

# Business Plan for the Chesapeake Bay Stewardship Fund

A strategy to guide conservation investments  
in the Chesapeake Bay region through 2025



July 13, 2012

## Globally Significant Resource and a National Treasure



Native Americans living along its shores gave the Chesapeake Bay an Algonquin name. *Chesepiook*, meaning "great shellfish bay," was used to signify the abundance of Bay crabs, oysters, and clams. The Bay was the site of the first English settlements in Virginia and Maryland; home to key battles of the War of 1812 and the Civil War.

Generations of watermen have made their living harvesting the bounty of the Bay, while recreational fishing, hunting, and boating attract millions of people each year and contribute significantly to the region's economy. Outdoor recreation activities on the Delmarva Peninsula alone drive an economy valued at nearly \$4 billion per year and support tens of thousands of jobs. Major annual seafood harvests—about 500 million pounds per year—serves millions of crabs, oysters, clams, and eels.

The Chesapeake Bay is the largest of more than 100 estuaries in the United States. Home to more than 17 million people, the Bay is about 200 miles long, stretching from Havre de Grace, Maryland, to Virginia Beach, Virginia. Its 64,000-square-mile watershed includes parts of six states—Delaware, Maryland, New York, Pennsylvania, Virginia and West Virginia—and the entire District of Columbia. The Bay is surprisingly shallow and has an average depth of only 21 feet.

The Bay is an extremely productive system supporting more than 2,700 species of plants and animals, including 348 species of finfish, 173 species of shellfish and at least 29 species of waterfowl. It is a vital corridor for migratory waterfowl and fish. Nearly one million waterfowl winter on the Bay — approximately one-third of the Atlantic coast's migratory population.

However, over the past half a century and more, water pollution, disease, urbanization, small and large dam construction, and riparian disturbances among other things has altered the landscape, degrading in-stream, river and coastal riparian habitat, reducing channel complexity, altering biochemical processes and sediment transport, while adding greatly to the impervious cover of the Bay watershed. The result is poor water quality in much of the Chesapeake system and corresponding reductions in some of the Bay's keystone fish and wildlife species.

Today, for example, the Eastern Oyster (*Crassostrea virginica*) is less than 1 percent of its historic population levels and its reef structures are no longer large enough to support the suite of ecosystem services that benefit the health of the Bay. Commercial landings of river herring in Maryland likely exceeded 100 million pounds during the 1800s, decreasing to less than 10 million pounds in the early 1900s and presently are less than 50,000 pounds. A



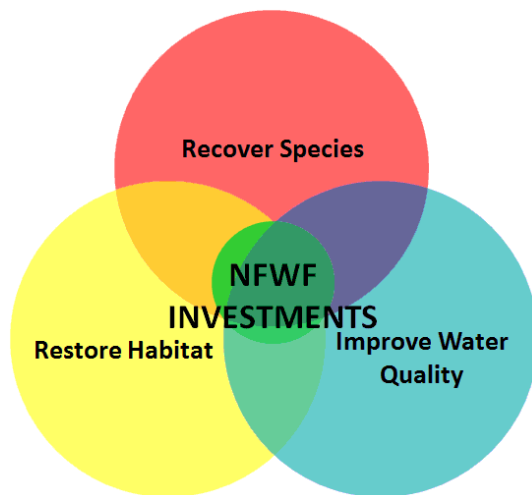
similar story is true for Virginia’s Eastern Brook Trout. Brook trout are the region's only native trout species, but healthy populations are hard to find. According to a 2010 study, brook trout in the Chesapeake have vanished from nearly half of the stream and river systems that once supported them. And while blue crab populations have rebounded, they are a highly volatile species susceptible to fluctuations in population size and in constant need of management attention.

The condition of these keystone species represent the plight of the Chesapeake, but converging policies, evolving restoration practices and key ecological trends suggest that with a focused approach to the recover, the Bay an its keystone species can and should rebound.

## Chesapeake Bay Business Plan

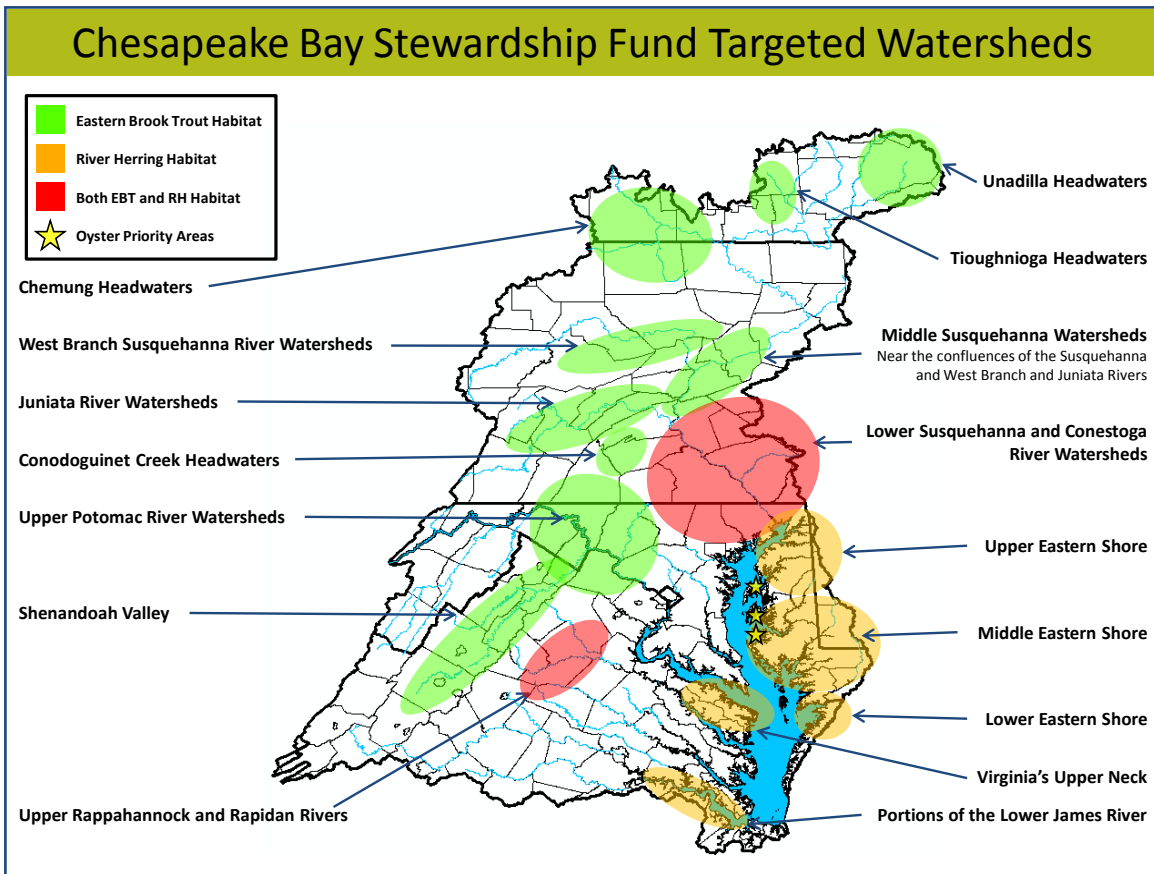
The Chesapeake Bay business plan outlines a comprehensive strategy to guide National Fish and Wildlife Foundation’s conservation investments in the Chesapeake Bay region through the year 2025. It sets clear and achievable conservation goals that will enhance the resiliency of the Chesapeake Bay ecosystem; increase populations of keystone species; reduce harmful pollutants from entering streams, rivers and the Bay; and aim to reduce the costs of the recovery effort.

The Chesapeake Bay Program, which is the Federal-state partnership charged with restoring the Chesapeake Bay, has set rigorous goals to be achieved in a set timeframe to restore the habitats and water quality of the Bay by 2025. As a partner in the Chesapeake Bay Program, the business plan clearly articulates the contribution NFWF will make toward achieving the Chesapeake Bay Program goals over the next twelve years, while advancing specific conservation objectives of NFWF.



This strategy builds on more than 10 years of investing in the Chesapeake Bay through NFWF’s Chesapeake Stewardship Fund. The Fund—which has been principally supported by the U.S. Environmental Protection Agency, other federal agencies and private companies—has resulted in important conservation outcomes including significant water pollution reductions and habitat enhancements. But perhaps its greatest contribution to the Bay effort is that it has concurrently expanded our knowledge about what measures are needed to clean up the Bay and built the capacity of organizations, governments and universities to tackle the challenges that lie ahead. In effect, the past 10 years has created the road map for NFWF’s Chesapeake Business Plan and its future investments.

**An underlying hypothesis of this strategy is that by focusing investments in targeted sub-watersheds** of the Chesapeake Bay, NFWF and its partners can simultaneously achieve measurable water quality improvements, fish and wildlife habitat enhancements and recover threatened freshwater and marine fish species. The strategy seeks to leverage past investments and the current work, and the funding and expertise of our government and non-governmental partners. And within these targeted watersheds, NFWF will make investments in capacity and technical assistance to help scale up restoration and protection efforts. Finally, the NFWF strategy seeks to advance new innovations and technologies that



can both drive the cost of the recovery effort down and accelerate the pace of restoration throughout the Bay region.

The Business Plan focuses on the recovery of four keystone species that historically have been present in a subset of the 16 targeted watersheds delineated in the map above: **oysters, crabs, river herring and Eastern Brook Trout**. These species were selected because their populations have been dramatically reduced, they are important species from a cultural and economic perspective and they serve as important indicators of the overall health of the Chesapeake Bay, its rivers and streams.

Furthermore, each species either demands very good water quality or benefits from it significantly. Each represents key physio-geographic and hydrologic subdivisions within the massive Bay watershed—Brook trout are freshwater species located in the Appalachian Plateau and the Piedmont; River herring are diadromous fish and move from fresh to salt water in the Bay's Coastal Plain, Piedmont and Appalachian regions; and oysters and crabs prefer the brackish waters found in the main stem and rivers of the Coastal Plain. Finally, specific programs led by government and non-governmental partners are underway that support the recovery of these species and that NFWF investments can leverage.

## Chesapeake Bay Conservation Outcomes

Past investments in the Chesapeake Bay have led to measurable outcomes, but there have been no specific conservation outcome targets from which to measure the progress or success of specific NFWF investments over time. The Chesapeake Business plan sets new targets that contribute directly to the

goals of the Chesapeake Bay Program and reflect the level of investment that NFWF anticipates making over a 12-year period. The outcomes are organized into 5 categories – water quality, oyster recovery, brook trout restoration, river herring recovery and blue crab management.

**Water Quality Improvements.** According to EPA computer models, the healthy "weight" for the Chesapeake is 187.4 million pounds of nitrogen and 12.5 million pounds of phosphorus washing off its watershed annually. In order to meet that level, the Chesapeake Bay states must shed about 63 million pounds of nitrogen and 3.1 million pounds of phosphorus by 2025.

NFWF Outcomes:

- Reduce nitrogen pollution by 6.3 million pounds or 10 percent of the Chesapeake Bay Program goal by 2025.
- Reduce phosphorus pollution by 1 million pounds or roughly 33 percent of the Chesapeake Bay Program goal by 2025.

NFWF Outputs:

- Restore 400,000 acres of habitat in targeted watersheds by 2025.
- Restore 1,500 miles of riparian forest buffers in targeted watersheds by 2025 or 10 percent of the Chesapeake Bay Program watershed goal.
- Install 1,800 miles of livestock exclusion fencing and associated riparian areas by 2025.
- Evaluate and set numeric goals that evaluate cost reductions in practices over time.
- Track the # number of local governments adopting water pollution financing strategies.

**Oyster Restoration.** The Chesapeake Bay Program has set a goal of restoring oyster populations in 20 Chesapeake tributaries by 2025. A tributary will be considered restored when over 50 percent of the suitable habitat is occupied by at least 50 oysters per square meter.

NFWF Outcomes:

- Restore oyster populations in five (5) subwatersheds, or 25 percent of the Chesapeake Bay Program goal by 2025, by restoring 150 acres of oyster reef. Priority watersheds include Harris Creek, Little Choptank and Cox Creek.

*Benefits of Healthy Oyster Populations:*

- *Water filtration, including nutrient assimilation*
- *Feeding and rearing grounds for a variety of species – invertebrates, crabs, fish, shorebirds, waterfowl*
- *Shoreline protection*

NFWF Outputs:

- Restore 150 of the 1,750 acres of projected restored reef needs in the 5 subwatersheds.
- Plant 200,000,000 oyster spat of the 2,000,000,000 estimated to be required to restore 5 subwatersheds.
- Reduce the cost of restoring an oyster reef by 20 percent by 2025.

*Challenges to Oyster Restoration*

- *Disease – MSX and Dermo*
- *Poor water quality*
- *Lack of hard bottom/ suitable substrate*
- *Shell and alternative substrate availability*
- *Spat production*
- *Planting capacity*
- *Overharvesting/poaching*
- *Available funding*

**River Herring Restoration.** The Chesapeake Bay Program has established a goal of restoring historical fish migratory routes by opening 1,000 additional stream miles by 2025, with restoration success indicated by the presence of river herring, American shad, Hickory shad, Brook Trout and/or American eel.

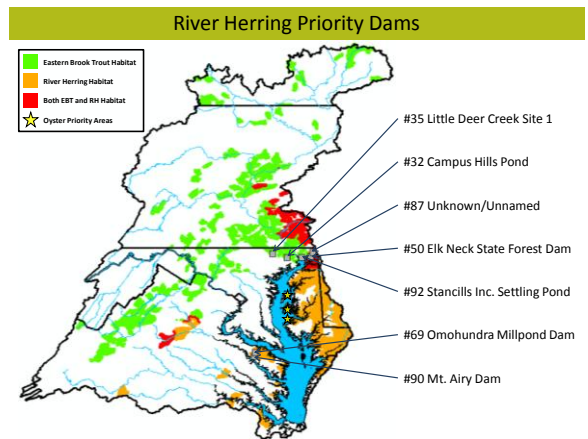


NFWF Outcomes:

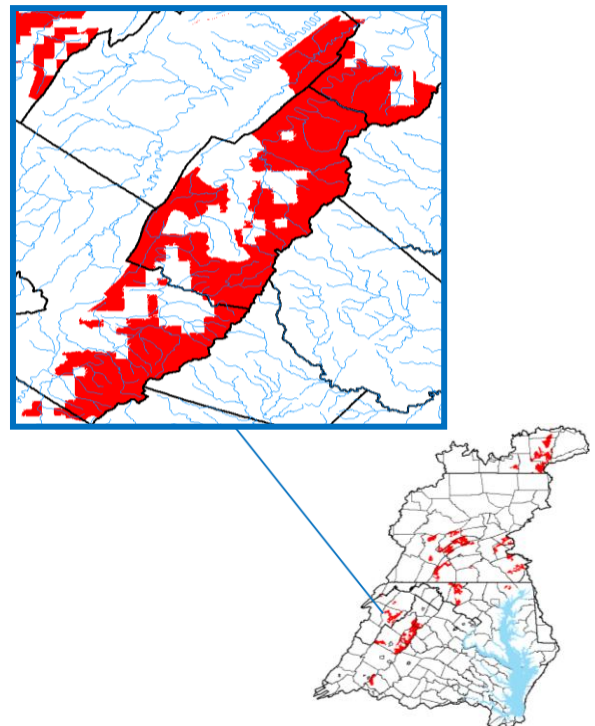
- Restore historical river herring migratory routes by opening 200 additional stream miles by 2025 or 20 percent of the Chesapeake Bay Program goal. Define success by presence of river herring and associated species such as of American Shad, Brook Trout and American eel.
- Establish quantitative river herring run counts in key rivers and streams in the Chesapeake.

NFWF Outputs:

- Prioritize stream barriers that inhibit fish passage and implement priority projects in targeted watersheds.
- Develop innovative approach to establishing counts of migrating adult river herring in coastal rivers and streams.
- Support the removal of 40 prioritized stream barriers that inhibit fish passage.
- Support the Bay Program in documenting the return of fish to opened stream reaches with a goal of documenting presence of river herring at 50 percent of all fish passage projects constructed.



**Eastern Brook Trout Recovery.** The Chesapeake Bay Program goal for Eastern Brook Trout is to restore naturally reproducing brook trout in 58 sub-watersheds. There currently is an effort underway to refine the indicator and move from the sub-watershed scale to the catchment scale. This is a result of new data collected that better characterizes brook trout populations at a finer geographic scale. But for now, the subwatershed goal remains.



NFWF Outcomes:

- Increase the number of sub-watersheds classified as healthy for EBT populations by improving 12 subwatersheds by 2025. This represents 20 percent of the overall Chesapeake Bay Program goal.
- Establish self-sustaining brook trout populations in 15 known extirpated subwatersheds by 2025.

**Blue Crab Management.** The Chesapeake Bay Program goal for blue crabs is a target abundance of 215 million spawning-age female crabs. Although the 2011 population of spawning-age female crabs of 194 million crabs is only 10% off the goal this population is subject to wide swings in abundance. The long term sustainability of this key fishery depends on reforming the system under which crab are managed and on improving the environmental conditions in the bay.

NFWF Outcomes:

- Achieve a 10% increase of the population over 2011 levels to meet Chesapeake Program Bay goals.
- Promote the sustainable management of the species by supporting fishery managers and watermen to develop a sustainable community-based quota management system for the Chesapeake Bay fishery.

NFWF Outputs:

- Key stakeholders, including the Maryland Waterman's Association and the Environmental Defense Fund, design new community-based fishery management system in Maryland.
- Key stakeholders in Virginia and in the Potomac River Fisheries Commission design a new/enhanced crab management system for their jurisdictions.
- Pilot community-based quota management programs for blue crab implemented in one or more jurisdictions to demonstrate how they can effectively work for watermen.

## **Key Business Plan Strategies and Actions**

NFWF will focus on five overarching strategies to address the major threats to the health of the Chesapeake Bay and to support the recovery of keystone species in the 16 targeted watersheds:

### **I. Habitat Conservation**

NFWF will assess its potential to significantly impact the permanent protection of priority habitats and working lands in the region. This effort will focus on providing relatively small private investments that will leverage and help direct public funding to conserve high priority habitat protection areas in the 16 targeted watersheds. Specific strategies include:

- 1) *Identifying public and private funding to direct to the highest habitat conservation strategies, particularly in riparian corridors along streams and rivers that benefit Eastern Brook Trout and river herring populations; and*
- 2) *Providing "piggy back" payments to landowners to encourage voluntary easements placed on riparian corridors. These piggy-back payments are a market-based approach where additional private funding can be stacked on top of NRCS or other cost share funds to encourage landowners to enter into lengthier conservation contracts or enter into agreements that put riparian lands into permanent conservation easements.*

### **II. Habitat Restoration: Investing in Strategic Restoration in Targeted Subwatersheds**

NFWF will make strategic investments in 16 targeted watersheds where opportunities to simultaneously achieve measurable water quality, habitat restoration and species recovery goals exist. Specific investments will include funding on-the-ground best management practices that are

proven to enhance ecological resiliency and accomplish our goals and enhancing stream health. The specific strategies include:

- 1) *Restore in-stream/river habitat, streambank and shoreline resulting in erosion control and habitat improvement;*
- 2) *Implement priority projects that lead to fish passage improvements and leverage funds to remove barriers, retrofit culverts and install passage structures;*
- 3) *Restore non-tidal and tidal wetlands; and*
- 4) *Restore riparian corridors and critical areas.*

### **III. Habitat Management: Targeting BMPs on Private Lands**

NFWF will make targeted investments to projects focusing on agricultural and other private landowners managing their properties and installing BMPs for improved water quality and critical habitats. Specific strategies include:

- 1) *Install livestock exclusion fencing on animal agricultural operations; and*
- 2) *Design and install appropriate riparian and vegetated stream buffers.*

### **IV. Species Specific Strategies: Oysters and Blue Crabs**

In addition to the investments to benefit *Eastern Brook Trout and river herring* by improving habitat quality and fish passage described under “Habitat Restoration”, NFWF will support the following species specific strategies for oysters and blue crabs:

- 1) *Oysters:* Fund oyster restoration projects in targeted rivers that leverage funds of federal and state agencies;
- 2) *Blue Crabs:* Support fishery managers and watermen to develop a sustainable community-based quota management system for the Chesapeake Bay fishery.

### **V. Outreach Capacity and Incentives**

- 1) *Building Capacity and Strengthening Landowner Technical Assistance*  
With a focus on the 16 targeted watershed areas, NFWF will increase the number of technical assistance providers to work with private landowners and strengthen the capacity of organizations, businesses and local governments to scale-up recovery efforts in these targeted geographies. Better networking and other approaches to sharing limited resources and leveraging expertise and equipment will be a focus of these efforts too.
- 2) *Advancing Innovations and New Technologies to Lower the Cost and Accelerate the Pace of the Bay’s Recovery*  
While targeted on-the-ground restoration work is underway, NFWF will concurrently invest in innovative methods and new technologies that hold promise of driving the costs of the recovery effort down, expanding the effectiveness of restoration practices and accelerating



the pace of recovery. The specific areas of interest relative to new methods and technologies are:

- a) Reducing the cost and increasing the effectiveness of on-the-ground habitat restoration practices;
- b) Accelerating species recovery efforts through advancements in aquaculture and by finding new and less costly reef and other habitat construction techniques;
- c) Identifying new stormwater management technologies that can drive down urban restoration costs and help communities achieve water quality standards; and
- d) Leading efforts to find market-based solutions to resolve issues related to excess manure from dairy and beef cattle, poultry and other livestock.

3) *Supporting Financing Strategies and Policy Development*

Financing the recovery effort is one of the most challenging issues facing federal, state and local governments today. New advances in restoration technologies hold promise to drive costs down, as do efforts to target investments where we can achieve the greatest conservation benefit for the least cost. Nonetheless, other financing strategies and other policies are needed to fund and to reduce the cost of the recovery. NFWF will provide expertise, tools and fund demonstration projects to support financing and policy development in the following areas:

- a) Aiding local governments in preparing financing strategies to fund Bay recovery efforts;
- b) Supporting new or evolving trading and offset programs that effectively engage the private sector in restoration activities that reduce costs and accelerate the pace of recovery; and
- c) Producing information and data that can support policies and procedures that reduce the cost of restoration across the watershed.

4) *Expanding the Exchange and Transfer of Information and Technology*

NFWF will continue to invest in a variety of forums, conferences, symposiums and other related activities to promote knowledge, information and technology sharing among key constituent groups, and with the general public. As new technologies, new regulations and new opportunities rapidly emerge, the need to make investments in this area grows. NFWF will continue to fund information exchanges with a particular focus on stormwater, agricultural/manure management, and habitat restoration, and with key audiences including local governments, practitioners and academia.

## **VI. Planning, Research, Monitoring**

- 1) *Prioritize stream barriers that inhibit fish passage, specifically those adjacent to critical Eastern Brook Trout and/or river herring habitat; and*
- 2) *Develop presence and/or abundance monitoring strategies for keystone species.*

## Estimated Overall Costs

The cost of restoring and protecting the Chesapeake Bay has been estimated in the billions of dollars. This strategy is intended to reduce the overall costs of the clean up, while achieving very specific conservation objectives in targeted watersheds across the Bay region. NFWF estimates that we can accomplish the above stated conservation outcomes with a 12-year budget of approximately \$100 million dollars, not including other matching funds. We anticipate that the NFWF contribution would be leveraged significantly with other state, federal and partner contributions estimated at roughly \$250 million.

<b>Chesapeake Business Plan Projected Budget (2013-2025)</b>	
<b>Habitat Conservation</b>	<b>\$ 7,500,000</b>
<b>Habitat Restoration</b>	<b>\$ 35,700,000</b>
1) in-stream/river habitat and streambank restoration	\$ 10,800,000
2) fish passage improvements	\$ 9,100,000
3) non-tidal and tidal wetland restoration	\$ 5,600,000
4) riparian corridor and critical area restoration	\$ 10,200,000
<b>Habitat Management</b>	<b>\$ 14,500,000</b>
1) Livestock exclusion fencing	\$ 1,600,000
2) Riparian and vegetated buffers	\$ 12,900,000
<b>Species Specific Strategies</b>	<b>\$ 15,200,000</b>
1) Oyster reef restoration	\$ 11,100,000
2) Blue crab management practices	\$ 4,100,000
<b>Outreach Capacity and Incentives</b>	<b>\$ 24,600,000</b>
1) Landowner technical assistance	\$ 4,800,000
2) Innovations and new technologies	\$ 11,000,000
3) Financing strategies and policy development	\$ 6,000,000
4) Exchange and transfer of information and technology	\$ 2,800,000
<b>Planning, Research, Monitoring</b>	<b>\$ 2,500,000</b>
1) Prioritize stream barriers that inhibit fish passage	<i>NFWF in-kind</i>
2) Prioritize and design restoration projects in targeted watersheds	\$ 1,100,000
3) Develop presence/abundance monitoring for keystone species	\$ 1,300,000
4) Assessment of land conservation strategy	\$ 100,000
<b>TOTAL ESTIMATED BUDGET</b>	<b>\$ 100,000,000</b>

The NFWF cost estimates are based on an analysis of the following:

1. Estimates that were generated for 5 of the targeted watersheds and then extrapolated across the 16 watersheds. We anticipate covering the cost of 30 percent of the restoration work in these 16 watersheds at a price of roughly \$40 million.

2. Estimates for fish barrier removal generated by the Chesapeake Bay Program which estimates the cost of a construction project at roughly \$200,000, plus other associated permitting and restoration work. NFWF has budgeted approximately \$9 million for fish barrier removal over 12 years to remove 40 priority fish impediments for a cost of approximately \$225,000 per construction project.
3. Cost estimates for oyster restoration are based on estimated that the Chesapeake Bay Program generated for restoring the first targeted river – Harris Creek. In that example, they estimate the cost of restoring an acre of oyster reef at \$75,000. NFWF anticipates accelerating the recovery effort by restoring roughly 150 acres of oyster reef by 2025 for approximately \$11 million.
4. Cost estimates for funding new technologies, innovative practices and financing strategies are budgeted at more than \$11 million over the 12 years. At roughly \$1 million per year, NFWF believes it can leverage other resources to make significant strides in using innovation and technology to reduce restoration costs and accelerate the pace of recovery.
5. The budget also projects \$4.1 million to be directed to strengthening blue crab management practices and less than \$3 million for technology and information exchanges.

## Appendix A. Methodology for Selecting Targeted Watersheds

NFWF staff and Chesapeake Bay partners undertook a GIS analysis to identify and select geographic areas or watersheds for which NFWF investments would be directed over time. These watersheds were selected because they demonstrated the greatest opportunity for NFWF to make investments in recovery efforts that would simultaneously result in measurable water quality improvements, positive habitat change and enhancements in keystone species populations. The GIS analysis layered the following maps and data sources to identify intersections on the Chesapeake landscape that would serve as our targeted investment areas:

“Priority Agricultural Watersheds in which to Focus Nitrogen and Phosphorus Reduction Activities.” This Chesapeake Bay Program data set identifies the HUC-12 land segments contributing the top 25 percent total nitrogen and/or phosphorus yields to the Bay within each state or basinwide. This information is of great importance to our EPA and state partners because the maps identify pollution “hotspots” where efforts must be concentrated in order to achieve Bay-wide water quality goals.

- 1) “Average IBI Rating 2000-2008.” This is also a Chesapeake Bay Program data set that identifies stream health as “Excellent”, “Good”, “Fair”, “Poor”, “Very Poor” or “No Data” based on Index of Biological Integrity data (typically derived through sampling of macroinvertebrates). NFWF omitted streams in “Excellent” health as restoration activities are not required in these areas and streams in “Very Poor” health as the amount of investment required to achieve measurable results is beyond the scope resources available by NFWF. Nonetheless, NFWF will continue to invest in innovations new technologies and financing strategies that can drive the cost of restoration in very poor quality watersheds down.
- 2) “Vulnerability to Development Pressure.” This Chesapeake Bay Program Resource Lands Assessment data set identifies areas in the watershed where vulnerability to development pressure is “Very Low”, “Low”, “Moderate”, and “High”. NFWF omitted areas of “High” development pressure in an effort to avoid investing in restoration activities likely to be disrupted by future land development.
- 3) “Eastern Brook Trout Population Status.” This Eastern Brook Trout Joint Venture data set identifies populations of Eastern Brook Trout by watershed as “Present: Intact”, “Present: Qualitative”, “Present: Reduced”, “Present: Greatly Reduced”, “Extirpated”, “Absent”, “Unknown”, or “Never Occurred”. NFWF eliminated watersheds where the EBT populations were “Present: Intact” as these areas require no additional restoration. NFWF also eliminated watersheds where EBT “Never occurred”. The remaining watersheds represent areas where EBT populations could be improved, restored, or reintroduced through restoration activities.
- 4) “Priority Watersheds for River Herring Conservation.” This USDA-NRCS data set identifies areas of priority for river herring conservation. We also used the Chesapeake Bay Program’s Fish Passage Prioritization tool to identify blockages that impede river herring and associated species recovery in the Chesapeake Bay.

This information, along with draft plans and strategies to restore targeted watersheds and associated species, were shared with experts representing federal and state agencies and non-profit organizations during a series of forums. In addition, the targeted watersheds and the draft plans were presented to the Chesapeake Bay Program Office leadership and Habitat Goal Implementation Team on several occasions. The results of analysis and the input received from experts has helped to shape NFWF strategy and directs our investments to places where we can simultaneously achieve water quality benefits, particularly in areas of priority for our principal funding partner, U.S. EPA; and also achieve habitat goals and a measurable species response – particularly for Eastern Brook Trout and river herring.