

Total Maximum Daily Loads
TMDLs
at Work
in Virginia

Restoring the Legendary Lynnhaven Oysters

Coordinated Actions Lower Bacteria Levels and Reopen Shellfish Areas in the Lynnhaven River Watershed

Oyster lovers and residents near Virginia Beach, Virginia remember a time that oysters from the Lynnhaven Bay watershed were once a celebrated delicacy served to dignitaries. Excessive bacteria levels in the Lynnhaven Bay watershed, however, forced the Virginia Health Department to shut down almost all of the shellfish areas for decades—until recently. Implementing the Lynnhaven Bay, Broad Bay, and Linkhorn Bay fecal coliform TMDL for shellfish areas has helped to reduce bacteria levels. Management actions targeting sources such as boating activities, on-site sewer systems, agricultural areas, and pet waste have successfully reduced bacteria levels. As a result of these efforts, Lynnhaven Bay watershed shellfish areas are reopening and Lynnhaven oysters are returning as an edible, marketable natural resource on local restaurant menus.

TMDL at a Glance

Lynnhaven Bay, Broad Bay, and Linkhorn Bay Watersheds TMDL for Shellfish Areas Listed Due to Bacteria Contamination

(approved March 2004)

www.deq.virginia.gov/tmdl/apptmdls/shellfish/lynnc.pdf

Causes of impairment

Bacteria (Fecal coliform)

Sources of impairment

Discharges from municipal separate storm sewer systems and sanitary sewer overflows, failing septic systems, sanitary discharges from transiting vessels

Restoration options

Agricultural best management practices, sanitary sewer system improvements, stormwater programs, boating programs, pet waste programs and erosion and sediment control

Stakeholder involvement

City of Virginia Beach, Hampton Roads Sanitation District, Lynnhaven River Now, state and federal agencies

Status of waterbody

Over 1,450 acres of shellfish areas meet bacteria water quality standards to ensure safe shellfish consumption

Benefits to stakeholders

Water quality, economic, recreation, funding, education

How are TMDLs at work in the Lynnhaven Bay watershed?

In response to shellfish harvesting restrictions placed on the Lynnhaven, Broad, and Linkhorn Bay watersheds, shown in Figure 1, the Virginia Department of Environmental Quality (DEQ) listed these waters on the state's Clean Water Act (CWA) section 303(d) list of impaired waters and initiated a fecal coliform TMDL to address excessive bacteria levels. The goal of the TMDL is to set bacteria reduction goals that will allow the Lynnhaven, Broad, and Linkhorn Bay watersheds meet Virginia's bacteria water quality standards to support the production of edible and marketable natural resource designated use.

The TMDL has provided stakeholders with an organized framework for compiling and analyzing data related to sources of bacteria within the watersheds. Identifying the sources, understanding the relative contributions from each type of source, and allocating the necessary bacteria reductions has helped stakeholders plan and prioritize their management efforts over time.

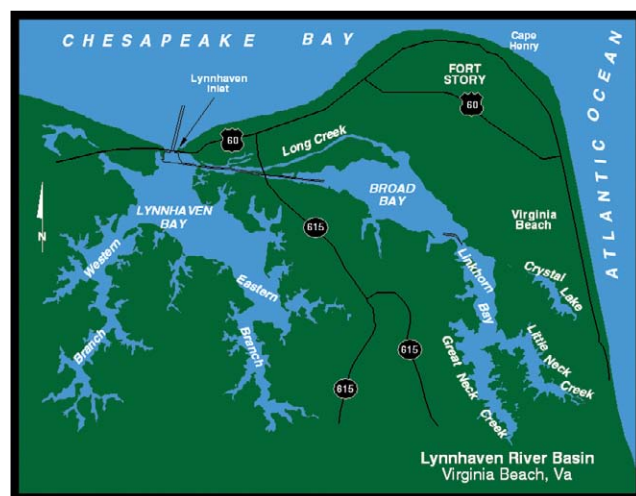


Figure 1. Map of the Lynnhaven River Watershed.

What is a total maximum daily load (TMDL)?

It is a study or analysis that calculates the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards. The TMDL establishes a pollutant budget and then allocates portions of the overall budget to the pollutant's sources. For more information on TMDLs, visit EPA's website at www.epa.gov/owow/tmdl.

Who were the local stakeholders and key partners involved in the TMDL process?

Developing and implementing the Lynnhaven, Broad, and Linkhorn Bay watersheds fecal coliform TMDL for shellfish areas involved a wide range of stakeholders and partners from the local, state, and federal levels. Local stakeholders include the City of Virginia Beach, the Hampton Roads Sanitation District, the Hampton Roads Planning District Commission. Nongovernmental organizations involved include Lynnhaven River Now, Alliance for the Chesapeake Bay, and the Chesapeake Bay Foundation. Key state partners include the Virginia DEQ, the Virginia Department of Health, the Virginia Department of Conservation and Recreation, the Virginia Marine Resource Commission, and the Virginia State Soil and Water Conservation District. Federal partners include the U.S. Environmental Protection Agency (EPA) and the U.S. Navy, which has federal facilities within the watersheds.

What are the elements of the TMDL process and how did local stakeholders participate?

Local stakeholders participated in the three primary elements of the TMDL process: CWA section 303(d) listing decisions, TMDL development, and TMDL implementation. Each element of the TMDL process provided stakeholders with an opportunity to express concerns and share information about the water quality problems in the Lynnhaven, Broad, and Linkhorn Bay watersheds with Virginia DEQ and other key state and federal partners. A description of each element of the TMDL process is provided below.

Section 303(d) listing decisions

Determining that a waterbody is not meeting its water quality standards is the first step in the TMDL process. A waterbody is impaired when it does not meet water quality standards for a particular pollutant and it goes on a list of impaired waters needing a TMDL. When waterbodies go on the state's list of impaired waters, referred to as the CWA section 303(d) list, stakeholders have the opportunity to provide input during the listing process. The Virginia Department of Health, Division of Shellfish Sanitation (DSS), collects monthly samples at over 2,000 stations in the shellfish growing areas of Virginia. Every 6 months, DSS determines if the data show that the water quality standards for protecting the shellfish use are met. If the water quality data exceed the protective criteria, the growing areas are closed for the direct marketing of shellfish. These closed shellfish waters are subsequently placed on Virginia's Section 303(d) list of impaired waters and a TMDL. Shellfish growing areas in Lynnhaven, Broad, and Linkhorn Bays were closed for many decades. Virginia DEQ placed these bays on Virginia's first CWA section 303(d) list in 1998.

TMDL development

Through the TMDL development process, Virginia DEQ worked with stakeholders to compile and analyze information on fecal coliform sources to determine their relative contribution and assign wasteload and load allocations. Using data from a technique called bacterial source tracking (BST), the TMDL analysis presented the relative contributions from five categories of bacteria sources: bird (28.6 percent), human (24.8 percent), wildlife (16.8 percent), livestock (16.8 percent) and pet (14.4 percent). The TMDL analysis concluded that 100 percent reductions in bacteria contributions from humans, pets, and livestock, as well as a 93.8 percent reduction from birds, were necessary to achieve the bacteria water quality standards.

The Virginia DEQ held public meetings in 2003 from May through November to provide local stakeholders with the opportunity to participate in the TMDL development process. The formal public meeting on the TMDL report was held in December 2003. Comments

during public meetings ranged from questions about funding for implementation activities to sources of bacteria to concerns about regulatory consequences of not achieving TMDL allocations. In 2004, Virginia DEQ completed the TMDL report, submitted it for EPA review, and received EPA approval.

TMDL implementation

To map out a strategy for achieving fecal coliform reduction goals, the Virginia DEQ developed a TMDL implementation plan in conjunction with local, state, and federal partners. In 2006, the Virginia DEQ completed the TMDL implementation plan and the Virginia State Water Board approved it in accordance with the provisions of the Code of Virginia. The initial implementation plan focused on activities related to human and pet sources of fecal coliform. Activities identified in the implementation plan fell into 10 categories, including agricultural best management practices (BMPs), sanitary sewer improvements, stormwater programs, boating programs, and pet waste programs.

The implementation plan is an iterative process toward achieving the fecal coliform wasteload and load allocations over a 15 year timeframe. This type of approach is often referred to as an adaptive management approach. Activities identified in the implementation plan fall into three phases: Phase I represents activities already initiated by stakeholders or planned in the near term; Phase II activities are those planned for the next five years that require funding; and Phase III contains activities that might require regulatory changes, but stakeholders could implement these activities if Phases I and II activities are not successful. After implementation of Phase I and ongoing activities, the Virginia DEQ and its partners will assess progress towards achieving the bacteria water quality standards to determine the degree of success and the need to implement additional activities.

Stakeholders participated in the development of the implementation plan through a workgroup led by the Virginia DEQ. This group, comprised of city departments, as well as state and federal agencies, met monthly to draft the implementation plan. Public meetings focused on the implementation plan were also held to get broader public input. The workgroup tasked with developing the implementation plan identified and integrated other activities affecting fecal coliform loads outside the TMDL process, such as watershed management planning and local environmental groups' educational activities.

■ Stakeholders Say...

"In 2007, we have resounding evidence that the steps we are undertaking to restore water quality in the Lynnhaven River are working."

—Lynnhaven River NOW
2007 State of the River Report

What is the current status of the Lynnhaven River watershed as a result of the TMDL process?

Ongoing and Phase I activities identified in the TMDL implementation plan played a significant role in reducing fecal coliform levels and restoring the health of shellfish areas. In late 2007, the Virginia Department of Health opened a total of 1,462 acres of shellfish areas in the three watersheds. According to the local watershed organization, Lynnhaven River NOW, the area has not had such a large area open to shellfish harvesting since 1931.

How did local stakeholders benefit from the TMDL process?

The Phase I and ongoing management activities implemented to achieve bacteria water quality standards generated a number of benefits for stakeholders. Benefits from TMDL implementation include the following:

- **Improved water quality.** Management activities focused on limiting human sources of bacteria, such as the No Discharge Zone that prohibits discharges of sanitary waste from boats and the significant reduction of septic systems, as well as voluntary compliance with pet waste ordinances, have contributed to reduced bacteria levels and improved water quality. In the Lynnhaven, Broad, and Linkhorn Bay watersheds, one indicator for improved bacteria levels is the amount of shellfish areas open for harvesting. In 2006, thousands of partners and stakeholders released oysters onto a



Figure 2. Bucket of oysters released to the Lynnhaven Bay in 2006.

sanctuary reef to promote oyster repopulation, as shown in Figure 2. The number of acres open for shellfish harvesting rose 22 percent from 2006 to 2007. As of 2007, 29 percent of the Lynnhaven River met bacteria water quality standards set to ensure safe shellfish consumption.

- **Increased economic opportunities related to marketable shellfish production.** With the opening of more than 1,450 acres of shellfish areas comes the opportunity to harvest and sell oysters and clams. There is a growing demand for Lynnhaven oysters by local and regional seafood restaurants, resulting in an increase in sales for local shellfish businesses.
- **Cleaner recreational activities.** The No Discharge Zone in the Lynnhaven River means that illicit discharges of sanitary waste by recreational vessels are prohibited. Through Virginia's Clean Marina program, four marinas located in the Lynnhaven Bay watershed gained clean marina certification. As a result, local residents and tourists have cleaner water for recreational activities such as boating and swimming.
- **Increased public awareness and participation.** The City of Virginia Beach works with Lynnhaven River NOW, a local watershed organization, to conduct public outreach and education programs that will help to reduce bacteria levels. The organization's membership total is nearly 10 percent of the Lynnhaven River watershed population. Through the use of newspaper and television, Lynnhaven River NOW helps to increase the awareness of issues affecting the watershed. Educational efforts include promoting the City of Virginia Beach's "Don't Feed the Ducks and Geese" program, "Scoop the Poop" program, and informing boaters about the No Discharge Zone.
- **Increased access to funding.** The TMDL implementation plan estimates over \$10 million is needed to cover the initial costs of implementing all management activities and an annual operation and maintenance cost of over \$6 million. Therefore, access to funding to implement these activities is essential. The City of Virginia Beach worked with other local communities, as well as state and federal agencies, to obtain federal and state funding for TMDL implementation activities. The City has set aside funds in their Capital Improvements budget to use it for future projects in the Lynnhaven Bay watershed. In 2007, the City of Virginia Beach provided approximately \$2 million to continue retrofitting some of nearly 1,000 untreated stormwater outfalls in the Lynnhaven Bay watershed.



December 2009 • EPA 841-F-09-002G

For more information on the bacteria TMDL for the Lynnhaven, Broad, and Linkhorn Bay watersheds, contact Jennifer Howell, Virginia Department of Environmental Quality, jshowell@deq.virginia.gov, (757) 518-2111

For more information on the Virginia TMDL Program, visit www.deq.virginia.gov/tmdl/homepage.html