

A Sustainable Chesapeake

BETTER MODELS FOR CONSERVATION

Edited by David G. Burke and Joel E. Dunn

THE CONSERVATION FUND



The case study you have downloaded is highlighted below. Other case studies from this Chapter of *A Sustainable Chesapeake: Better Models for Conservation* can be individually downloaded. The editors encourage readers to explore the entire Chapter to understand the context and sustainability principles involved with this and other featured case studies. The full publication contains 6 Chapters in total: Climate Change Solutions, Stream Restoration, Green Infrastructure, Incentive Driven Conservation, Watershed Protection and Stewardship.

CHAPTER 5 WATERSHED PROTECTION

Introduction	174
Valleys Planning Council	175
Using Smart Growth, Ecology-Based Planning and Community Advocacy to Preserve a Treasured Landscape in Baltimore County, Maryland <i>By Teresa Moore</i>	
Improving Codes and Ordinances	187
Building a Cleaner James River <i>By William H. Street and Amber Foster</i>	
Earning Multiple Credits for a Forested Riparian Buffer	195
A Methodology for Reducing Pollution in Pennsylvania's Susquehanna Watershed <i>By Scott Van de Mark</i>	
Converting Poultry Manure from Waste to Resource	201
Using Manure and Paper Mill Waste to Reclaim Abandoned Mine Lands in Pennsylvania <i>By Scott Van de Mark and Dr. Richard Stehouwer</i>	
Lynnhaven River NOW	211
Improving Water Quality in the Lynnhaven River <i>By Karen W. Forget</i>	

Lynnhaven River NOW

Improving Water Quality in the Lynnhaven River

The Lynnhaven River NOW organization has achieved remarkable success with a well orchestrated campaign to bring back healthy oyster populations through innovative watershed pollution reduction and habitat restoration initiatives.

CASE STUDY SUMMARY

The Lynnhaven River watershed covers 64 square miles of the City of Virginia Beach. Watershed development is largely residential with approximately 225,000 people, or roughly one-half of Virginia Beach's population, living in one-fifth of the city's total land area. Water quality in the Lynnhaven is currently degraded due to high levels of pollutants entering the river and decreased acreage of beneficial habitats that filter pollut-

ants from the water. The Lynnhaven River oyster used to be a delicacy locally and around the world, until eating the oysters became a health hazard due to pollution.

Lynnhaven River NOW (LRNow) was founded in 2002 with the mission to substantially improve water quality in the Lynnhaven River. The group chose the oyster as its symbol and set the tangible goal of eating an oyster from the river by 2007. To reach their goal, they began working to:

1. Identify and reduce sources of nutrients, sediment, bacteria, and chemicals running off of lawns, parking lots, roadways, and out of septic systems in the Lynnhaven watershed
2. Restore vital habitats such as oyster reefs, salt marshes, and riparian buffers that filter polluted runoff and improve water quality for the river and its marine life
3. Educate and engage the community and partner organizations in the restoration effort

LRNow and the partnerships they have created have been remarkably successful at improving water quality and gaining public support for their initiatives in a short period of time. When they were established, most of the river did not meet the Virginia Department of Health standards for safe shellfish harvest, an indicator of river health. In 2006, thanks to LRNow's leadership, 7% (365 acres) of the river was opened to shellfish harvest. In 2007, almost 29% (1,462 acres) of the river met the standard and was opened for harvest. In 2008, almost 31% (1,574 acres) of the river met this standard and were opened. Some of the newly opened areas have been closed since 1930. The ongoing success of LRNow demonstrates a



Long Creek, a tributary of the Lynnhaven River. The creek and entire river are now a "no discharge zone," which means vessels cannot discharge sewage into the water.



A bushel of Lynnhaven River oysters. LRNow and its partners embarked on an ambitious effort to increase the population of native oysters in the Lynnhaven River.

model for the restoration of water quality through leadership, partnerships, and volunteerism.

RESOURCE MANAGEMENT CHALLENGE

Like many tidal waters of the Chesapeake Bay and its tributaries, portions of the Lynnhaven River are severely polluted and have been identified in Virginia state water quality reports as having impaired (Category 5) surface waters needing Total Maximum Daily Loads (TMDLs). TMDLs establish the maximum amounts of an impairing substance or stressor that a water body can assimilate and still meet water quality standards; they also allocate that load among pollution contributors.

Pollution in the Lynnhaven River has caused many problems. Both the main stem of the Lynnhaven and the Eastern and Western Branch of the upper river are impaired due to low levels of dissolved oxygen—which affects a wide variety of aquatic life. Recreational use of the Eastern and Western Branch is impaired due to *Enterococcus* criteria violations. Most of these branches were closed to shellfish harvesting. The water is

contaminated with enteric bacteria from human, pet, and wildlife fecal matter. Fish consumption is limited by the advisory for PCBs issued by the Virginia Department of Health in 2004. Water clarity is severely diminished by toxic algae blooms and high concentrations of suspended sediments.

Stormwater runoff is the main source of pollution that enters into the river, but other contributing sources are boats that discharge their sewage, poor pet waste management, sanitary sewer overflows, and old leaky septic systems. Most of the watershed was developed before there were any environmental regulations and retrofitting is difficult and expensive. The landscape is very flat and poses challenges to flood control and nutrient and runoff management. Lastly, it is difficult to change the behavior of 225,000 people who are accustomed to conveniences that harm the river.

CONSERVATION VISION

The recovery of the Lynnhaven River began with a unifying, non-threatening vision created by individuals from Virginia Beach, particularly Harry Lester, Andy Fine, and Bob

Stanton. The principal founders have a strong connection with the area, a love of the water, and shared a dream of a cleaner river. They started Lynnhaven River 2007 (later changed to Lynnhaven River NOW), with the expressed mission to clean up the river enough so that they could eat the Lynnhaven oysters in 2007 on the 400th anniversary of the exploration of the river by the English.

LRNow set out to be the model for community-based water quality improvement. Previous conservation and restoration initiatives in the watershed failed to have a collective effect. LRNow felt that the general concept of water quality improvement was difficult for most people to understand and embrace. In addition, the community lacked a clear vision for a clean and healthy river. To create and enunciate that vision, the group chose the oyster as its symbol.

The oyster is a tangible and powerful symbol that people in Virginia Beach could easily rally around, understand, and measure. The Lynnhaven River oyster, known for its large size and salty flavor, was a delicacy in Paris, New York, and the local region in the early 20th century, but had not been eaten for years due to pollution and disease. The oysters used to be so famous that Sinclair Lewis wrote about them in *Babbitt and Main Street*. The oyster is a keystone species in the river because it filters sediment and algae from tremendous volumes of water, and oyster reefs provide critical habitat and food for animals in the river. It also revived proven memories of the way the river used to be, with oystermen shacks and oysters the size of dinner plates. Best of all, if restoration efforts were successful, people could eat the oysters once again.

The organization raised funds, hired excellent staff, and built successful

partnerships that leveraged others' expertise and resources. The partners include the City of Virginia Beach, the National Oceanic and Atmospheric Administration, U.S. Army Corps of Engineers, Virginia Institute of Marine Sciences, Chesapeake Bay Foundation, and others.

LRNow focused their efforts on **pollution control** measures that treat or reduce the sources of sediment, nutrients, and bacteria before the pollutants reach the river. They also focused on the **protection of natural habitats** that improve water quality by filtering out pollutants and providing homes for the river's marine life, and specifically on the **restoration of oyster reef habitat**. Lastly, they made every effort to **raise awareness in the watershed** because they felt that community education is one of the only strategies for reducing pollution from private residential properties in the Lynnhaven watershed. This culminates every year with their State of the River Report, which provides statistics and grades regarding river health.

IMPLEMENTATION RESOURCES

The organization's principal founders had extensive contacts and experience in Virginia Beach, which they called upon to develop a small capital campaign for LRNow. They built a board of directors with broad backgrounds and wrote letters to people asking for donations. They wanted 70 individuals to become founding members, which would require a commitment of \$1,000 each year for a total of three years. The board met monthly in the mornings and set specific goals: improve water quality; create oyster reefs; manage stormwater; control pollutants; engage partner organizations; and educate the community.

The City of Virginia Beach has provided resources and contracts to LRNow to enhance the collective effort to improve water quality. The city realized that LRNow could do things beyond the government's capability and could help them accomplish their mandates, particularly as it related to education. In all, the city has contributed \$150,000 to LRNow since 2002. LRNow also received a grant from the National Fish and Wildlife Foundation for \$30,000 to launch an important part of their program.

To raise additional funding for the organization, LRNow hosts an annual oyster roast. This cultural event is usually held at a volunteer's home, includes a band, and features the newly restored Lynnhaven River oysters. A monumental moment came in 2007 when LRNow was able to



Shucking a Lynnhaven River oyster. The oyster is a tangible and powerful symbol for LRNow's conservation and restoration efforts.

serve Lynnhaven oysters for the first time. The oyster roast typically raises approximately \$25,000 to \$30,000 a year. It also gives LRNow a chance to celebrate its successes and galvanize its supporters for the long road yet to come.

The LRNow budget can be viewed in thirds: approximately one-third from individual donations, one-third from foundation and government grants; and one-third from contracts with the city government. LRNow also intends to set up a long-term endowment.

In 2003, a committed group of local citizens came together to foster partnerships that would apply public and private resources to the challenge of reducing pollution in the Lynnhaven River. That core group formed the nucleus of what has grown into an award-winning river restoration project with more than 3,000 members called Lynnhaven River NOW.

Their goal is a clean and healthy Lynnhaven River and their objectives are to:

1. Identify and reduce sources of contamination in the river; reduce nutrients, sediments, and chemicals running off of our lawns, parking lots, roadways, and out of septic systems
2. Restore lost habitats such as oyster reefs, salt marshes, and other buffers that help to filter polluted runoff and protect the river and its marine life
3. Educate and engage the community and partner organizations in restoring and protecting the Lynnhaven River

CONSERVATION STRATEGY

One of the most important things that LRNow did was to inspire the Virginia Beach city government to become a leader and strong partner in the restoration effort. Their participation led to new sewers and new laws that reduced pollution. A key early strategy was for LRNow to hire Barry Frankenfield, a Virginia Beach city employee, two days a week. By hiring from within the city, LRNow was able to pick up Barry's knowledge, experience, and connections, and hit the ground running.

LRNow then took excellent steps to engage citizen leaders within the city by setting up subcommittees to deal with specific projects, including the following: Landscape Practices, Clean Boating and Marinas, Education, Oyster Restoration, Public Relations & Marketing, Stewardship and Access, Public Policy, and Water Quality. Thanks to the city's adoption of Lynnhaven's vision, city employees

were encouraged to attend meetings and were paid for their time. The subcommittees currently hold regular meetings and are a very effective way to involve volunteers, so that their goals are measurable, tangible, and clearly understood, and that the results of their efforts provide a sense of gratification.

In 2005, LRNow hired a full time education director who developed and implemented a comprehensive community education program, which continues to expand every year. LRNow's education program has been the key to turning the tide and facilitating the various water quality improvement initiatives. LRNow's education efforts include working with the public school system to offer training for teachers and direct support of environmental education programs in all of the schools in Virginia Beach.

LRNow's partnership with Dave Iwans and Associates provides them with

excellent materials, including a quarterly newsletter, which advanced their mission and membership. LRNow set a goal of obtaining membership and involvement from 5% of the watershed population, which they surpassed. In 2008, they had obtained membership and involvement from 10% of the watershed. In 2009, they raised their goal to 15%. That same year, they revised their website and began a semi-monthly newsletter.

LRNow PROJECTS

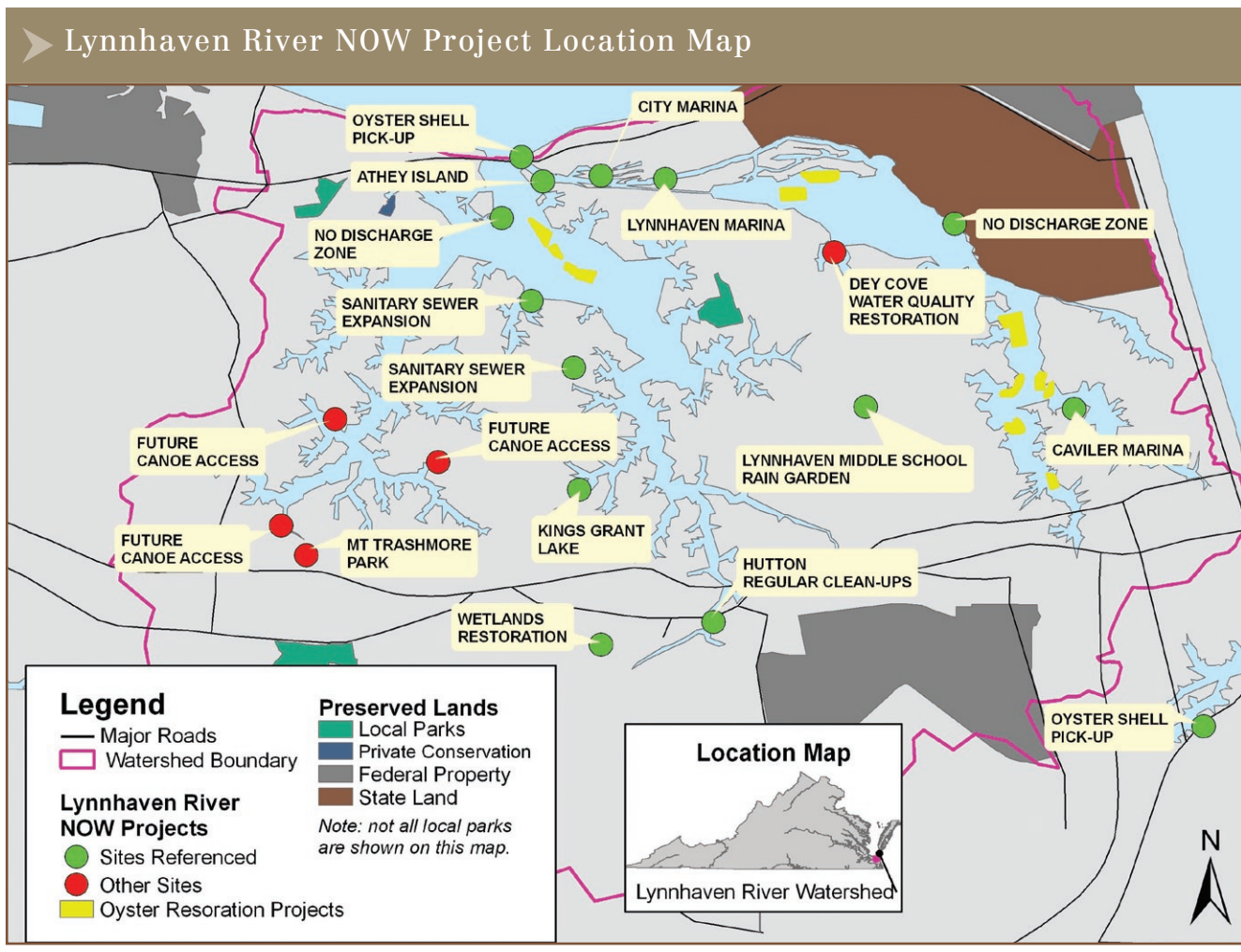
LRNow launched a series of projects to increase pollution control, with the following goals: 1) reduce bacteria, 2) eliminate the "dead zone" (covering approximately 90% of the river) by reducing additions of nitrogen and phosphorus, and 3) improve water clarity for underwater grasses.

Clean Marinas: LRNow encouraged certification of "clean marinas" that provide vessel pump-out facilities and lessons in "clean boating" practices. Their first success was the city-owned marina. Next they moved to private marinas. There are currently four clean marinas, and all have appropriate policies and procedures in place as well as an on-going monitoring program.

No Discharge Zone: LRNow took the impressive step of working with the City Council, the Virginia Department of Environmental Quality, and the U.S. Environmental Protection Agency to designate the entire river a "no discharge zone," which prohibits the discharge of sewage (treated or untreated) from all vessels. The Lynnhaven was the first tidal river in Virginia to receive this designation. After final approval, the City Council passed an enforcement ordinance that requires all boat owners to lock their sewer valves and place dye tablets in their holding tanks. Through a cooperative program with Hampton



Virginia Beach Mayor Oberndorf, LRNow staff, and others install a stormwater treatment system at Mt. Trashmore Park. This system will reduce bacteria and pollutants from runoff entering the Lynnhaven River.



Roads Sanitation District, LRNow has also been able to offer one free pump-out each season to boaters. The Hampton Roads Sanitation District brings the equipment to boater's dock and pumps out their boat.

Sanitary Sewer Expansion: To reduce the sources of human waste, LRNow convinced the City of Virginia Beach to reduce the number of sanitary sewer leaks and overflows into the river, and aggressively pursue the elimination of septic tanks within the watershed. Since 2003, the Public Utilities Department has completed 42 projects in the Lynnhaven River watershed including the largest project, the extension of sanitary sewer lines on the Little Neck peninsula. There is an on-going effort to routinely test the lines and keep them in good maintenance to avoid leaks.

In addition, there have been several pump station upgrades, reducing the chances of an overflow in a storm. These projects represent an investment of more than \$45,000,000 in improved infrastructure.

Solar Aerators in Kings Grant Lake: Most of the lakes in the watershed are surrounded by residential properties and have poor water quality with high bacteria levels, high nutrient levels, and low dissolved oxygen levels. LRNow worked with the Public Utilities Department to install solar-powered aerators in two of the lakes as a pilot project to determine their effectiveness in improving water quality. The data from the test lakes is positive, showing lower levels of bacteria and nutrients and higher levels oxygen levels. LRNow plans to work with the Department of Public



A sign defining the Lynnhaven River as a "no discharge zone."



From LRNow and the SPCA's "scoop the poop" campaign.



LEFT: An LRNow intertidal reef at Athey Island.



RIGHT: A LRNow intern delivering oyster shell from participating restaurants.

Works to expand this program and install aerators in more lakes in the Lynnhaven system.

Water Quality Infrastructure: LRNow aggressively pursued the development of water quality infrastructure, such as retention lakes and ponds, which filter pollutants from the water before they reach the river. With more than 1,000 untreated stormwater outfalls in the watershed, LRNow lobbied the City Council to allocate \$2.05 million and earmark the 2006 capital improvement budget to “retrofit” some of these outfalls with devices that intercept and reduce pollutants. LRNow consistently asks citizens not to pour grease down the drain, which can block pipes and cause wastewater to overflow and release bacteria and other contaminants into the river.

Reduce Pet Waste: One-third of the fecal coliform pollution in the Lynnhaven River is from dog waste. To reduce the sources of pet waste, LRNow worked with the SPCA to develop “Scoop the Poop” programs, which encourage pet owners to clean

up after their animals before the waste is washed into the river.

Broad Bay and Linkhorn Bay Oyster Reef Construction: LRNow worked with the U.S. Army Corp of Engineers to complete Phases I and II of a three-phase oyster reef restoration project in the Lynnhaven River. Sanctuary reef construction is the premier strategy for revitalizing the devastated oyster population, which has declined by 99% since 1607. Together they created 35 acres of oyster reef in 2007 and 22 acres in 2008. These acres are low profile reef on the river bottom, located primarily in Broad Bay and Linkhorn Bay. The Virginia Institute of Marine Sciences identified these areas using hydrodynamic models and historical records of productive oyster grounds as the best location for reefs to supply spat to the entire river system. LRNow also teamed with up the Chesapeake Bay Foundation and the Oyster Reefkeepers of Virginia to encourage citizens and schools to purchase oyster gardening equipment and grow oysters, which are then rounded up and deposited on the sanctuary reefs.

Athey Island Oyster Reef Construction:

LRNow also worked with the City of Virginia Beach, Fish America Foundation, and Virginia Marine Resources Commission to create an intertidal reef at Athey Island. This modest reef is a half acre in size and located at the confluence of the Long Creek and the main stem of the river. It is visible from local restaurants and shops across the creek and is in a great location to receive natural spat set.

Save Oyster Shell:

During the summer months 2006, LRNow developed and ran a Save Oyster Shell pilot program with eight restaurants and two public drop-off sites. Funding for the pilot project was provided by the Chesapeake Bay Restoration Fund. The success of the pilot program convinced the City of Virginia Beach to provide funding through their Oyster Heritage Fund to run the program year-round. There are now fourteen restaurants participating, with two public drop-off sites, and LRNow picks up shell from private oyster roasts. During the summer months, LRNow is averaging 25 bushels of



LEFT: LRNow volunteers help plant a buffer garden. This buffer will slow the flow of stormwater runoff and capture pollutants.
RIGHT: Children at one of LRNow's pearl schools. This program recognizes schools that teach environmental responsibility.



shell per week; in the winter months it drops to about 10 bushels per week. The shell is cured and then used for oyster reef restoration. Shell from the pilot project was used in the construction of the Athey Island Reef.

Green Ribbon Committee: Because of LRNow's urging, the City Council formed a Green Ribbon Committee to provide advice and assistance on water quality matters. The committee has made 56 specific recommendations to the City Council on changes to building codes and ordinances that will reduce the impact and extent of impervious cover; preserve and enhance existing natural resources; integrate stormwater management to maximize efficiency and effectiveness of the overall system; and utilize other means that are effective and practicable to improve water quality. The Green Ribbon Implementation Committee is currently working through directives, policy changes, and code and ordinance revisions.

Open Space Protection:

Ninety percent of the Lynnhaven River's watershed is developed with

residences, roads, and buildings. The remaining open space is crucial for the protection of water quality and wildlife habitat. LRNow has been a strong advocate with both city and state governments to protect 100 acres of undeveloped land in the watershed, especially within the Conservation Corridor System identified by the Hampton Road Planning District Commission.

Rain Garden Construction: Inspired by an LRNow teacher workshop on rain gardens, two middle school science teachers at Lynnhaven Middle School developed a two-year project called the Lynnhaven Legacy that has transformed the school grounds and provides a model for other schools. LRNow worked closely with the school to construct a 900 square-foot rain garden, create an outdoor classroom, build a butterfly garden, install eight rain barrels and "scoop the poop" boxes, and restore a wetland area. All the classes in the school played a role in the planning and execution of the project including the math, science, social studies, and

English classes; the art students; the technology students; and the special education classes. The funding came from a variety of sources, including three grants and funds from the City of Virginia Beach and the school's PTA.

Community Education Programs:

LRNow put a great deal of emphasis on raising public awareness because they felt that community education is one of the only strategies for reducing pollution from private residential properties in the watershed. LRNow programs include four public meetings per year, seminars and lectures on various topics, a bi-annual river symposium, community workshops, presentations to civic leagues and other community groups, and a teacher education program. In 2008 alone, LRNow provided 107 educational programs, including eight workshops for teachers. Two years ago, LRNow launched the "Pearl School" program to recognize, encourage, and support the efforts of teachers and schools that are developing an ethic of environmental



responsibility and stewardship among students. LRNow has also completed a wetland restoration project called “Growing Wetlands in the Classroom,” through which plants are grown by students and transplanted to restoration sites.

Events and Opportunities for

Participation: Throughout the year, LRNow engages citizens by leading clean-ups in various locations around the watershed. LRNow and Wild River Outfitters also host an annual “Paddle for the River”—a seven-mile race or three-mile fun paddle, with proceeds benefitting LRNow. LRNow also hosts an annual photography contest; the winning photo is published in the LRNow calendar. LRNow holds an annual volunteer appreciation picnic and officially recognizes a volunteer of the year, which provides a member of the community with a prestigious award.

RESULTS

Bacterial levels: In 2008, shellfish were safely consumable from 31% of the Lynnhaven River, up from 29% in 2007 and 7% in 2006.

Pollution Control: The “no discharge zone,” established in 2007, was the first for an estuary in Virginia and the second in the whole state. In 2008, the City of Virginia Beach allocated another \$3.8 million to retrofit more of the untreated stormwater outfalls.

Sewer System Improvement: The City of Virginia Beach spent \$45 mil-

lion to reduce the number of sanitary sewer leaks and overflows into the river, and they have aggressively pursued the elimination of septic tanks within the watershed. Only 276 septic tanks remain in the watershed and city officials estimate that they will reduce that number to 125 by 2010.

Protection of Natural Habitats: As of 2007, 62 acres have been protected. LRNow has also strongly advocated for the stringent enforcement of the “no net loss” policy in place to protect wetlands from destruction.

Oyster Reef Restoration: Nearly 60 acres of oyster reef habitat have been created and seeded with wild stock oyster spat.

Raise Awareness: In 2008, LRNow provided 107 educational programs, including several workshops, 6 clean-ups, and 27 presentations to community groups. In addition, in 2008, LRNow accounted for 30 newspaper articles focusing on Lynnhaven River water quality, and ran 4 television advertisements about pet waste and fertilizer. They published an oyster restoration publication, a landscaping guide, and a 2009 calendar.

KEYS TO SUCCESS

► **Leadership:** The principle founders of LRNow took the initiative to start the organization and chose to surround themselves with environmental and community leaders that shared their vision.

► **Funding:** The principle founders were able to recruit approximately 70 individuals who committed to funding the first three years of the organization. This provided enough funding to hire staff, who in turn applied for grants from foundations and developed government service contracts.

► **Partners:** LRNow was effective because their partnership with the city enabled them to more effectively implement restoration measures and appropriate regulations. In addition, LRNow became the coordinating entity for others working on restoring the river.

► **Communication:** LRNow had a clear vision with a tangible core element of opening up the shellfish beds. They communicated it to the public efficiently and effectively. A good idea that is well expressed can quickly grow into a movement.

► **Volunteers:** LRNow was able to accumulate an impressive group of volunteers to achieve the organization mission. The committees give ownership and responsibility to participants.

PHOTOS AND FIGURES

All photos by Lynnhaven River NOW
Figure by Burke Environmental Associates/The Conservation Fund



FOR MORE INFORMATION

Project Contact:

Karen Forget
Executive Director
Lynnhaven River NOW
1608 Pleasure House Rd., Ste. 108, Virginia Beach, VA 23455
Phone: (757) 962-5398 | Email: kforget@lynnhaven2007.com | www.LRNOW.org