

LYNNHAVEN RIVER NOW PRESENTS THE

2012 State of the River Report

POLLUTION

INDICATOR	2012 GRADE	2011 GRADE	WHERE WE ARE IN 2012	WHERE WE WANT TO BE
BACTERIA	C+	C+	42% of river meets shellfish standard/90.4% of river meets swimmable/fishable standard	100% of the river meets the shellfish standards
NITROGEN & PHOSPHORUS	D	D	Nitrogen & Phosphorus levels are too high for SAV to thrive	Nitrogen & Phosphorus levels that meet SAV habitat requirements ¹
DISSOLVED OXYGEN	D	D	7.9 impaired square miles (approximately 90% of the river)	0 impaired square miles
WATER CLARITY	F	C	Sediment & algae levels are too high for SAV to thrive	Sediment & algae levels that meet SAV habitat requirements

POLLUTION CONTROL

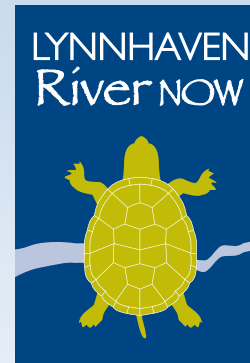
CLEAN BOATING	A-	A-	NDZ in effect 4 certified marinas 2,300 gallons pumped out	NDZ in effect, 8 certified marinas, Annually increasing gallons pumped out
NEW FUNDS FOR WATER QUALITY	A	A-	Since 2003 – \$17 million In 2012 – \$3.57 million	\$3 million per year
STORMWATER TREATMENT	D	D	20% of stormwater treated	100% of total watershed treated with stormwater management
SANITARY SEWERS	C+	C+	4 SSOs 4,175 gallons of sewage spilled 216 septic tanks remaining (13 less than 2011)	0 sewer overflows per year & 0 gallons sewage spilled 0 septic tanks remaining of 11,600

HABITAT

OYSTERS	A	B+	466,000 oysters transplanted 63 acres sanctuary reef 250 linear feet of new oyster shoreline	250,000 per year transplanted 100 total acres of sanctuary oyster reef 300 linear feet of new oyster shoreline per year
OPEN SPACE & PUBLIC ACCESS	B-	B-	3,104 acres of open space (104 new acres) 5 public access sites (1 new access site)	Open Space: 4,000 acres Public Access Sites: 15 public sites
WETLANDS	A	B+	.134 acres net gain 4 living shoreline projects	0 permitted losses per year Increasing number of living shoreline projects each year
UNDERWATER GRASS BEDS	F	F	0 acres	175 total acres

AWARENESS

EDUCATION PROGRAMS	A	A+	123 programs 805 Pearl Homes	80 programs per year 1,000 Pearl Homes
MEDIA ATTENTION	A	A+	27 articles Video produced 7 new publications	Coverage 18 times per year 10 new publications
MEMBERSHIP & INVOLVEMENT	A	A	Membership: 7,290 Involvement: 15,260	Membership: 5,000 Involvement: 30,000 (15% of the watershed population)
SCHOOL PARTICIPATION	A	A	44 Pearl Schools 7 Teacher Trainings Participation from most watershed schools	50 Pearl Schools per year 10 teacher trainings per year Participation from all watershed schools



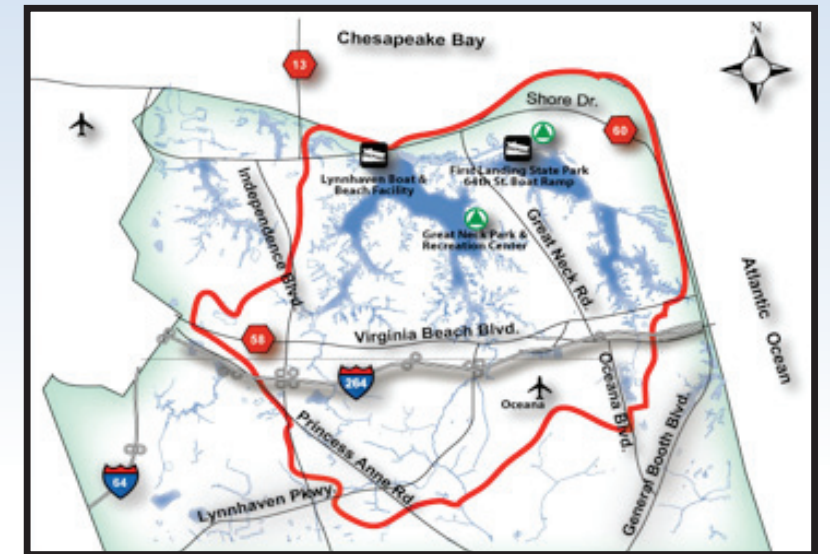
Clearly, one of the highlights of 2012 was the acquisition of the Pleasure House Point property. More than 2,000 residents participated in the grand opening of this important Natural Area on the Lynnhaven River. As the last significant parcel of open space on the river, the Pleasure House Point Natural Area not only provides important habitat and opportunities for future restoration projects, but it also provides residents and visitors an opportunity to explore, learn about and enjoy several different habitats and the plants, animals and birds that inhabit each eco-zone. Lynnhaven River NOW (LRNow) is excited about the possibility for future outdoor education that this Natural Area offers as well as opportunities to enjoy the peace of nature. Other highlights from the past year include receiving the Dugdale Award for Environmental Excellence from the Garden Club of Virginia and the Best New Sustainability Award from the Virginia Recreation and Park Society.

Three new programs were added in 2012. We completed our first oyster castle project on the northwest shore of Broad Bay Island and are very encouraged by the early results. More oyster castle projects are planned for 2013. We deployed our first group of spat catchers to 20 Virginia Beach residents. Look for results from this project in our spring 2013 newsletter. And perhaps most importantly, the first four living shoreline projects were completed in the Lynnhaven. Too often, bulkheads and other hardened shorelines have cut off the connection between the land and the river and destroyed our wetlands. Living shorelines keep this connection, allowing the wetlands to grow, thrive and migrate landward as sea levels rise, while still protecting the property from erosion.

As we have reported in previous years, we have seen notable progress in reducing bacteria levels in the Lynnhaven. 90.4% of the Lynnhaven River meets the swimmable/fishable standard and 42% meets the shellfish standard. While our goal is for 100% of the river to meet the shellfish standard, we know that significant effort is required to hold onto these levels from year to year and we appreciate the efforts of the City, our dog owners and boaters to reduce bacteria levels in the water.

We have not seen the same progress in reducing our nitrogen and phosphorus levels which directly impact water clarity and the restoration of our underwater grasses. A ban on phosphorus in lawn fertilizer goes into

effect in 2013. Perhaps this will help reduce our phosphorus levels. Nevertheless, nitrogen remains one of the most important and potentially destructive pollutants in the river. Help from everyone is needed if we are going to successfully reduce our nutrient levels.



With the successes and challenges of 2012, our water quality grade remains a B.

The Lynnhaven River watershed is 64 square miles and home to 230,000 residents. This is almost 3,600 people per square mile or 18 people per acre. Add to this that 38% of the land area in our watershed has an impervious surface (rooftops, driveways, parking lots, roadways) and 30% is managed turf. This only leaves 32% of the watershed with optimal rainwater infiltration. In most of our watershed when it rains, the water runs back into the river immediately either directly or through our stormwater system carrying with it all of the pollutants it encounters along the way – dog waste, fertilizer, pesticides, loose sediments, toxins and trash. Controlling pollutants entering the river is everyone's responsibility. We appreciate all that our residents are doing to lessen their impacts.

While much progress has been made, two things are clear. To maintain our progress takes continued vigilance and further effort is needed to tackle the remaining obstacles to a clean and healthy Lynnhaven River for us and future generations. We know that this goal is within our grasp and with your assistance we will reach it.

Stormwater runoff is the main vector that brings **POLLUTION** to the Lynnhaven River. During rain events, pollutants are washed from the watershed and carried by rain water into storm drains that dump directly into the river.

BACTERIA C+

Bacteria testing is done regularly in the Lynnhaven River by the Virginia Department of Health, Shellfish Sanitation Division. Bacteria levels determine what areas of the river are open to shellfish harvest. In partnership with the City, boaters and dog owners, we have made notable progress in the past decade in reducing bacteria levels. Currently, 42% of the river is open to shellfish harvest, a very rigorous standard. For the first time this year, we are also tracking the percentage of the river that meets the swimmable/fishable standard and are happy to say that 90.4% of the river meets the swimmable/fishable standard. We have expectations for increasing both of these percentages, but are pleased with the progress that has been made and know that continuous effort is required to hold onto these gains.

DISSOLVED OXYGEN D

All marine animals require dissolved oxygen to live, just as all land animals require atmospheric oxygen. Dissolved oxygen is produced when underwater plants photosynthesize and oxygen is removed from the water when marine organisms breathe and when aquatic bacteria decompose dead algae, plants and animals. In 2012, 7.91 square miles of the Lynnhaven were impaired for dissolved oxygen. This represents 90% of the river. The keys to increasing dissolved oxygen are to reduce sediment runoff allowing our underwater grasses to return and to reduce excess nutrients entering our river and stimulating the growth of algae that both reduces water clarity and increases aquatic bacteria that consume oxygen.

Water quality can be improved through **POLLUTION CONTROL** measures that treat or reduce the sources of sediment, nutrients and bacteria before these pollutants reach the river.

CLEAN BOATING A-

The No Discharge Zone has been in effect in the Lynnhaven for six years. Each year the number of gallons of sewage pumped from our boats increases. This past summer, 2,300 gallons were pumped out. This is a 62% increase over 2011 and does not include the gallons pumped out at the new 24-hour self service pump-out facility at the City Marina in Long Creek as there is no mechanism for monitoring gallons on the self-service pump. Six pump-out facilities are available in the Lynnhaven for boater's convenience and HRSD continues to offer one free pump-out per boat per season. The total number of gallons of this potent waste product that have been pumped out since the No Discharge Zone took effect is 8,800. We continue to encourage all of our marinas to become certified under the Virginia Clean Marina Program.

SANITARY SEWERS C+

Sixty sanitary sewer projects were completed in the Lynnhaven in 2012 at a total cost of \$6.9 million. These maintenance and improvement projects include root control, wet well cleaning, find & fix and other measures. Since 2003, \$78.2 million have been spent on expansion and improvements to our sanitary sewer system. Nevertheless, we still experience sanitary sewer overflows (SSOs), primarily during storm events. The number and size of sanitary sewer overflows directly impacts bacteria levels in the river. During 2012, there were four, a significant decrease in number from previous years, but the number of gallons spilled was equal to last year, 4,175 gallons. Effective back up power systems for all pump stations is a key element in reducing SSOs.

NITROGEN & PHOSPHORUS D

No significant reduction in nitrogen and phosphorus levels were indicated in 2012. Nitrogen and phosphorus are the main ingredients in lawn and garden fertilizer; nitrogen is also air-deposited in the river with car exhaust as the major source in our watershed. In a rain storm, fertilizer is washed off lawns and carried to the Lynnhaven River directly or via stormwater. Once in the river, excess nitrogen and phosphorus negatively impact water quality because they promote algae growth and algal blooms which reduce water clarity and ultimately remove dissolved oxygen from the water. A ban on phosphorus in lawn fertilizer takes effect in 2013 which may help to lower the phosphorus levels, but excess nitrogen will remain the most destructive nutrient for the Lynnhaven River system.

WATER CLARITY F

Though anecdotal reports indicate that water clarity has improved, until water clarity reaches a level where sunlight can penetrate to the river floor and our underwater grasses can rebound, the improvement is not significant enough to record. The 6 acres first reported two years ago has not survived. Like all plants, underwater plants must have sunlight to germinate and grow. Water clarity is diminished by sediment runoff and excess algae. Submerged Aquatic Vegetation is a critical element of the river ecosystem and provides habitat, raises dissolved oxygen levels, absorbs nutrients and aids in settlement of sediments.

**NEW FUNDS FOR WATER QUALITY A
STORMWATER TREATMENT D**

In the past ten years, the City has spent \$17 million on stormwater projects intended to improve water quality and we have just begun to tackle the problem of stormwater and the pollutants it delivers to the river in every rain storm. During 2012 alone, \$3.6 million dollars were spent on projects intended to improve water quality. Thirty-eight percent of the Lynnhaven watershed is impervious and 30% is managed turf. That only leaves 32% where infiltration of rain water is optimal. In any rain event, water drains rapidly off of our impervious surfaces carrying with it all the pollutants it encounters along the way: dog waste, fertilizer, pesticides, toxins, loose sand and soil and trash. Currently, only 20% of our stormwater is treated or retained before being dumped into the river. As state and federal stormwater requirements become more rigorous, improvements in our stormwater system will become even more important. The City is committed to looking at innovative new methods of treating stormwater and removing bacteria, excess nutrients and sediments from the river. In addition to what the city can do, we must also require higher levels of stormwater management on newly developed and redeveloped properties and ask even more of our residents and businesses in reducing pollutants. We can all contribute to solving this problem by reducing the runoff from our properties through the installation of rain barrels, rain gardens, buffers and living shorelines. In fact, it is the only way this problem will be solved.

Protection and restoration of beneficial natural **HABITAT** is critical for a healthy Lynnhaven River. These natural habitats improve water quality in the river by filtering out pollutants and they provide homes for the river's marine life.

OYSTERS A

The famed Lynnhaven oyster is a keystone species in the river and restoration of our oyster reefs and oyster population has been central to LRNow's restoration work for the past decade. We currently have 63 acres of sanctuary reef in the Lynnhaven providing important habitat for our native oysters. Almost a half million new oysters, 430,400 from the school oyster gardeners, 31,500 from the citizen oyster gardeners, and 3,761 from the spat catchers were placed on our sanctuary reefs during 2012. Our Save Oyster Shell program grew substantially in the past year also, collecting 2,280 bushels, almost two times the shell collected in 2011. Three exciting developments in oyster restoration during this past year were the completion of our first oyster castle project (250 linear feet of oyster shoreline), continuing work on plans for a spat-on-shell facility on the Lynnhaven and our first Spat Catcher project.

WETLANDS A

For the first time since we began tracking, we had a net increase in wetlands in the Lynnhaven in 2012! Our goal each year has been 0 permitted loss of wetlands. In 2012, we exceeded this goal and actually had a permitted gain of .134 acres of wetland – small, but very important to have turned the corner from permitted losses each year. Wetlands should grow at the interface between the river and the land. They protect the river's water quality by intercepting and removing sediments and nutrients from runoff before it enters the river. Wetlands also provide key habitat for animals, especially juveniles. Too often in the Lynnhaven, bulkheads and other hardened shorelines cut off the connection between the land and the river and destroy our wetlands. LRNow is working to encourage living shorelines as an alternative to bulkhead. Our first four living shoreline projects were completed in 2012.

Lynnhaven River Now is raising environmental **AWARENESS** in the watershed because community education is one of the only strategies for reducing pollution from private residential properties in the Lynnhaven watershed.

EDUCATIONAL PROGRAMS A

Education and building awareness of water quality issues has always been at the heart of LRNow's work and continues to be a key to our success. Media coverage, development of focused publications on important topics, maintenance and enhancement of our website, regular distribution of our E-News and our printed newsletter and community education events all help us to reach our education and awareness goals. At the end of 2012, we had enrolled 805 Pearl Homes in Virginia Beach. More than 2,000 people participated in our Fall Festival at Pleasure House Point and we had 3,885 subscribers to our E-News and 843 Facebook Friends at the end of 2012. In addition, LRNow conducted 123 educational programs during 2012 including a new Oyster Gardener Kayak trip and a very successful Fall Festival. A highlight of 2012 was receiving the Dugdale Award for Environmental Excellence from the Garden Club of Virginia.

MEDIA ATTENTION A

Media coverage of the condition of the Lynnhaven is invaluable in educating the public and generating interest in helping to address the river's problems. During 2012, we were pleased to have 27 articles published regarding LRNow's work to improve water quality. A highlight was our involvement in the production of a video on oyster restoration and participation in the Whole Foods competition. In addition to media coverage, LRNow completed seven new publications this past year: Tidal Wetland Restoration, Oyster Update, Pleasure House Point Zone Guide and our four quarterly newsletters.

OPEN SPACE & PUBLIC ACCESS B-

The acquisition of the Pleasure House Point property was completed in 2012 and is the most important new open space acquisition in the Lynnhaven watershed in the past decade. The 104 acres of natural area at Pleasure House Point give the community an opportunity to explore, learn about and enjoy several different habitats: maritime forest, wetland, shallow water, scrub-shrub, and beach habitat, and the different animals and birds that inhabit each. In addition, the Pleasure House Point property also provides an additional access point for kayakers, fishermen and others to enjoy the river. Open space is necessary both for the health of our wildlife and the well-being of our residents. Several other projects are currently in the planning stages: Thalia Creek canoe/kayak launch, the Thalia Creek Greenway and planning in the Lynnhaven Strategic Growth Area.

UNDERWATER GRASS BEDS F

Currently, there are no significant underwater grass beds in the Lynnhaven. Historically, submerged aquatic vegetation (SAV) grew in dense beds and is critical habitat for crabs, fish, and other aquatic life. In addition, SAV put dissolved oxygen into the water, creating a healthy environment for marine animals. Reestablishment of SAV beds is also essential to plans to reintroduce the bay scallop to the river. There is evidence that viable seed beds still exist, but several factors are negatively affecting our SAV. Runoff of sediments that cloud the water prevents necessary sunlight from reaching the floor of the river. In addition, excess nutrients from fertilizer and fecal matter stimulate the growth of algae that further cloud the water. The final factor is the increasing water temperatures that may be adversely affecting the eel grass that once populated the Lynnhaven.

MEMBERSHIP & INVOLVEMENT A

During the past ten years, membership and involvement in LRNow has grown steadily. Our current membership is 7,290 and over 15,000 people were involved in educational programs, trainings, and volunteer activities during 2012. The core of our work continues to be centered around our committees: Oyster Restoration, Wetlands, Stewardship and Access, PR and Marketing, Public Policy, Landscape Practices and our Executive Program Committee. While these numbers are encouraging, we have a goal of involvement with 15% of the population of our watershed, which is almost double our current involvement. We have begun tracking our volunteer hours and will be excited to report that to you next year.

SCHOOL PARTICIPATION A

The Pearl School program, Wetlands in the Classroom and our teacher training program are the core of our school programs and outreach to our future water stewards and their families. We are dedicated to giving our Virginia Beach students opportunities to learn about the natural world and develop an ethic of stewardship for our bounty of natural resources. We had 44 certified Pearl Schools in 2012 and 3,194 students and teachers from 62 different schools directly involved in programming with us. In addition, we conducted seven teacher trainings involving more than 100 Virginia Beach teachers. In 2012, our Wetlands in the Classroom program received the Best New Sustainability Award from the Virginia Recreation and Park Society. We are excited to offer a new program, Nurturing Natives, in 2013 with some of our Virginia Beach schools and look forward to the opportunities that the Pleasure House Point Natural Area will give us to expand outdoor activities for students.