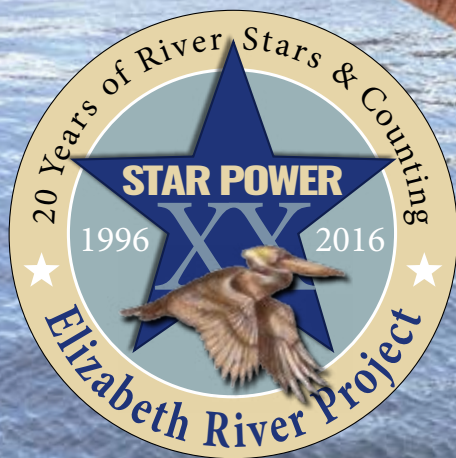


Star Power:

*Toward a
Thriving
Urban River*



Vision:

Our model collaboration of citizens, businesses, government and academia will achieve a world-class legacy: a thriving urban river.

Clean waters and resilient shores will create enriched quality of life for citizens and wildlife, and a thriving economy for responsible commerce; so that our children and grandchildren will know that we had them in mind.

- Watershed Action Team, Elizabeth River Project, August 19, 2015



Discovering river life aboard The Learning Barge. Photo by Larry J. Anson

Plan Made Possible by:

This is a 10-year plan to improve the environmental health of the urban Elizabeth River in Southeast Virginia. The plan was made possible by a capacity-building grant from Chesapeake Bay Funders Network, an Innovative Nutrient and Sediment Reduction grant from the National Fish and Wildlife Foundation, and generous donors to the Elizabeth River Project. Special thanks for meeting support: Landmark Communications, the Chesapeake Bay Foundation – Hampton Roads, Kinder Morgan, the Portsmouth Service League, Mario's Italian Restaurant and Mike Kirsch. A special salute to the many stakeholders and scientists who gave unstintingly of their time and expertise, including those first developing the State of the River 2014 report which served as the foundation for this plan, and those serving throughout 2015 on a reconvened Watershed Action Team for the Elizabeth.

This planning effort was led by the non-profit Elizabeth River Project, 475 Water Street C103A, Portsmouth, VA 23704 (757-399-7487). Learn more, elizabethriver.org

Summary of actions:

These five actions must be carried out simultaneously, with the active engagement of all sectors of the community, for the vision to be achieved.



*Calling businesses, governments, schools and homes.
Find your starring role: elizabethriver.org.*

Action: Keep the goo going!

Clean up contamination in the bottom of the Elizabeth River to non-toxic levels in all known hotspots (p3).

Action: Achieve sustainable development and redevelopment practices, working with government, citizens and businesses (p5).

Action: Restore resilient natural shores, where healthy wetlands, oyster reefs and re-forested banks provide habitat for plentiful wildlife (p10).

Action: Restore clean water.

Find and fix the sources of the highest levels of fecal indicator bacteria, while also reducing nutrients (p15).

Action: Create a river revolution,

led by 25,000 citizens of all ages and walks of life who understand, embrace and promote the restoration of the Elizabeth River (p20).

Map of focus areas (p11-12).



c. 2015 Conor Makepeace

Introduction: “The flying, chirping, thriving river”

I JUST GOT BACK FROM PADDLE BOARDING the Lafayette branch of the Elizabeth on a gorgeous fall morning. Something large was making fish flap in every direction beneath the Tidewater Drive bridge as I paddled under (a hungry rockfish?). For long stretches, tiny white asters bloomed among marsh grasses turning their autumn gold. Three blue herons startled, croaking, from a side creek, then took turns leading my way. Sitting now on my porch, I hear an osprey’s chirp, high in the pine tree from which larger birds like to survey our living river.

Nearly 20 years ago, the non-profit Elizabeth River Project stunned Hampton Roads by announcing a plan with broad community support for restoring the health of an urban river then presumed dead. Banner headlines and 11 news articles in one week greeted the plan in *The Virginian-Pilot*.

There were always those of us who knew life persisted and could thrive, given broad community support. This 20th anniversary Watershed Action Plan, to be introduced to the public in 2016, celebrates efforts that have been massive, precedent setting and community-wide to reclaim the health of our home river. The Elizabeth River is now very much presumed alive, thanks to every level of government, virtually every prominent waterfront industry, thousands of homes, tens of thousands of school children, team upon team of researchers and many, many more. You have earned the Elizabeth River an international reputation for “collective impact,” the greater results that can be achieved when disparate interests pull together. “The power of collective action comes... from the coordination of their differentiated activities through a mutually reinforcing plan of action,” wrote the Stanford Social Innovation Review in 2011, citing Elizabeth River Project as one of the best examples in the country.

And yet. The water I paddled today was so murky that I wondered how those herons would spot their dinner. Suspended silt, washed into the river with every rain, is just

one sign of the daunting volume of untreated urban runoff pollution that still largely eludes our best collective efforts.

It seemed in those first years that it would take a miracle to address the leading problem identified by our first Watershed Action Team, 120 stakeholders from all walks of life, unveiling their plan in 1996. Their top priority? Reduce some of the world’s highest levels of contamination, pooled in the river bottom from defunct wood treatment plants. “The goo must go!” We inspired politicians and school children to chant. It is indeed some kind of miracle that four major cleanups have now taken place on the river bottom, with drops in fish cancer, thanks to Elizabeth River Project with many partners; the US Navy, the US Environmental Protection Agency, Columbia Gas and many more. And yet there are at least as many more hotspots still to address.

New, similarly diverse Watershed Action Teams updated the plan for us in 2001, and again in 2008. Elizabeth River Project believes in the power of a plan with a broad base of ownership, so our teams always represent a broad swath of business, government, citizen and science interests. In 2008, team members were so emboldened by progress across so many fronts that they envisioned the urban Elizabeth one day becoming “swimmable.” To get there, they prescribed a new level of citizen outreach.

THE LEARNING BARGE, “America’s Greenest Vessel,” was born in 2009 as Elizabeth River Project’s one-of-a-kind education vessel, booked to capacity for student field trips ever since. We opened Paradise Creek Nature Park in 2013, 40 revitalized acres showing how nature can co-exist in the heart of an urban harbor. River Star Homes (3.100 as of today) followed River Star Businesses (115 who together have voluntarily reduced pollution by 323 million pounds) and River Star Schools (169 by last count) as free, easy ways to join Elizabeth River Project in “the river revolution.”

THESE HAVE BEEN A TREMENDOUS 20 years, worthy of a heck of an anniversary celebration. Yet along the way, we have also learned just how super-sized and long-term is the challenge of restoring one of the world’s dirtiest rivers.

In one of the hardest lessons, we learned to re-define that “swimmable” goal. We concentrated tremendously hard on organizing community-wide efforts to achieve it first in the Lafayette sub-watershed, by a deadline of 2014. In fact, state monitoring showed that the environmental goal of meeting “recreational contact” standards was achieved by December 2014. Among many efforts, Hampton Roads Sanitation District and the City of Norfolk have spent hundreds of millions overhauling waste treatment systems to reduce the potential for pipes leaking harmful bacteria.

And yet, I’ll be carefully washing off my paddleboard before I put it away, because I now know two hard truths: First, no urban river on the East Coast meets state standards for bacteria after a heavy rain. “Swimmable in dry weather,” officials told me in Boston, despite their celebrated swim meets in the Charles. Urban cities, whether Boston, Norfolk or Portsmouth, simply have too much paving and too little opportunity for treating their huge volumes of runoff. The encouraging state findings here don’t apply for 48 hours after a storm, as we now warn people in Safety First tips at elizabethriver.org. Second, global warming has given us a problem much larger than we could hope to control. From Maine to Florida, warmer waters now incubate a naturally occurring bacteria, *Vibrio vulnificus*, that can be deadly if you have a compromised immune system. This bacteria loves shallow, brackish waters like the creeks along the Elizabeth.

So our new Watershed Action Team, prescribing this 2016 plan, reset bacteria goals in environmental terms that were probably the more appropriate all along. The team of more than 100 worked on the consensus based plan you are reading. Among “clean water” goals are a call to erase the F’s for Indian River and Broad Creek, earned in State of the Elizabeth River Scorecard 2014 for “fecal indicator” or poo related bacteria (Elizabeth River Project and Virginia Department

of Environmental Quality). Achieving this goal will help wildlife and make the river safer for humans, but -- setting aside the wild cards of urban runoff and warmer seas -- we would need weekly testing at public beaches to be able to measure how this goal translates for safe swimming. There are no public beaches on the Elizabeth.

Columbus learned that where you end up is not always where you thought you were headed, but can be all the more worthwhile. This newest Watershed Action Team, convened March - August 2015, believed sustainable development and redevelopment are the hope of the future for getting stormwater runoff under control. The team believed in new opportunities only now on the horizon, such as for sustainable development of 10,000 acres of rural Chesapeake if conservation principles are followed; and sustainable redevelopment of a half-mile of abandoned Norfolk waterfront with the help of the Dutch, recently lending the city their vision for a green “East Downtown.”

Achieving resilient shores, often through enlightened development and redevelopment practices, is one of five priorities in the 2016 Watershed Action Plan for the Elizabeth. While earlier plans called out “the goo must go” (clean up the bottom of the river) as the No. 1 priority, you’ll notice the priorities are not numbered in this plan (for the first time). That’s a salute to the progress it’s time to celebrate, and also an indication of how strongly this team felt that all five areas must be addressed, simultaneously – from cleaning up the remaining toxic goo to getting an Elizabeth River curriculum in the schools - to be worthy of the world-class collaboration that brought us this far.



Bill Tierman, The Virginian-Pilot

I hope you do celebrate as you read these pages, and I hope you find your role. There’s nothing sweeter than a leaping, flying, chirping, blooming, thriving river. This is the plan to get us ever closer on our home river, the Elizabeth.

- Marjorie Mayfield Jackson, Executive Director,
Elizabeth River Project (October 12, 2015)



The Learning Barge, powered by sun and wind, was Elizabeth River Project’s response to the call in the last action plan for a new level of outreach. The barge stays booked to capacity for students. Join the journey to discover the power of the new 20th anniversary plan.

Action: Keep the goo going!

Clean up contamination in the bottom of the Elizabeth River to non-toxic levels in all known hotspots.

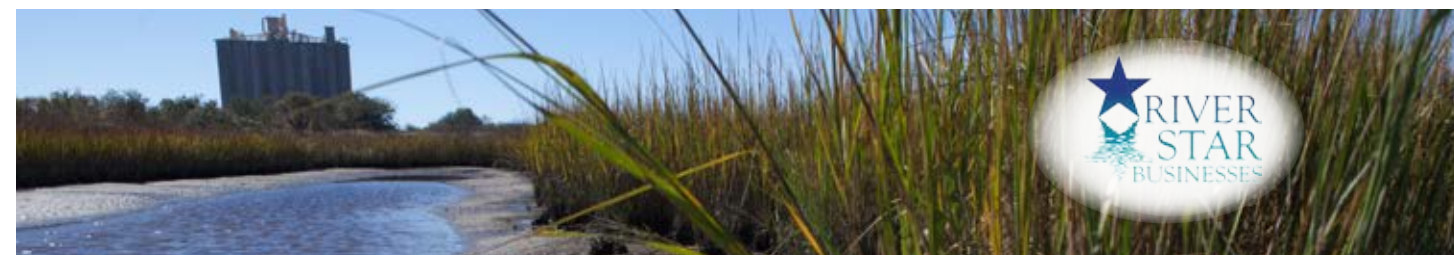
2025 Goal: Reduce cancer in the indicator fish, the mummichog, to background levels in known hotspots. Reduce polycyclic aromatic hydrocarbon (PAH) levels in these hotspots to below 45 parts per million, the level at which adverse effects are seen in marine life.

2020 Goal: Achieve these cleanup goals for Atlantic Wood and at least one other site, in addition to cleanups already achieved. Make progress or identify a plan for all known hotspots with an active partnership that meets regularly.

THE BOTTOM SEDIMENTS IN THE ELIZABETH RIVER for decades have harbored some of the highest levels of contamination in the world. Thanks to prior versions of this action plan and strong community partnerships for implementation, significant strides have been made.

Cancer in bottom-dwelling fish dropped to almost nothing following removal of more than 37 million pounds of contamination at Money Point in Chesapeake by Elizabeth River Project, Living River Restoration Trust and diverse additional partners, along with related restoration of wetland and oyster habitats. The US Environmental Protection Agency (EPA) in spring 2015 began a massive project to contain 135 million pounds of contamination at Portsmouth's Atlantic Wood site, named one of the nation's "Superfund" or worst-of-the-worst sites. Columbia Gas in 2014 removed 40 million pounds of contamination in Crawford Bay, while Kinder Morgan in 2015 began addressing bottom contamination at its recently purchased terminal on the Elizabeth's Eastern Branch.

Yet additional "hotspots" in the Elizabeth River bottom remain unaddressed. Three with some of the highest known remaining contamination – a final portion of Money Point; Republic Creosote and Scuffletown Creek sites - are slated for eventual cleanup by the Port of Virginia as mitigation for filling in uncontaminated sediments alongside Craney Island, when the port expands its terminal facilities there. However, the schedule and funding for the Craney Island project are uncertain.



Eleven River Star Businesses voluntarily did their part to improve the river at Money Point. Kinder Morgan Elizabeth River Terminals welcomed these new wetlands. Photo by Chesapeake Bay Program.



The mummichog fish is the "canary" of the river bottom. Cancer has dropped dramatically in mummichogs at Money Point following cleanup.

Meanwhile, contamination in the Elizabeth River bottom continues to pose a severe threat to marine life. The contamination is correlated with cancer, genetic mutations and deformity in fish and impacts to the larger food chain. Bottom-dwelling fish, clams and other life along the mud must be healthy, plentiful and diverse for larger fish, shore birds, and other river life to thrive.

WATERSHED ACTION TEAM 2015 prioritized the highest risk problems in the river sediments as: 1) Toxic concentrations of chemicals, primarily PAHs as a byproduct of wood treatment plants that formerly operated on the Elizabeth River; 2) Poor sediment quality not associated with contamination, but rather with excess nutrients and fine-grained sediments accumulating in shallows impacted by storm water runoff; and 3) toxic contamination from heavy metals and polychlorinated biphenyls (PCBs). PCBs were used in electrical equipment and other applications until the compounds were banned in 1979.



For the 2008 river action plan, Elizabeth River Project & partners removed 39 million lbs. of "goo" (PAH) at Money Point (left). Joe Rieger, Elizabeth River Project (right) is among scientists finding 24 species of fish have returned.

Goo Steps Recommended:

1) Elizabeth River Project's Sediment Remediation Partnership to convene at least annually to coordinate efforts, with a steering committee of the partnership to meet more frequently (explore funding by participating groups) to advance efforts and maintain a data base.

2) Address all known hotspots, including:

- Scuffletown Creek, Republic Creosote, Money Point Phase 3; all slated for clean up by the Port of Virginia as mitigation sites for the loss of healthy bottom with the expansion of Craney Island.
- Atlantic Wood - Underway (EPA).
- Kinder Morgan Eastern Branch Terminal - Underway.
- Paradise Creek - Plans underway by Living River Restoration Trust.
- Copper slag, mouth of Western Branch - no current plans.

FOCUS AREAS

- Promote holistic approaches that include restoring wetlands and oysters, using Money Point 1 & 2 (Elizabeth River Project, Living River Restoration Trust) as models
- Review sediment disposal options and costs.
- Review metals and PCBs to consider for cleanup standards and approaches.

- Continue to review the goal of 45 ppm for PAH, considering whether site specific and compound specific goals may be more appropriate in the future.
- 3)** Continue "goo must go" education campaign with decision makers, school children, and the public (also see education action).
- 4)** Sediment partnership should also explore causes and solutions for non-contaminated river bottom exhibiting poor habitat quality and links to water quality issues.



Free yard flag when you agree to 7 simple steps. Possible funding for home projects!



Free help & public recognition when your business documents voluntary environmental gains.



Carry out a school project that helps the river. "Princess Elizabeth" will recognize you!

Find your starring role: Elizabeth River Project, Elizabethriver.org, 399-7487



The Elizabeth River watershed is about 90 percent developed. Sustainable practices are essential when considering further development. Photo: Ed Ketz

Action: Achieve sustainable development and redevelopment practices,

working with governments, citizens and businesses and the Living River Restoration Trust.

2025 Goals:

- **All four watershed cities** (Chesapeake, Norfolk, Portsmouth and Virginia Beach) adopt coordinated sustainable development policies and practices.
- **Environmental responsibility** is the accepted standard for business activity in the Elizabeth River watershed, from development and re-development to on-going business operations.
- **A majority of qualifying business and government facilities** with a high potential to reduce pollution or restore/ conserve habitat have documented stewardship results meeting standards of the Elizabeth River Project's River Star Businesses program.
- **Sustainable redevelopment of East Downtown** and the Southern Branch industrial corridor; sustainable development of the Dominion Boulevard Corridor in Chesapeake.
- **Increase in vegetated wetlands.**
- **All four watershed cities** adopt new tools to protect large trees, emphasizing incentives that encourage voluntary compliance.
- **Progress toward a goal of 40%** tree canopy throughout the watershed.
- **1,000 River Star Homes** of Elizabeth River Project have installed native plant gardens (begin tracking 2016).

- **A regional plan is adopted** creating contiguous wildlife habitat along a connected corridor of "greenways," or vegetated shorelines, and "blueways," or water trails.
- **The Living River Restoration Trust**, a sister non-profit of Elizabeth River Project, achieves a long-range strategy to conserve priority sites for conservation.



Perdue Agribusiness Chesapeake Plant grows oysters as one of Elizabeth River Project's 115 River Star Businesses. Goal: 150!

2020 Goals:

- **Achieve model sustainable practices** in the development of the 10,000 acre Dominion Blvd. corridor in Chesapeake and the redevelopment of Norfolk's East Downtown.
- **Expand River Star Businesses to 150** (up from 115 in 2016).
- **No net loss of vegetated wetlands due to development.**
- **All four watershed cities** protect the 100-foot buffer along the shore to the maximum extent practical. For Norfolk, this includes strengthening official zoning guidance to protect, extend and enhance this buffer zone city-wide.
- **500 River Star Homes** have installed native plant gardens.
- **Review existing and planned greenway** and blueway studies of localities to plan a regional greenway/blueway system of habitat corridors and identify funding.
- **At least one locality adopts new protective ordinances** or incentives for conserving large trees. All four localities review existing and proposed ordinances for protecting large trees.
- **At least one locality** requires a minimum of 10% projected tree canopy for new developments.
- **Living River Restoration Trust** becomes active in urban land conservation in the Elizabeth River watershed. The Trust protects at least three new parcels in perpetuity and actively promotes land conservation.

THIS URBAN WATERSHED IS ALMOST 90 PERCENT developed, creating unsustainable levels of polluted runoff from paved areas and severe stress on wildlife with the disappearance of vital habitats. Remaining undeveloped or abandoned tracts are under tremendous pressure for development or redevelopment. Sustainable practices exist that could conserve wildlife habitat and limit pollution during development, but too often such practices are neither well-understood nor preferred by the public, relevant trade organizations and decision-makers.

Meanwhile, Hampton Roads tops most lists for highest sea level rise on the East Coast over the last 100 years, generally associated with climate change and its well-known future risks. This poses a high risk to wildlife habitat as wetlands disappear under water and trees fall into the water with eroding shores. As well, a warming climate changes what native plant species can survive where, reducing available food and cover for native wildlife.



Norfolk's Environmental Stormwater Management Division earned Model Level River Star in 2015 for projects like this 15,500 sq. ft. marsh at Myrtle Park.

The Elizabeth River Project in 2008 published *Balancing Industry and the Environment, How to Achieve Win-Win on the Industrial Waterfront*, as a national guide to urban sustainable redevelopment practices commissioned by the EPA. The guidebook cites dozens of case studies involving Elizabeth River Project's River Star Businesses, www.riverstarbusinesses.org. Numbering 115 business and government facilities in the Elizabeth River watershed as of 2015, these facilities have passed peer review for documenting significant voluntary results in pollution prevention, wildlife habitat, or both. These River Star Businesses have voluntarily reduced pollution by 323 million pounds and restored or conserved 1,754 acres of urban wildlife habitat (1997-2016).

In 2011, Elizabeth River Project introduced River Star Homes, www.riverstarhomes.org, as a free program to engage the homeowner in reducing pollution and restoring habitat. As of 2016, 3,100 homes participate, receiving a free yard flag as well as frequent grant-funded opportunities to assist with rain barrels, rain gardens, shoreline plantings, lawn makeovers and more. The program has inspired neighboring efforts including Bay Star Homes, intended primarily for homes outside the Elizabeth River watershed, and Pearl Homes, intended



primarily for Lynnhaven River watershed residents. Some homes in the Elizabeth River watershed participate in more than one of these programs, achieving additional impact.

AMONG LOCALITIES, Virginia Beach updated its ordinances to reflect more sustainable practices in recent years thanks to a Green Ribbon Committee. Experts from the Netherlands included Norfolk in 2015 “Dutch Dialogues” to plan resilient shores as part of sustainable redevelopment of a half-mile of abandoned waterfront known as “East Downtown.” The City of Portsmouth partnered with Elizabeth River Project to develop Paradise Creek Nature Park as a model for sustainable development. And the City of Chesapeake is

considering adoption (2015) of a strategic plan calling for sustainable development practices in 10,000 acres of rural area known as the Dominion Boulevard corridor.

Watershed Action Team 2015 prioritized problems affecting wildlife habitat in this order: 1) Unsustainable watershed development and redevelopment practices including a lack of sufficient management of stormwater runoff; 2) Habitat fragmentation and loss of wetlands, forests, and bottom habitat; 3) Sea level rise and climate change. The team identified keystone wildlife species including native oysters, speckled trout, blue crab, striped bass, osprey, bufflehead ducks, river otters and the brown pelican.



Photos courtesy US Army Corps of Engineers

Above and here, Norfolk Christian Lower School plants wetlands they grew in the classroom, helping restore wildlife habitat at the US Army Corps of Engineers' Crane Island. The students earned recognition as a River Star School with Elizabeth River Project.

Sustainability Actions Recommended:

1) Promote a menu of sustainable practices, engaging governments, businesses and citizens, including construction and landscaping trade groups. Establish a sustainable development advisory committee to develop a menu of priority practices to promote, including long-term land conservation opportunities with the Living River Restoration Trust, recommendations in Elizabeth River Project's sustainable development guidebook and practices promoted throughout this plan.

• Elizabeth River Project's action steps include:

Explore potential for law students help develop potential policy recommendations that might promote the incentives and changes we are seeking. A coastal law policy clinic at the College of William & Mary is a possibility.

Elizabeth River Project and partners work with local and state governments in a two-way conversation to achieve more sustainable development and redevelopment practices, while meeting government needs.

Elizabeth River Project and Chesapeake Bay Foundation: Support the strengthening of zoning ordinances to protect, extend and enhance the shoreline buffer in Norfolk.

Elizabeth River Project: Develop education how-to materials for citizens accessible through 21st century media such as a phone app to give to River Star Homes and new residents.

Empower citizens to help influence sustainable policies.

- Community partners to work together for sustainability: The Dominion Boulevard corridor of Chesapeake for development, the Eastern Branch and Southern Branch for redevelopment.
- Develop working relationships to promote sustainable practices with development trade groups such as Tidewater Builders Association, landscape architects, lawn companies.

2) Expand Elizabeth River Project's River Star Businesses program, a voluntary initiative recognizing government and industrial facilities.

- FOCUS AREAS**
- Focus recruiting and technical assistance to encourage sustainable practices in these target areas as practical: East Downtown Norfolk, the Dominion Boulevard Corridor in Chesapeake and the Southern Branch Industrial Corridor (Portsmouth & Chesapeake).
 - Focus recruiting and technical assistance for reducing bacteria and nutrient pollution (see clean water goals) in these areas as practical: Indian River, Broad Creek, Paradise Creek, headwaters of Eastern Branch.

3) (Living River Restoration Trust) Work with other urban land trusts to complete a strategic plan to become the first active land trust in the Elizabeth River watershed.

- Overcome roadblocks for accepting multiple parcels for long-term conservation.
- Develop brochures and other marketing materials.
- Accept a minimum of three parcels of urban land in the watershed by 2020 for long-term protection.



Sara Felker (middle & right), River Star Homes program manager, measures the home of Pat Thrasher (left) for a shoreline planting to be funded in part by Elizabeth River Project. Photos by Chesapeake Bay Program.

4) (Local and state governments, Elizabeth River Project, the Trust, Friends of Indian River and other partners) Work together to develop and implement a connected network of wildlife habitat corridors or greenways and blueways.

- Identify opportunities for restoration corridors and public access, working with partners such as the Green Infrastructure Center which have habitat mapping capabilities.
- Consider funding such as Chesapeake Bay Gateways, Coastal Zone Management.
- Review city codes that discourage natural areas such as those that discourage no-mow zones.

5) (Partner organizations) Conduct a backyard habitat campaign to promote native plants, using River Star Homes and social marketing to promote benefits and overcome barriers in concert with the new Virginia Native Plant Marketing Partnership.

- Include these additional important partners: Area cities, VA Department of Conservation and Recreation, Hampton Roads Native Plant Society, master gardeners, Old Dominion University, Eggleston.
- Make widely available an easy to use reference for native plants. Consider an update of Elizabeth River Project’s guide to native plants or another guide such as Department of Conservation and Recreation native landscape guide.
- Use Chesapeake Bay Program’s Smart Tool to track homeowner efforts.
- Increase availability of native plants at local nurseries. Build relationships and offer promotions with the big box stores and nurseries including Eggleston and Old Dominion University nurseries.

- Campaign to reduce invasive species such as English Ivy, privet, Japanese Honeysuckle.
- Campaign to include ways to increase beekeepers to help pollinate natives.
- Campaign to make use of Elizabeth River Project’s Paradise Creek Nature Park as a hub for growing and understanding native plants and invasive species. Elizabeth River Project is adding a River Academy with a greenhouse and a Forest Conservation Corps of volunteers to grow natives and remove invasive species. The 40 acres are under continuous improvement to remove invasives and plant natives.
- Promote more environmentally friendly mosquito control.
- Cities: Consider giving priority to natives and incentivizing native landscaping.
- Educate municipal review staff and the public about native salt tolerant species and shifts in shoreline species due to sea level rise.

6) SUPPORT THE PROTECTION AND RESTORATION OF TREES, especially large or “heritage” trees.

- Localities are encouraged to consider a minimum requirement of 10% tree canopy for new developments, while providing sufficient staffing for inspection.
- Elizabeth River Project: Research model potential ordinances and funding for localities to protect large trees (Boston, San Antonio). Encourage cities to consider incentives such as mitigation fees per diameter inch.
- Elizabeth River Project: Create social media tools to celebrate heritage trees, making use of an app available to transfer heritage trees to a data base.



The City of Norfolk and Elizabeth River Project are working together to plan the sustainable redevelopment of a half-mile of abandoned downtown waterfront behind Harbor Park, known as East Downtown.

Action: Restore resilient natural shores, where healthy wetlands, oyster reefs and re-forested banks provide habitat for plentiful wildlife.

2025 Goals:

- **Create or restore 20 acres** of tidal wetlands, 20 acres of non-tidal wetlands, 40 acres of vegetated buffer, 20 acres of oyster reefs, seeded with 20 million oysters.
- **Make living shorelines** the preferred, affordable and practical approach for resilient shoreline stabilization.

2020 Goals:

- **Create or restore 10 acres** of tidal wetlands, 10 acres of non-tidal wetlands, 10 acres of oyster reefs seeded with 10 million oysters.
- **Showcase living shorelines**, or shorelines stabilized through natural approaches, in all four watershed cities and with each sector of the community. Promising potential sites include:

FOCUS AREAS

- Industrial sector, Norfolk Southern’s Lamberts Point living shoreline
- Residential sector, Chesterfield Heights and Indian River living shorelines
- Government sector, Harbor Park living shoreline and Great Bridge Battlefield Park

- **Standardize and demonstrate the effectiveness of the “Oyster Berg”** and hybrid living shorelines combining Oyster Bergs or similar structures, wetland restoration, bags of oysters and coir logs for affordable, small scale stabilization in all four watershed cities.

A HEALTHY TIDAL RIVER REQUIRES HEALTHY wetlands and forested shores to support wildlife and filter pollution. Yet the Elizabeth River has lost enormous swaths of wetlands and forest since Colonial times, including 50% of its tidal wetlands since World War II. Estimated loss of forestland in the Elizabeth River watershed was 64 acres in 2013/14 alone.

Elizabeth River Project has been the catalyst for dozens of wetland restorations and hundreds of other shoreline plantings on the Elizabeth since constructing the first voluntary wetland restoration in Virginia in 1997 at Larchmont Public Library. The project, Birdsong Wetland, a partnership with the City of Norfolk, won the international Clearwater Award. Many restorations are now conducted in partnership with Elizabeth River Project’s 114 River Star businesses, 169 River Star



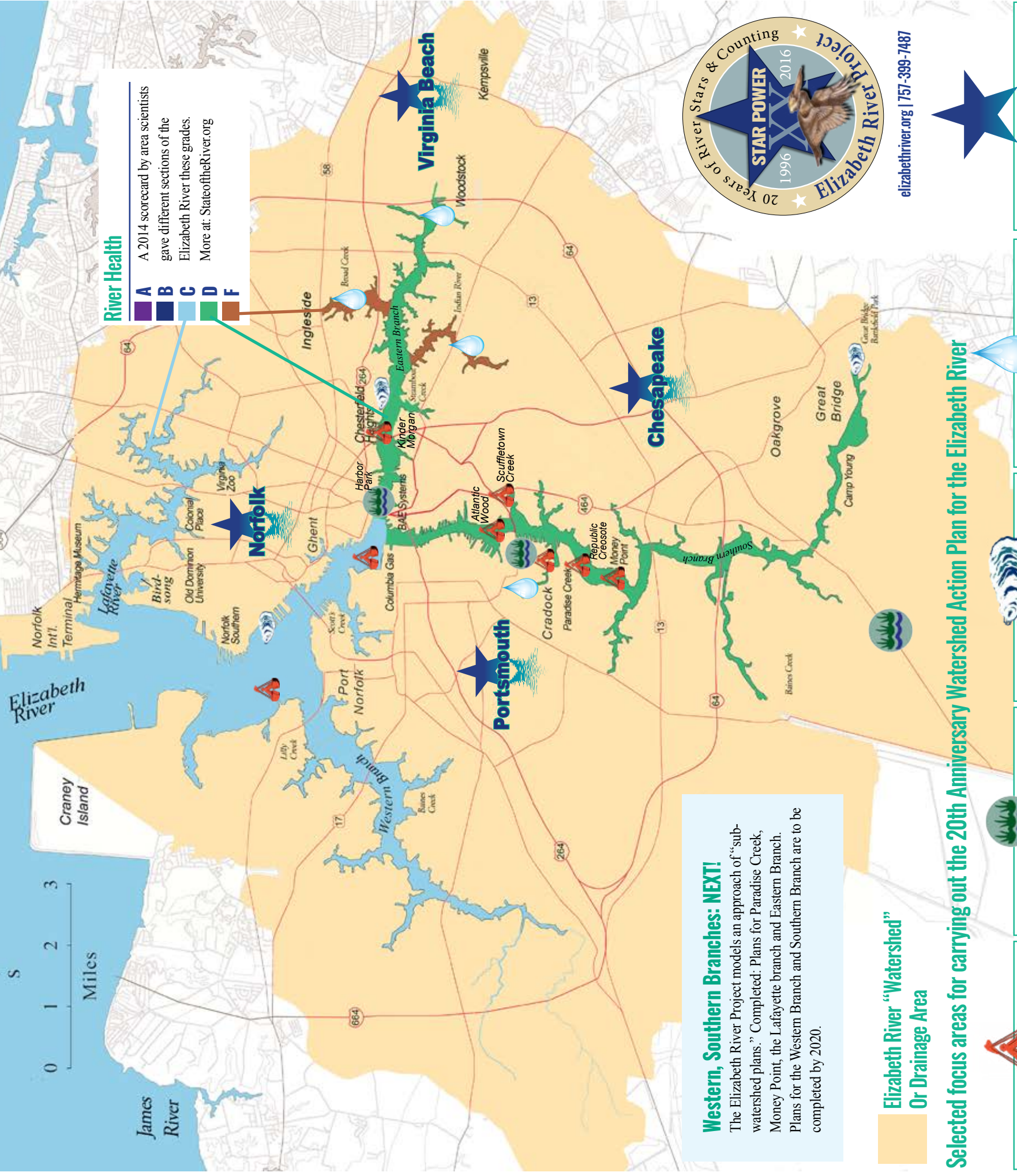
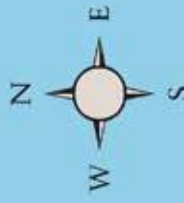
Elizabeth River Project stockpiles oyster shells for reefs with more than a dozen completed. More to come! Photo by Chesapeake Bay Program.

Schools and 2,900 River Star Homes (2015 figures). Lafayette Wetlands Partnership spearheads smaller, volunteer led efforts on the Lafayette branch of the Elizabeth. The Elizabeth River Project in 2013 with the City of Portsmouth opened Paradise Creek Nature Park, 40 acres featuring 11 acres of wetlands restored by the Port of Virginia and 29 acres of maritime forest in on-going revitalization with volunteers and students. Education facilities are under construction (2015).

Meanwhile, the Chesapeake Bay Foundation and NOAA’s Chesapeake Bay Office have worked hand in hand with Elizabeth River Project, the US Army Corps of Engineers, the Lafayette Wetlands Partnership and many other partners are working to bring back the once famous “Norfolk oyster.” Together the partners have restored about 25 acres of oyster reefs (some as mitigation sites). Chesapeake Bay Foundation has grown 13.3 million oyster spat for reefs restored on the Lafayette branch. In 2013, the Corps of Engineers found historically large oysters surviving on ancient reefs in the Lafayette in an underwater survey. Lafayette Wetlands Partnership, Elizabeth River Project and SKW Constructors pioneered “oyster bergs,” small, simple oyster reefs that are accessible to the citizen for volunteer use.

Find Your Starring Role for a Thriving

Elizabeth



River Health
 A 2014 scorecard by area scientists gave different sections of the Elizabeth River these grades. More at: StateoftheRiver.org

- A** (Purple)
- B** (Dark Blue)
- C** (Light Blue)
- D** (Green)
- F** (Brown)

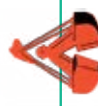
Western, Southern Branches: NEXT!
 The Elizabeth River Project models an approach of “sub-watershed plans.” Completed: Plans for Paradise Creek, Money Point, the Lafayette branch and Eastern Branch. Plans for the Western Branch and Southern Branch are to be completed by 2020.

Elizabeth River “Watershed” Or Drainage Area



elizabethriver.org | 757-399-7487

Selected focus areas for carrying out the 20th Anniversary Watershed Action Plan for the Elizabeth River



Keep the Goo Going!

Cancer dropped in fish after The Elizabeth River Project cleaned the river bottom at Money Point. Columbia Gas is also cleaned and Atlantic Wood underway. More sites to come: Republic Creosote, Scuffletown Creek, Paradise Creek, copper slag near Western Branch, Kinder Morgan E. Branch.



Sustainable Development & Redevelopment Needed

East Downtown Norfolk, The Dominion Blvd. Corridor in Chesapeake & the Southern Branch Industrial Corridor are focus areas for sustainable development and redevelopment.



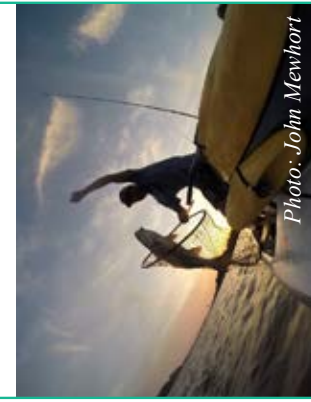
Restore Resilient Shores

Watch for high-profile “living shorelines,” bringing back wetlands, oysters, native trees and shrubs, at Norfolk Southern’s Lamberts Point, Chesterfield Heights and (completed) Great Bridge Battifield Park.



Restore Clean Water

Fecal related bacteria levels are especially high in Broad Creek, Indian River, the Kempsville area and Paradise Creek, making these priority focus areas.



Create a River Revolution

Calling homes, schools, businesses and government facilities in all four cities! Join our free River Star programs to find your starring role in the plan to restore a thriving Elizabeth. Visit elizabethriver.org.



Photo: John Mewhort



Lafayette Wetlands Partnership, other partners and volunteers establish a “living shoreline” on Colley Bay, part of the Lafayette branch. A “coir log” made of coconut fiber will protect the new wetland plants and stabilize the shore.



Norfolk Southern, River Star Business, and advisors plan a 1,200-foot “living shoreline” to halt erosion and restore wildlife habitat along Lamberts Point.

“LIVING SHORELINES” have gained traction in the area as a natural means for controlling erosion in the face of rising seas while enhancing wildlife habitat. Typically, natural slopes are restored in place of bulkheads or other hardened shorelines; wetland and upland native plants are installed, and a “toe” is often added off-shore, typically made of rock, to lessen wave action. Oyster habitat may be added as well. “Coir logs” made of coconut husks may be part of the design.

FOCUS AREAS

Hermitage Foundation Museum and Gardens worked with Elizabeth River Project, the City of Norfolk and other partners to install one of the earliest living shorelines and continues to expand this effort. More recent River Star Business projects to achieve living shorelines include Great Bridge Battlefield & Waterways Park in Chesapeake and a showcase project proposed by Norfolk Southern along 1,200 feet of eroding shore at its Lamberts Point site.

Resiliency Steps Recommended:

1) PROMOTE LIVING SHORELINES with citizens, government, businesses and schools.

- Elizabeth River Project and partners as appropriate: Support VA Marine Resources Commission (VMRC) efforts to streamline the permitting process for living shorelines (underway). Encourage the commission to consider allowing flexibility, when appropriate, for applicants to construct living shorelines seaward instead of landward.
- Promote incentives such as the recent inclusion of living shorelines for eligibility under the Clean Water Revolving Loan Fund program administered by VA Department of Environmental Quality; and tax relief available for wetlands and conservation easements. Elizabeth River Project: Encourage full funding of VA Department of Environmental Quality’s living shoreline loan program.
- Increase elevations of wetland restoration projects to account for sea level rise.
- Control *Phragmites* (common reed, an Asian invasive plant) and other shoreline invasive species as part of living shoreline projects.
- Continue to expand Elizabeth River Project’s Wetlands in the Classroom program, traditionally funded by Dollar

Tree Foundation, with students growing wetlands to install in living shorelines. Add instruction about living shorelines and their value during sea level rise.

2) Continue large-scale restoration of the once-famous Elizabeth River oyster.

- Construct and seed oyster reefs where surveys show appropriate hard bottom and ready recruitment, and where navigation will not be impeded (Elizabeth River Project, Chesapeake Bay Foundation, NOAA, US Army Corps of Engineers, localities).
- Consider oyster structures as hardened sill in living shorelines.
- Support the scientific evaluation of whether oyster restoration practices are appropriate for regulatory credits as Best Management Practices, including oyster reef restoration, oyster blocks and reef balls and oyster gardening.
- Standardize a mold for the oyster berg and enlist volunteers and partners to mass produce the oyster berg (Elizabeth River Project, Lafayette Wetlands Watch, Titan America, Chesapeake Bay Foundation etc). Promote hybrid shoreline restoration projects with bags of oyster shell, coir logs, wetland restoration and oyster bergs to contain costs and make natural shoreline stabilization more accessible.



Chesapeake Parks, Recreation & Tourism earned Model Level River Star Business in 2016 for projects such as this “living shoreline” planted to control erosion and restore wildlife habitat at Great Bridge Battlefield Park. Living shorelines are urgent to create resiliency for some of the nation’s fastest rising sea levels.



John Mewhort catches a puppy drum fish in our highest priority focus area, the Eastern Branch. Photo: John Mewhort

Action: Restore clean water.

Find and fix the sources of the river's highest levels of fecal indicator bacteria*, while also reducing nutrients.

2025 Goals:

- **Achieve reductions in bacteria and nutrient levels** in targeted areas, so that all major tributaries improve or earn at least a C for fecal indicator* bacteria and dissolved oxygen in the State of the Elizabeth River Scorecard.

2020 Goals:

- **Conduct intensive monitoring in targeted areas** for fecal indicator bacteria. Find and fix sources as practical.
- **Develop and begin implementation of stormwater** improvement plans for the largest under-treated properties in the watershed.
- **HRS D to achieve improvements in nutrient reductions** at its two large plants near the mouth of the Elizabeth River, the Virginia Initiative Plant and the Army Base Plant.
- **Community partners**, including Virginia Department of Health, municipalities, HRS D, Elizabeth River Project and others, agree on an approach and best practices for addressing septic systems as a potential source of fecal indicator bacteria.



Students gather river water for testing on the Learning Barge. Photo by Chesapeake Bay Program

* Fecal Indicator bacteria are used to detect and estimate the level of fecal contamination of water.

HIGH CONCENTRATIONS OF BACTERIA ASSOCIATED with fecal matter (“fecal indicator bacteria”) have placed oyster harvesting off-limits in the Elizabeth River since the 1920s while posing long-standing risks for human contact. Meanwhile, excess nutrients have often led to massive algal blooms originating in the Elizabeth in late summer and spreading into the lower bay, with the potential for related fish kills.

In the earliest versions of this Watershed Action Plan (1996, 2001), bacteria and nutrient challenges were low on the totem pole of priorities for a river ranked as one of the most toxic on the East Coast. By 2008, however, enough progress had been made in addressing toxics that planning teams turned with renewed interest to bacterial challenges.

Goals in a 2008 version of this plan called for meeting state standards for bacteria in some portions of the Elizabeth by 2014. A concerted community-wide focus on the Lafayette tributary to the Elizabeth led in December 2014 to a draft report from Virginia Department of Environmental Quality proposing to remove the Lafayette from its list of waters impaired by bacteria levels. The Virginia Department of Shellfish Sanitation is also evaluating a change in the long-standing ban on harvest of the once famous Norfolk oyster.

Elizabeth River Project also in 2014 completed a comprehensive sub-watershed plan for the Eastern Branch of the river, dubbing it “the Lost Branch,” for lack of awareness. Leading the environmental challenges on the Eastern Branch: Enterococcus bacteria levels earning F’s for two Eastern Branch tributaries, Broad Creek and Indian River, when compared to state criteria for recreational human contact (State of the Elizabeth River Scorecard 2014, Elizabeth River Project and Virginia Department of Environmental Quality.)

Among the most significant progress to reduce nutrients and bacteria in the Elizabeth has come through massive overhaul of aging sewer systems by the Hampton

Roads Sanitation District (HRS D) and area cities, in part to comply with federal directives. HRS D has upgraded its Army Base and Virginia Initiative plants at a cost of more than \$200 million and recently added state-of-the-art bacteria analysis capabilities in its lab to help track down the sources of fecal indicator bacteria. The City of Norfolk has spent more than \$180 million to replace aging sewer lines in the Lafayette sub-watershed.

NUTRIENTS REMAIN a significant concern with algal blooms persisting in the Elizabeth each summer. However, the 2014 State of the Elizabeth River Scorecard found improving trends for nitrogen through much of the Elizabeth River. Nitrogen levels are dropping steadily not only in the Elizabeth’s Southern Branch, but also its Eastern Branch and Main Stem.

Also of concern in the 2014 scorecard were high levels of PCB contamination in fish and crabs in much of the river. Although in general, edible fish have lower concentrations of PCBs than non-edible fish, the VA Department of Health has issued fish consumption advisories for the lower James and Elizabeth Rivers based on PCB levels in fish. The Dept. of Health offers a tiered hierarchy of consumption limitations for the Elizabeth River, varying among fish species. PCB contamination is a complicated problem to address, since the compound persists in the environment and moves through the food chain. VA Department of Environmental Quality is working to address PCB contamination in the James and Elizabeth. The Elizabeth River Project is working with Duke University to measure PCB levels in red drum and speckled trout caught by anglers throughout the Elizabeth River.

Watershed Action Team 2015 identified the highest risk water quality problems in the Elizabeth as: 1) High concentrations of fecal indicator bacteria, 2) High concentrations of nutrients that can result in low dissolved oxygen in the river, 3) Toxics.



Employees pause from work at HRS D’s Army Base treatment plant, one of two waste treatment plants recently upgraded to reduce nutrients in the Elizabeth. Photo: HRS D

Clean Water Actions Recommended:

FOCUS AREAS

1) Develop a plan to identify and fix the sources of some of the river's highest fecal indicator bacteria levels, found in Broad Creek, Indian River, the headwaters of the Eastern Branch and Paradise Creek (State of the River Scorecard 2014, Elizabeth River Project and VA Dept. of Environmental Quality).

- Elizabeth River Project, Virginia Department of Health, HRSD and Cities of Portsmouth, Norfolk, Chesapeake and Virginia Beach work together to track the sources of problem bacteria and, as funding allows, fix sources determined to be related to sanitary sewers. HRSD's newly developed Pathogen Program will assist the partners in identifying and confirming wastewater problems, including identifying human sources of fecal contamination and their origins.
- Conduct intensive dry weather monitoring to determine hotspots of fecal indicator bacteria (Elizabeth River Project). HRSD analyze samples to determine source. If of human origin, HRSD, Virginia Department of Health and localities work to find and fix sewer problems as practical. If not, Elizabeth River Project work through River Star Homes to influence citizen behavior. Chesapeake to conduct targeted bacteria monitoring in areas within its storm drain system.

- Encourage regional partners to continue to research Best Management Practices in areas where there is a lack of efficiency data, including for fecal indicator bacteria.
- Conduct focused social marketing campaigns through River Star Homes in the target areas to change citizen behavior related to fecal indicator bacteria and nutrients in the river. Research indicates that education alone has little impact on behavior. Follow social marketing principles to address barriers and benefits for the targeted audiences to adopt the target behaviors.

Target these River Star Homes behaviors to reduce bacteria – Scoop the dog poop, keep grease out of the sink, don't feed the geese.

Target these River Star Homes behaviors to reduce nutrients – natural lawn care, planting trees, living shorelines, native plant species, land conservation, energy conservation.

2) Establish a regional task force on septic tanks to better understand the extent of septic systems as a cause for elevated fecal indicator bacterial concentrations and consider approaches such as better mapping, enforced pump out, education, incentives and possible grant programs for hooking up to wastewater systems (VA Dept. of Health, Dept. of Environmental Quality, Elizabeth River Project, localities, other non-profits).

- Partner with Septic Smart USA.

3) Reduce nutrients and bacteria through government, business and citizen actions.

FOCUS AREAS

- HRSD finalize Virginia Initiative Plant and Army Base Plant upgrades to reduce nutrients, bacteria.
 - Cities, Elizabeth River Project, River Star Businesses work together to identify priority sites, plan and implement stormwater treatment for large untreated areas posing high risks. Example: Norfolk's plans for large-scale stormwater retrofit to capture nutrients at Lake Taylor on the Eastern Branch.
 - Help governments, River Star businesses achieve their plans for meeting regulatory requirements for Total Maximum Daily Loads.
- 4)** Pursue opportunities to increase the availability of mass transit and alternate transportation initiatives, as an important means of reducing nitrogen in runoff.
- A model example is Chesapeake's draft strategy for the Dominion Corridor, calling for a biking network, walkable

neighborhoods and ready access to mass transit for all residents.

5) Evaluate the watershed for legacy upland sources of PCB and other contamination in runoff

- Identify potential upland legacy sources (Virginia Department of Environmental Quality, Elizabeth River Project, other partners).

6) (Elizabeth River Project, VA Department of Environmental Quality, HRSD, localities and other partners) Research emerging contaminants, their impacts on the Elizabeth River and possible approaches for reducing impacts, recognizing that locality programs exist for some of these issues:

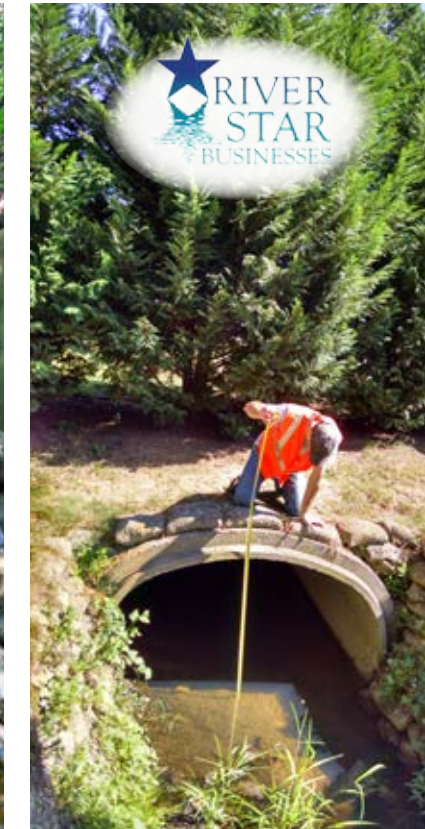
- 1) pharmaceuticals and personal care chemicals in river water (Hampton Roads Planning District and Norfolk Public Works have messaging),
- 2) microplastics in river water (see Virginia Marine Debris Reduction Plan of Coastal Zone Management and EPA's Trash Free Waters program),
- 3) impacts to water quality from flooding,
- 4) pathogens such as *Norovirus* and *Vibrio*,
- 5) increases in global water temperatures and
- 6) how nano technology may be impacting the river.



Billy Cook (right) spreads compost for his River Star Homes lawn makeover with Mike Fowler, Elizabeth River Project. Goal: Create healthy soil without chemicals.



Martha Vesprille and Tim Ferring earned champion for extra efforts as a River Star Home.



HRSD earned Inside Business River Star Business Hall of Fame 2016 in part for sleuthing to discover the source of fecal related bacteria in Wayne Creek on the Lafayette. The wastewater treatment authority added a state-of-the-art lab after these efforts identified a leaking underwater sewer main.



Top to bottom, clockwise: Paradise Creek Nature Park in full fall regalia. Volunteer helps remove invasive species from the park. Native wild flowers were grown for the park by area students, attracting wildlife like the threatened monarch. Elizabeth River Project and City of Portsmouth operate this public park to show YOU how to restore an urban river. Directions: ParadiseCreekNaturePark.org. Photos by Chesapeake Bay Program.



River Star School students help restore wetlands at Kinder Morgan Elizabeth River Terminals, a River Star Business.

Action: Create a river revolution, led by 25,000 citizens of all ages and walks of life who understand, embrace and promote the restoration of the Elizabeth River

2025 Goals:

- **Enlist 10,000 River Star Homes** (up from 3,100 in January 2016; assuming 2.5 people per household, this approximates 25,000 citizens) and 1,000 volunteers in devoted, active roles in the restoration of the Elizabeth River. Coordinate activities for maximum efficiency and results with related programs including Bay Star Homes and Pearl Homes. *
- **Create a continuum of integrated, cross-disciplinary river education** from pre-K through higher education,

engaging all four school systems, private schools, youth groups and volunteers, area colleges and universities.

- **Decision makers in each of the four cities**, state and federal government, and the private sector, serve as active champions in the restoration of the Elizabeth.

- **Expand public access to the Elizabeth River** including expanding the Elizabeth River Trail into a network of bike trails along the Elizabeth, connecting across all four cities, as practical.

2020 Goals:

- **Transform the Learning Barge** and Paradise Creek Nature Park into the River Academy for students and the public, also integrating Wetlands in the Classroom and River Star Schools.
- **Pilot River Star Neighborhoods** in each of four cities. Grow River Star Homes to more than 5,000 strong with partnerships in each city to document pollution reductions and help cities achieve Total Maximum Daily Loads (TMDLs, known as pollution diets prescribed by regulatory action).
- **All four school systems** adopt an Elizabeth River curriculum where possible.
- **Implement a sustained outreach program** for informing and engaging decision-makers.
- **Expand public access**, exploring expanding the Elizabeth River Trail for biking and walking into the Eastern Branch.



L-R clockwise: Aboard The Learning Barge, student meets a periwinkle, while at Paradise Creek Nature Park Sarah Sumoski, Urban Park Ranger introduces students to marine woods. Bottom, Robin Dunbar, Deputy Director of Education for The Elizabeth River Project gathers students for a barge field trip. The River Academy will combine barge and park experiences. Photos by Chesapeake Bay Program.

WHEN THE NON-PROFIT ELIZABETH RIVER PROJECT came on the scene in 1993, the urban Elizabeth River was presumed dead. A typical urban legend: You need six shots if you fall in. Few people knew the name of the waterway flowing through their urban downtowns. Confidence that the river could be restored was at an all-time low.

Over several decades, Elizabeth River Project and many partners have worked to increase public interest in the home river uniting four urban cities in Southeast Virginia. Public awareness has been the top priority of the Board of Directors of Elizabeth River Project since 2008, launching The Elizabeth River Project's Dominion Virginia Power Learning Barge in 2009 as "America's Greenest Vessel," a steel barge symbolizing the working urban river but with a live wetland on board, symbolizing the Elizabeth returning to life. More than 50,000 have now been aboard. Student field trips book to capacity with many of the students arriving from 169 River Star Schools that each year document hands-on river projects.

Elizabeth River Project also restored Paradise Creek Nature Park as a showcase for students and the public, in 2015-16 adding the Dominion Wetlands Learning Lab, expanded green parking, a maritime playground and the Fred W. Beazley River Academy to increase education opportunities. Portsmouth

Public Schools began using the park as its field station for an Elizabeth River curriculum. The Elizabeth River Project in 2011 added River Star Homes to its star fleet of stewardship partners and started RIVERFest, attracting as many as 4,000 festival goers by 2015.

In short, we've been working to make the public fall in love again with the Elizabeth.

Along the way, partners on the Elizabeth River became internationally known as a model for collaboration. Stanford Social Innovation Review cited the Elizabeth River Project in 2011 as one of the eight best examples in the country of an organization achieving "collective impact" by bringing diverse partners together to address a community challenge. Other researchers reached similar conclusions in a 2013 text book, The Case for Grassroots Collaboration.

Nonetheless, Watershed Action Team 2015 identified many needs for more targeted education (described throughout this plan) in order to achieve the education goals prescribed. Among those still too often missing from the fold: Military families, minorities, key decision makers.

Education Steps Recommended:

- 1) **MAXIMIZE THE LEARNING BARGE** and Paradise Creek Nature Park as complementary outdoor classrooms that make possible a paradigm shift in the Elizabeth River Project's ability to provide meaningful river education.
 - Pilot combined field trips with the barge and park (2015/16).
 - Develop a portfolio of river education programs to educate river stewards throughout their learning career, pre-kindergarten to college and beyond.
 - Relate curriculum to Virginia Standards of Learning.
 - Engage public and private schools, home schools and

youth groups as key partners.

- Engage college and university faculty as partners. Consider faculty event on the Learning Barge. Make the Learning Barge a research vessel for university levels and scientists.
- Expand River Star Schools and expand Wetlands in the Classroom.
- Strengthen education partnerships throughout the community to achieve this goal.
- For funding, invite school superintendents, principals, higher education faculty for receptions at the River Academy. Ask school systems to help request state funding.



Elizabeth River Project is building the Fred W. Beazley River Academy at Paradise Creek Nature Park to educate all ages. The plan calls for integrating education experiences at the park with those aboard Elizabeth River Project's Learning Barge.

2) Expand River Star Homes, focusing on targeted areas and building partnerships with each of the four watershed cities.

- Enlist citizens as River Star Homes to make behavior changes and implement on-the-ground projects that help achieve pollution reduction and wildlife habitat goals defined elsewhere in this plan.

- Coordinate tracking of results with localities for Total Maximum Daily Load credits, using the SMART Tool.

- Pilot a new aspect of River Star Homes, “River Star Neighborhoods,” in each city. Define criteria for identifying a River Star Neighborhood (such as 25 percent participating as River Star Homes and an ongoing community project in pollution prevention or habitat enhancement). This effort will need to be led by a champion or champions willing to organize each neighborhood.

3) Ensure that programs to increase environmental literacy have relevance to key restoration priorities throughout this plan.

- ERP with education partners: Programs at the nature park, Learning Barge and River Star Homes should target the same focused behavior changes.

- ERP with education partners: Continue the “Goo Must Go!” education campaign related to cleaning the river bottom.

- Expand RIVERfest, moving ERP’s free outdoor festival throughout the watershed to enlist new audiences.

- Continue ERP presentations throughout the community including by Princess Elizabeth, ERP’s re-enactor of the British royalty for whom the river was named in 1619.

4) Increase public access to the Elizabeth with increased miles of bike, hiking and canoeing trails.

FOCUS AREAS

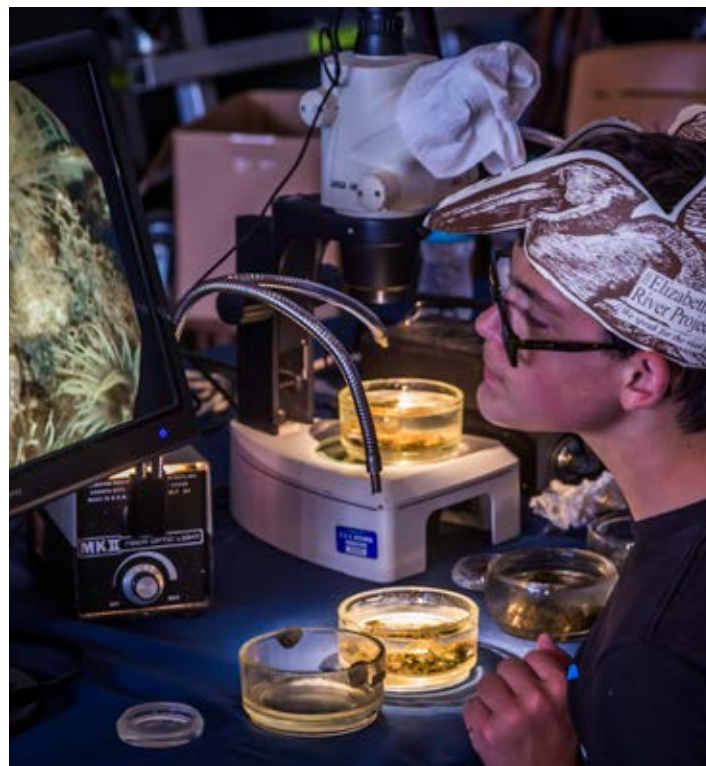
- Friends of Indian River and partners: Pursue the expansion of the Elizabeth River Trail into the Eastern Branch, then into all four cities along the Elizabeth, as funding allows.

5) Continually engage and inform decision-makers at the federal, state, regional and local levels regarding this plan and the vital necessity of their participation.

6) Consider approaches that appeal to a greater diversity of audiences, including younger generations, the military and minorities, where these audiences are a significant part of the population targeted for priority behavior changes.

- Develop an Elizabeth River phone app to include sustainable practices, native plants, rain gardens, etc.

- Review planned programs by partners such as Hampton Roads Planning District Commission and Wetlands Watch.



Observing river life up-close at RIVERFest 2015 at Nauticus. Photo by Larry I'Anson.



Join David, Nichole and Sloane Kushner – a River Star Home family recruited by a River Star Business, Ohef Sholom Temple.

Watershed Action Team 2015:

Special thanks to these stakeholders and experts for preparing this plan, as well as to: Team facilitator, Dr. E. Frank Dukes, Institute for Environmental Negotiation, University of Virginia; Work-group chairs, Karen Jones Squires, Education & Public Involvement; Barbara Brumbaugh, Water Quality; Andrew Larkin, Wildlife Habitat; Mike Unger, Sediment Quality.

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 Jayne Whitney, Friends of Indian River
 Elizabeth Williams, Resident of the Woodbine
 Justine Woodward, VMRC
 Ross Worsham, Atlantic Wood Industries

Find your role. Restore a thriving urban river.



“When the wetlands really come back,

When the forests return to the shore, when healthy fish & clams & oysters find a home in the Southern reaches of the river again, and the sun rises off the Atlantic in the morning to reflect itself in the serene, pure waters of the Elizabeth River,

Our children and grandchildren will know that we had them in mind.”

The Late Charles Kuralt, CBS; Unveiling Elizabeth River Project's First Action Plan, 1996

