The Elizabeth River and the Chesapeake Bay

The Chesapeake Bay is a body of water and, like a human body, its health depends on what goes into it. But, as everyone knows, the Chesapeake is not as healthy as it once was. The problems stem, in part, from the declining quality of the rivers that feed the Bay. This fact sheet explains how the Elizabeth River contributes to the Bay and outlines some ways to help you keep the river clean.

THE RIVER

Since the days of the early 17th century, when Captain John Smith sailed past on his way to Jamestown, Virginia's Elizabeth River has undergone dramatic changes. Particularly in the past century, the development of a bustling industrial economy has attracted to the banks of the Elizabeth an assortment of commercial and military facilities all dependent on the river for transportation. The Elizabeth River is the major deep water port for the Hampton Roads area, home of our nation's largest Navy base, and a link to the Intracoastal Waterway. The relentless dredging needed to improve navigation has made the Elizabeth twice as deep as it once was but only two-thirds as broad. Many areas of wetlands and shallow water have disappeared.

Today the Elizabeth River is an imposing wall of industrial plants, and huge hulking freighters and military vessels line both sides of the river's main channel like a technological gauntlet. Fertilizer and pesticide plants, creosote and cement factories, shipyards and drydocks, oil terminals and coalloading operations give the river a definite "working river" atmosphere. The western branch is the exception where primarily residential land use abuts the river.

The Elizabeth River is often called one of the nation's most polluted waterways. Yet many of the headwater areas, some of which are fed by the waters of the Great Dismal Swamp, offer relatively untrammelled marshes and backwaters where boating, fishing, and crabbing are still popular.

THE BASIN

Europeans first settled in the Hampton Roads area in the 1600's, and just prior to the Revolution, the port city of Norfolk was Virginia's largest urban area - with nearly 6,000 residents. The construction of the Navy shipyard at Portsmouth in 1812 triggered a moderate wave of development, which rapidly accelerated later in the century when railroads linked the port's maritime transportation capability with inland areas.

By 1900, the dredging for navigation that would drastically alter the river's shape and appearance was well underway, reaching a peak in World War II. As recently as 1957, much of this dredged material was deposited directly into the water at Hampton Roads or the Chesapeake Bay - perhaps as much as 40 million cubic yards. Since 1957, the dredged material has been disposed of at the Army Corps of Engineers' Craney Island Disposal Facility, where because of contaminants in the sediment, special handling and disposal procedures have been developed.

Today, the growth of South Hampton Roads shows no sign of slowing. Virginia Beach, once an isolated beach town, is now Virginia's largest city with nearly 400,000 inhabitants. As more people are drawn to the Hampton Roads area, it

seems likely that the demand for enhancing recreational opportunities and the aesthetic value of the Elizabeth River will increase. Unfortunately, so too will the demand being placed upon the Elizabeth's already stressed resources.

THE PROBLEMS

In 1983, the EPA Chesapeake Bay Program identified the Elizabeth River as one of the most highly polluted bodies of water in the entire Bay watershed. Heavy metals and organic compounds have contaminated bottom sediments and made the Elizabeth River a "toxic hot spot."

Heavy loads of metals such as lead, copper and mercury have been detected in the Elizabeth River at levels 2 to 10 times as great as those found mid-Bay or in the Potomac. Over 300 different organic compounds have been identified in Elizabeth River sediments. Research reveals that contaminated sediments are to blame for a lack of diversity of life in the sediments. Poor flushing characteristics of the tidal river, exacerbated by dredging navigation channels, mean that sediments and toxics are trapped there.

Oily wastes and creosote dumped into the river are sources of polynuclear aromatic hydrocarbons (a "family" of chemicals sometimes called PNA's or PAH's). These compounds have been strongly correlated with fish disorders in the Elizabeth River, including skin lesions, cataracts, and fin rot. Other sources of PNA's include industrial processes, petroleum spills, urban runoff sewage effluent and combustion of fossil fuels. PCB's (polychlorinated biphenyls), another "family" of toxic chemicals, have also been detected in significant quantity in the Elizabeth River and recent research has revealed that these toxic substances "bioaccumulate" or are retained and concentrate in the tissues of crabs, fish and other aquatic life.

Two designated Superfund sites are located along the river, one a source of lead, and the other, creosote and pentachlorophenol (PCP). According to the Water Control Board there are many inactive industrial sites which have contaminated soil, groundwater, and surface water, and which contribute to the problems of the Elizabeth River. Using EPA data, the Southeastern Virginia Planning District Commission (SVPDC) recently estimated that there may be 1200-4300 leaking underground storage tanks in southeastern Virginia, with many located in the Elizabeth River basin.

A 1988 EPA report examined 649 potential hazardous waste sites in Southeastern Virginia and upon closer examination, 377 sites (federal and private) were considered potential Superfund sites. Of these, 316 (84%) were located in the Elizabeth River basin, and it is notable, as observed, that the number of potential sites increases closer to the river.

Along the Elizabeth River, the Water Control Board has issued 65 permits for industrial (including federal) and 15 for municipal facilities to control discharge of wastewater which may contain heavy metals and other potentially toxic substances. Nine of the permits are considered "major" discharges: three private industrial, three federal industrial, and three municipal. Because of discharges containing copper and other heavy metals of concern, three private and one military shipyard on the Elizabeth River are part of EPA's 304 (l) list of potential "toxic hot spots."

There are other contributors to the Elizabeth River's water quality problems. Nonpoint source runoff from the highly urbanized South Hampton Roads area is a

major source of pollutants. According to a l989 Report by the SVPDC, the two major sources of "fresh" water to the Elizabeth River are wastewater discharge and urban runoff.

Also, thousands of recreational boaters, who use the Elizabeth River as they travel on the Intracoastal Waterway, dump untold gallons of sewage into the river, contributing to the pollution of oyster and shellfish beds. Many of those boats are coated with tributyltin (TBT) paint, which has been shown to be highly toxic to aquatic life. As a result, TBT is now banned for most recreational boats registered in both Virginia and Maryland, but is still allowed for larger vessels.

The environmental changes that have come to the Elizabeth River have obviously gouged ecological wounds that may take years to heal. The challenge for the future is to restore the river's ecological, recreational and aesthetic assets, and yet allow for continued economic growth.

WHAT CAN BE DONE

Positive steps have been made to address long-standing problems of the Elizabeth River by state and local government as well as the military. The 1989 SVPDC report states that "over the past decade, water quality in the river has improved especially with respect to conventional pollutants such as biological oxygen demand and suspended solids. There are continuing problems with nutrients and toxics, at least in part due to historic activities."

Virginia has launched the Elizabeth River Restoration Program. Initiatives include studies of water quality problems, contaminated sediments, and affected living resources. The Program includes stepped up inspections more personnel assigned specifically to the Elizabeth River, and a new program for issuance of "Notices of Violation" by the Water Control Board. A mobile bioassay laboratory assigned to the Elizabeth River tests the effects of discharges on fish and invertebrates. A comprehensive long-term water quality monitoring/sediment contamination program has been initiated with input from university toxics experts and regional governments.

There are several problem oil/water separator facilities on the river, both military and commercial, discharging high concentrations of organic priority pollutants to the river. The Water Control Board is studying water samples, more effective treatment systems, and conducting inspections aimed at strengthening permit requirements for these ineffective separators. Recent studies by both the military and the Water Control Board have lead to the establishment of a Best Management Practices (BMP) manual for the shipbuilding and repair industry. Because they are aimed at controlling pollution from industrial sources, BMP's become enforceable parts of discharge permits.

The Navy has several discharge permits, one with over 100 outfalls, and has instituted a program to help with the cleanup and restoration of the Elizabeth River. During the mid-1980's the Navy facilities on the Elizabeth River violated discharge permit limits sixty times over a two-year period. Today these problems have been largely addressed through the Navy's own inspection and "notice of violation" process, and with over four million dollars in repairs to sewage pipes, industrial wastewater treatment processes and drydock drainage systems. Also, recently the Navy has discontinued use of TBT in bottom paints for all vessels.

The 1989 SVPDC report "Elizabeth River Basin Environmental Management Program" summarizes water quality, hazardous waste, and land use issues and makes management recommendations for future government action. Improvements to water quality are the aim of local government implementation of Erosion and Sediment Control Programs, Stormwater Management Programs, and the Chesapeake Bay Preservation Act criteria. As residential, commercial, and office space development accelerates in South Hampton Roads, implementing land use control measures will help avoid magnifying the already serious problems of the Elizabeth River.

There has been a long-standing problem of sewage disposal on the Elizabeth River, which has lead to shellfish closures dating back to before 1920. These problems will be greatly improved by the opening, in mid-1992, of the Hampton Roads Sanitation District's Virginia Initiative Plant (VIP). The plant, located at Lambert's Point, will also treat sewage from Pinner's Point which has been discharging sewage with only primary treatment into the Elizabeth.

HOW YOU CAN HELP

Individual citizens can also do a great deal around the home to prevent further harm to the river.

- Recycle used motor oil and antifreeze, don't dump it down the storm drain.
- Don't flush household toxics, such as oven cleaners, pesticides and paint strippers down the drain; use Southeastern Public Service Authority (SPSA) house- hold hazardous waste collection facilities.
- Prevent erosion by keeping your yard grassed and by using splash blocks at downspouts.
- Refrain from overfertilizing lawns and gardens.
- Use marine sanitation devices on your boat and empty them at marina pumpout facilities.

With a little care and attention, the Elizabeth River - despite its many problems - may one day send a message of hope to those living elsewhere in the Chesapeake Bay region and the nation. If citizens in the Hampton Roads area can work with government and industry officials to halt the decline of Queen Elizabeth's once-pristine river, then almost certainly the prospect of "better days ahead" waits in the future for other beleaguered streams and bays.