

Health Indicators in the Chesapeake Bay Watershed

ACTIVITY 1: INTRODUCTION TO THE CHESAPEAKE BAY TODAY

"Stops" refer to reference points on the *Exploring the Chesapeake—Then and Now* (www.nationalgeographic.com/resources/ngo/education/chesapeake/index.html) Web site's "Now" map tour, which students can use in their research.

1. How have transportation changes on the waters of the Chesapeake affected the water quality of the bay? (Stop #3—Powerboats now account for approximately 90% of the recreational boats in the U.S. Unfortunately, they use more fuel than smaller boats or sailboats.)
2. What are some of the key challenges faced by those trying to clean up the bay? What may happen if the goals of the clean-up effort are not reached by 2010? (Stop #4—Some of the challenges include reducing pollution from sewage treatment plants and suburban areas, and the restoration of wetlands and waterside forests, which are natural pollution filters. If the states do not succeed in meeting the cleanup deadline which they set, the cleanup effort will be taken over by the Environmental Protection Agency.)
3. What is an industry that was historically central to the economy of the bay region, and remains so today? How has that industry contributed to the decline of the bay's health? (Stop #5—Agriculture has traditionally been central to the region's economy. It has damaged the bay's health by causing fertilizer runoff, leading to "algae blooms" which choke out other marine life.)
4. How has the decline in manufacturing along the bay's tributaries created new problems for the bay? (Stop #9—Factories have closed in Richmond and other bay region cities, and those cities are trying to make their economies grow in other ways. This has led to "suburban sprawl"—the uncontrolled growth of neighborhoods, shops, and offices around the old city centers. This sprawl uses up land that used to be wild, disrupts historic farming and fishing communities, and creates large amounts of watershed pollutants.)
5. How has the U.S. Navy contributed to the effort to improve the area's conditions? What remains a criticism of the armed forces? (Stop #11—The Navy has worked with the EPA to reestablish bird habitats, wetlands, and forests on Chesapeake-area military installations. But the Navy has not dealt with its fleet of rusting "ghost ships" on the James River—decommissioned vessels which are leaking deadly toxins into the watershed.)
6. What is the relationship between crabs, seagrass, and pollution? (Stop #12—Crabs rely on seagrass to hide from predators while they molt and reproduce. The bay-wide pollution which has devastated the seagrass has therefore made crabs more vulnerable and reduced their populations.)
7. What role do oysters play in the health of the bay? What role might they play in its future? (Stop #15—Oyster populations filter large amounts of bay water and help keep it clean. Overharvesting, pollution, and the arrival of troublesome parasites have combined to reduce oyster populations dramatically. The recovery of oyster populations is crucial to the environmental and economic health of the bay.)

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ACTIVITY 2: HOW DID THE BAY GET THIS WAY?

1. What took place around 1000 B.C. in the Chesapeake Bay area? *(Native American agriculture began. Crops included corn, squash and beans. Native Americans fished the Bay with spears, traps, and hook and line.)*
2. Who explored the Chesapeake Bay during the 1500s? *(Spanish and French explorers reached the bay.)*
3. What big businesses existed along the bay during the mid-1600s? *(The Colonists established booming businesses in ship masts and timber. They cleared land for agriculture and used hook and line on shallow-water species of fish.)*
4. How did colonists change the environment in the mid-1700s? *(The Colonists stripped 20% to 30% of forests for settlements. They grew tobacco, which depleted the soil and caused erosion. Bay shipping ports began to fill with eroded sediments and became too shallow for navigation. The Colonists began to catch fish in nets.)*
5. How did people use the forests along the Chesapeake Bay in 1835? How did this change later in the 1800s? *(By 1835, half of the Chesapeake region forests had been cleared for agriculture, timber, and fuel for homes and industry. By 1890, nearly 60% of the watershed's forests had been cleared. However, a process of land abandonment and reversion to forest began and continued through the early 1900s.)*
6. What did water quality tests in 1918 reveal about the health of the Chesapeake Bay? *(The University of Maryland Chesapeake Biological Laboratory was founded. The first water quality surveys indicated that the bay was in good shape, except in heavily industrialized areas.)*
7. How did technological advances in the mid-1940s contribute to the decline of the bay's health? *(Widespread use of chemical fertilizers began. The human population exploded and the "suburb" was born. Changes in fishing boat and equipment technology caused many fish species to decrease.)*
8. What chemical was found in the water in 1975 and what dangers did it pose? *(High levels of kepone, a toxic chemical, were found in Virginia's James River, threatening fish, shellfish, wildlife and public health.)*
9. What did a Maryland senator's "white sneaker test" reveal in 1988? *(Bernie Fowler, now a Maryland state senator, waded into the Patuxent River. Water clarity was so poor he could not see the tips of his white sneakers beyond ten inches deep.)*
10. What good news about toxic releases was reported in 1998? *(Chesapeake Bay Program data confirmed that industries showed a 67% reduction in toxic releases in the Chesapeake Bay region between 1988 and 1996.)*

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ACTIVITY 3: EXPLORING CREATURES AND FEATURES OF THE CHESAPEAKE BAY

1. **Fish:** What activities affect the fish populations and what can be done about it? (*Overfishing, pollution, destruction of seagrass habitat, the blockage of streams, and agricultural runoff have affected the fish in the Chesapeake Bay. People can help by reducing pollutants, minimizing development, and adhering to regulations regarding fishing.*)
2. **Bay Grasses:** What is SAV and why is it so important to the health of the bay? (*Submerged aquatic vegetation (SAV) is important to the health of the bay because it provides protection and food for bay organisms, contributes to the oxygenation of the water, prevents erosion, and absorbs nitrogen which might otherwise cause "algae blooms."*)
3. **Forests:** How do forests help animals and plants in the Chesapeake Bay watershed? (*Forests protect water quality, create habitats for fish and wildlife, improve air quality, encourage recreation, and contribute to the economy.*)
4. **Air Pollution:** What are the main sources of air pollution along the Chesapeake Bay? (*Industrial factories, automobiles, agricultural sources, and natural sources.*)
5. **My Watershed:** What is a watershed? How many states make up the Chesapeake Bay watershed? (*A watershed is the total land area that drains water into a given river, lake, estuary or other body of water. The Chesapeake Bay watershed spans six states—Delaware, Maryland, New York, Pennsylvania, Virginia, and West Virginia— and the District of Columbia.*)
6. **Streams & Rivers:** How do freshwater sources benefit the bay? (*Naturally functioning, stable stream systems promote the diversity and availability of habitats.*)