively or "bloom", then die and sink to the bottom. Bacteria begin to decompose the dead algae and in the process use up much or all of the water's dissolved oxygen. Such areas of low or no dissolved oxygen cannot support other Bay creatures.

Population growth and its effect on the Bay is the most complex and politically sensitive issue facing Bay managers today. A study released in January, 1989 by the 2020 panel - a commission appointed by the Bay state governors - predicts another 2.6 million residents (20 percent increase) in the watershed by the year 2020. A population increase of this magnitude translates into extensive changes in current land use patterns to more developed land. If this growth is not rationally planned, the report warns we will pay the costs in the form of more pollution, inadequate infrastructure, and more expensive transportation. Many fear that sprawling or scattered development will undermine the progress made by Bay restoration efforts thus far.

Restoring the Chesapeake

Efforts to halt the degradation occurring in the Chesapeake Bay started as early as 1973, when then -

Senator Charles Mathias conducted a tour of water quality problems in the estuary. The trip resulted in a conversation with the administrator of EPA and eventually led to a five year, \$25 million EPA study. Out of ten candidate issues, three were chosen as targets for the study: nutrient enrichment, toxics, and the disappearance of underwater grasses (called submerged aquatic vegetation or SAV by scientists).

The report, presented to congress in 1983, concluded that nutrient enrichment was the chief factor in the decline of SAV beds. Responding to the serious implications of the study's findings and underscoring their commitment to the Chesapeake, the Bay states and EPA signed the first Chesapeake Bay Agreement in December, 1983. Programs were soon put in place to begin reducing the input of nutrients and Baywide coordinated monitoring and modeling began.

A second Bay Agreement, signed in 1987 by the governors of Pennsylvania, Maryland and Virginia, the Mayor of the District of Columbia, the Chesapeake Bay Commission and the EPA, expands upon the first agreement and delineates state and federal participation through a defined set of complementary goals and objectives. Specific commitments are outlined in such areas as water quality, public education, living resources, and population growth and development. A direct outgrowth of the

Agreement is a concerted, cooperative campaign taking place in the Bay community to meet these commitments and manage the Bay's resources wisely. For the past two and a half years, such efforts have included the concerns and advice of citizens, scientists and local government officials. Proposed policies have been circulated and open to public scrutiny, inviting all of us who use the Bay to have a voice in governing it.

While the monitoring and modeling programs put into place have resulted in an extensive body of information that helps direct public policy, we are far from understanding the intricacies of so powerful a system as the Chesapeake Bay. The rates and magnitude of declines in Bay resources, however, force us to set directives based upon what we do know, and to modify policies as more knowledge becomes available. In some areas of study, we are just beginning to know what questions to ask. Throughout this process, we need to keep the following points in mind:

1. Each of us will affect the Bay - that fact is inescapable. However, it is up to each of us to decide whether our impact will be a positive or negative one.
2. The Bay's ecosystem depends upon each of its constituent parts. We cannot sacrifice the wetlands, the tributaries, or the land, and still save the Bay.
3. The Bay suffers from a variety of problems, some of which have developed over many years. We cannot expect the solutions to be quick or simple.