



**AMERICAN
RIVERS**



LIA MASTROPOLO

Restoring Pennsylvania's Rivers for People and Nature

Success stories from the keystone state

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INTRODUCTION

Pennsylvania has long been a leader in nature-based river restoration, from removing obsolete mill dams, to restoring floodplains, to using green infrastructure to reduce pollution and flooding. All throughout the Commonwealth these projects are being led by local governments and community-based organizations eager to improve the places they call home. The direct benefits of these projects are many and varied: from better fishing to reduced flooding, the projects show that restoring rivers using nature delivers results.

This document is comprised of a series of case studies examining how Pennsylvania municipalities have successfully implemented nature-based solutions to some of the problems that have plagued its rivers and communities. These have included, though are not limited to: flooding, lack of nature access, pollution, and habitat loss. The case studies that follow were developed through conversations in 2024-2025 between American Rivers staff and local leaders involved with these projects. Each case study is meant to provide a summary of a successful nature-based solution, including how it came about, problems it was meant to solve, how it was funded, and what sort of benefits have been experienced by the local community. Where possible, we have included testimonials from the people involved in the work.

Many of the projects examined are newly built, such as the Radnor Wetland which was designed using an innovative strategy to solve a local flooding problem. Others may have been around for a long time, representing tried and true approaches--for example, Wildwood Park in Harrisburg is a good example of how green infrastructure was designed for flood control over a hundred years ago. The common theme across all case studies included in these pages is that they illustrate what successful river restoration projects can look like when they are designed to benefit both people and nature.



LIA MASTROPOLO

BY THE NUMBERS:

3,785

Linear feet of stream
restored

1,900

Feet of new walking
trail installed

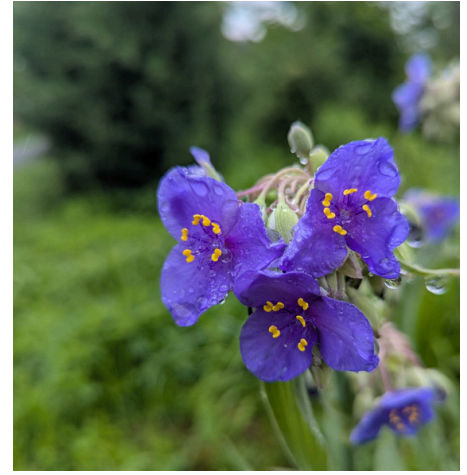
\$2 million

Total grant funding
raised to restore the
creek, trails, and
access

A tributary to Codorus Creek, Poorhouse Run is a small urbanized stream that flows through a public park and alongside two school campuses in the City of York, PA. Prior to restoration, there were problems with flooding and poor water quality downstream, and the ecological habitat on the site was limited both within the stream and in the greenspace alongside it. This section of stream was restored by reconnecting that floodplain and establishing a native riparian buffer. The project also included public access features like trail improvements, seating, signage, and a small footbridge. Since completion, the flooding issue has been largely eliminated, and people regularly wade and fish in the creek. The adjacent trail is popular for walking.

HOW IT CAME TOGETHER

Despite degraded stream conditions and frequent flooding in the vicinity of the park, the creek was nevertheless an attraction for local children, and the community was interested in seeing it restored in a way that would allow safe access. The city was under regulatory obligations to improve water quality, and this factor combined with flooding and access concerns made a project in this location a good opportunity to solve multiple problems at once. The project was initially conceived of by the city's Public Works Director, but was taken on by other municipal departments including Parks and Recreation. The restoration was designed to address access and flood reduction needs while also satisfying state-required pollution reduction targets. From concept to completion, the restoration took approximately ten years.



LIA MASTROPOLO

ECOLOGICAL IMPROVEMENTS

An increase in birds, small fish, pollinators, and other wildlife have been observed post-restoration, including waterbirds such as great egrets. The riparian buffer, densely planted with native shrubs and flowers, provides high quality foraging and cover for these species, in addition to visual appeal.

HOW IT WAS FUNDED

The project was funded by a series of five grants from the Pennsylvania Department of Conservation and Natural Resources as well as the Pennsylvania Department of Environmental Protection's Growing Greener program, beginning with a planning grant in 2016 followed by a series of phased implementation grants. The York County Stormwater Consortium, of which the City of York is a member, also provided significant funding. The total cost of the project from planning through implementation was approximately \$2 million.



LIA MASTROPOLO



BY THE NUMBERS:

8,000

Linear feet of stream
restored

33

Acres of new
meadow habitat
created

**\$3.4
million**

Total grant funding
raised to restore the
creek and meadows

Approximately 8,000 feet of Conawago Creek was restored using floodplain reconnection and riparian habitat enhancement in a formerly degraded creek section located along Conewago Recreation Trail near the border of Mount Joy Township in Lancaster County, and Londonderry Township in Dauphin County. The restoration was designed to improve water quality and habitat, and reduce flooding. Previously, the site flooded about five times per year. The restoration was also designed to connect a wildlife corridor between the Susquehanna River and the headwaters of the Conewago Creek for animals to migrate, forage, and breed. Varied habitat has been provided, including 33 acres of meadow. In addition the site has been used to host various community events, including a 5K run and community science events. Since completion, the site has only flooded once, and upstream communities have reported less flooding.

HOW IT CAME TOGETHER

The project was first conceptualized in 2005, but formal planning didn't begin until 2017 with a planning grant from the National Fish and Wildlife Foundation. It advanced through multiple phases of engineering design and construction, and was completed in 2022.

ECOLOGICAL IMPROVEMENTS

Visitors report an increase in birds and beneficial insects at the restoration site, including egrets, bald eagles, butterflies, bees, and even an endangered wood turtle. A multi-year study of biodiversity change post-restoration is also underway, but incomplete as of summer 2025.

HOW IT WAS FUNDED

The project was entirely grant-funded, at a total cost of approximately \$3.4 million. The largest funder was the Pennsylvania Department of Environmental Protection's Growing Greener program, with additional major funding through the US Environmental Protection Agency (via the Dauphin Co. Countywide Action Plan), federal stimulus dollars (via Lancaster County), the Lancaster Clean Water Fund, Susquehanna River Basin Commission, Mariner East Pipeline mitigation funds, the National Fish and Wildlife Foundation, and Pennsylvania American Water.



"The Conewago Restoration provides a valuable outdoor classroom for my aquatic ecology course... Students quickly identified the increased diversity of invertebrates and habitats at the restored reach compared to the urban and agricultural systems that we had visited earlier in the semester. There were also frequent comments about how "relaxing" and "peaceful" the site was."

- Rob Northington Assistant Professor of Biology and Environmental Science Elizabethtown College



WETLANDS AT LONG'S PARK

CITY OF LANCASTER, PA



LIA MASTROPOLO

BY THE NUMBERS:

16 million

Gallons of water
cleaned each year

75,000+

People visit the park
each year for
concerts and other
recreation

\$515,000

Total grant funding
raised

Long's Park Wetlands were designed to improve the health, safety, and appearance of Long's Pond and the surrounding area, part of an 80-acre public park and recreation complex in the City of Lancaster. The innovative system is designed as a series of small pools, floating islands, marshes, and filters which together reduce visible pollution in the pond as well as the downstream Little Conestoga Creek and ultimately, the Chesapeake Bay.

Long's park is a much-visited attraction in Lancaster, and as such this restoration project is highly visible to the public. It was designed with boardwalks, viewing platforms, and seating areas that connect with and complement the park's existing network of walking trails. Native plantings were chosen for colorful blooms which create a garden-like experience for visitors. Signage throughout the wetland area explains how the different parts of the system work together for improved water quality.

HOW IT CAME TOGETHER

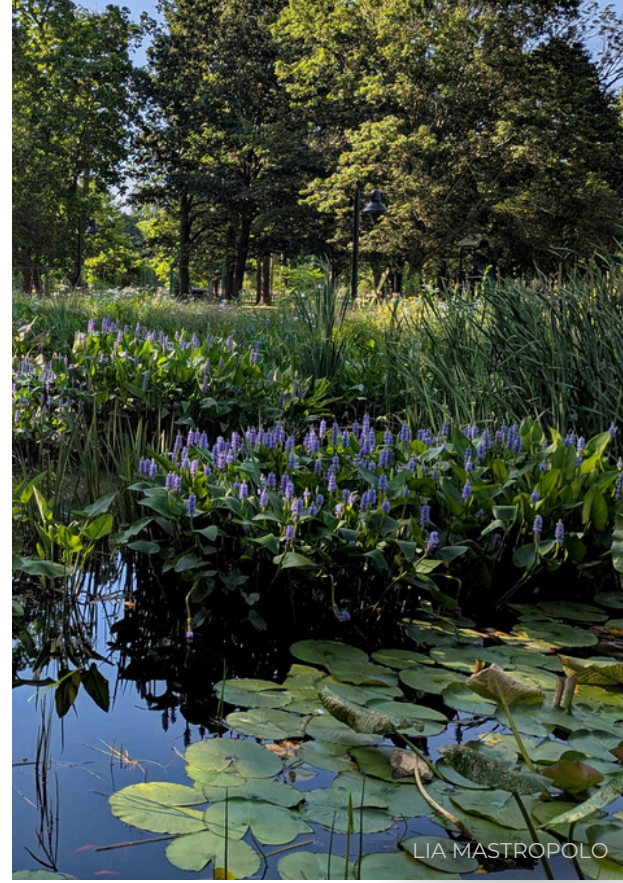
Long's Park Pond has long suffered from water quality issues and unsightly algae growth. The new wetlands were conceived of to reduce algae in the pond by increasing its water quality and thus reducing the maintenance cost associated with managing the algae. Because of the highly visible location, public access features and signage were also important priorities which required additional planning and fundraising to implement. In addition, the wetlands help the City of Lancaster meet regulatory requirements to reduce pollution downstream.

HOW IT WAS FUNDED

The construction cost was approximately \$1,800,000. The City received approximately \$515,000 in grants from Pennsylvania Department of Environmental Protection's Growing Greener program, Lancaster Clean Water Partners, the Pennsylvania Fish and Boat Commission, and the Susquehanna River Basin Commission.

ECOLOGICAL IMPROVEMENTS

Prior to creation of the wetlands, the area was mowed lawn used primarily for occasional overflow parking during events. Since the wetlands were built, turtles, frogs, dragonflies, honeybees, and butterflies—including monarch butterflies and caterpillars—are seen regularly. More and greater varieties of birds are being seen in the area too, including recently a green heron.



"The completion of this project is another huge step forward for the City of Lancaster that we are taking to protect our waterways and being good stewards of the land for future generations."

- Danene Sorace, Mayor, City of Lancaster





DAUPHIN COUNTY PARKS AND RECREATION

BY THE NUMBERS:

1907

Year Wildwood Park
was created

115,000+

People visit the park
each year

90

Acres of wetland area

\$1

Amount paid by
Dauphin County to
purchase the land
from the City of
Harrisburg in 1977

Wildwood Park was originally created in 1907 as means of reducing downstream flooding in the City of Harrisburg while improving access to nature for city residents. Once known as “Wetzel’s Swamp”, the park and wetlands were created by damming Paxton Creek. Since then, the 90-acre lake and surrounding 229-acres of forest, meadow, and wetlands have been preserved and lightly improved for recreational purposes. The shallow lake/wetland complex functions as a natural sponge, absorbing peak storm flows and protecting the adjacent neighborhoods. It also provides a valuable outdoor oasis within the city, including a popular 3-mile walking trail. Over the past ten years the park has seen a 40 percent increase in visitors, with the most recent estimate at approximately 115,000 per year.

HOW IT CAME TOGETHER

Wildwood Park was developed in the early twentieth century as part of the City Beautiful Movement, an effort to improve urban conditions through planning and aesthetic improvements. Since that time, that park passed through periods of use followed by disrepair in the mid-twentieth century and then more recently, revitalization. Both recreation and flood control remain primary management objectives for Wildwood Park.

ECOLOGICAL IMPROVEMENTS

Because of its location within a highly urbanized area, Wildwood Park provides critical habitat to a wide variety of species. For this reason it is ecologically rich, particularly

in its variety and number of water birds. On any given day, park visitors may find egrets, great herons, and wood ducks in and around the shallow lake. The Towpath Trail is particularly popular for birders and wildlife photographers. In 1999, a nature center was built to provide a space for conservation and ecological education.

HOW IT WAS FUNDED

While it is unclear how much the City of Harrisburg paid for the land when it was first purchased from private owners in 1907, the subsequent transfer from the City to Dauphin County was made for the price of only one dollar in 1976. At the time, the cost of deferred maintenance was beyond the City's capacity to absorb, and the transfer was made out of necessity. Since then, investments have been made over time to enhance recreation and reduce pollution. As sediment continues to be captured from upstream in the Paxton Creek watershed, funds need to be raised for its removal in order to maintain the lake and wetlands at current water levels.



CHARLIE SMITH



DAUPHIN COUNTY PARKS AND RECREATION



BY THE NUMBERS:

156

Miles of connected
aquatic habitat

**\$575
million**

In grant funding
secured

2

Obsolete, dangerous
dams removed

Adjacent to the Fort Bedford museum and historic site, Fort Bedford Park is a public gathering space and popular fishing spot in Bedford, PA. It is located on the Raystown Branch of the Juniata River Water Trail, a popular destination for both locals and tourists. The park was until recently the location of two obsolete and hazardous low-head dams. In 2025, both dams were removed, opening up 156 miles of connected river for fish passage and paddling. In 2026, phase two of the project will begin, which will include restoring the new floodplain area, planting trees, and beginning work towards additional improvements to the park and surroundings. The park redevelopment, which began with the removal of the two dams, will ultimately help revitalize the riverfront and create important amenities for the local community.

HOW IT CAME TOGETHER

The Borough of Bedford had inherited the two now-obsolete low-head dams at Fort Bedford Park. The costs associated with safely maintaining the two dams had become prohibitive, so when funding became available to remove the dams, borough leadership jumped at the opportunity to eliminate this safety and financial liability. The timing coincided with public interest in advancing key park improvements, including connection of discontinuous segments of a popular walking trail. The converging factors created an opportunity: to restore the river's ecology as well as public access to it through a phased redevelopment project that addresses both goals in tandem. Phase 1 of the project, removal of the two dams, was completed

during the summer of 2025. Phase 1, which will include additional restoration of the floodplain and park grounds, will begin in the spring of 2026.

ECOLOGICAL IMPROVEMENTS

Ecological improvements have already been observed since removal of the two dams. Smallmouth bass and wild brook trout have been seen in the tributaries upstream of the former dam sites. Freshwater mussels, which are associated with increased movement of small fish species, have also been found recently. In early 2026, trees will be planted in the floodplain, creating additional habitat for birds, small mammals, and pollinators.

HOW IT WAS FUNDED

Funding for the ecological restoration was secured by American Rivers from a mix of state, federal, and private sources. These included a \$55,000 grant from the Rockwell Foundation for design and engineering of the dam removals; \$170,000 in Bipartisan Infrastructure Law stimulus funding from the Fish and Wildlife Service's National Fish Passage Program; and \$200,000 for floodplain restoration from Pennsylvania's Department of Conservation and Natural Resources C2P2 program, and the Department of Community and Economic Development's Watershed Restoration program. The Bedford County Conservation District contributed an additional \$150,000 for plantings to be used in the floodplain restoration.

“These dams have not only contributed to excessive flooding, but they have also been detrimental to our local ecosystem and have been a safety concern for decades. As the dams have slowed down the flow of the river, they have also slowed down the flow of progress here in our community.”

-Kenny Fetterman, Councilman, Borough of Bedford.





LIA MASTROPOLO

BY THE NUMBERS:

1,600Native trees
planted**700,000**Gallons of
floodwater
managed during
big storms**\$3.7
million**

Total project cost

Radnor Township, located in the the headwaters of the Darby-Cobbs Creek, has long suffered from major flooding during storms. To solve this problem and ensure long-term resilience, the township combined traditional pipe and storage systems with an environmentally-sensitive wetland enhancement located adjacent to a popular local park and multi-use trail. The wetland enhancement included the removal of trash, waste, and invasive trees and shrubs; regrading the site to hold and infiltrate water; and planting 1,600 native trees. It was designed to hold storm runoff from both small as well as much larger rain storms--an innovative design approach that is meant to help the Township weather the increasingly large and more frequent storms expected in the future. Since construction, sites that were formerly flooded regularly have remained dry even during large storms.

HOW IT CAME TOGETHER

The project came together after years of conversations and planning among local leaders. In 2009, park improvements were proposed by the Delaware Riverkeeper Network. In 2017, the Township commissioned a watershed study that led to selection of the South Devon location. A local engineering firm, Meliora Design, tailored the site design to specifically address the types of storms that have led to flooding in the Township in the past. Construction was completed in 2024.



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ECOLOGICAL IMPROVEMENTS

The enhanced wetland drains to Little Darby Creek, which has become degraded over the years by erosion and sedimentation. With reduced pollution and storm flooding, the stream can now provide better habitat for fish and the aquatic food webs they rely on. In addition, the newly planted native trees, shrubs, flowers, and grasses provide habitat and foraging for birds and pollinator species. The site contains a mix of wetland, upland, meadow, and forested habitat that serve as refuge for a range of different kinds of local wildlife.

HOW IT WAS FUNDED

Radnor Township has a stormwater utility, which allows it raise funds for the purpose of managing flood water during rain storms. This local funding source was important for covering the costs of planning and design to identify this innovative project. Once the concept was fully developed, the township was able to secure additional local funds and grant funding for construction: approximately \$500,000 each from the National Fish and Wildlife Foundation and the Pennsylvania Department of Environmental Protection's Growing Greener program.



FLOATING WETLAND ISLANDS

THE HIDEOUT, LAKE AND SALEM TOWNSHIPS, PA



PAUL MATARAZZO

BY THE NUMBERS:

6

Lakes and ponds
managed by The
Hideout

7

Floating wetlands
installed

\$7,000

Approximated
construction cost per
island

The Hideout is a private lakeside community in southern Wayne County, Pennsylvania. Seven floating wetland islands have been installed in two of the community's six lakes as a pilot program to improve water quality and reduce the need for chemical water treatment. Each of these small islands is about 100 square feet in size, constructed of a rubberized material that holds water-loving native plants. The plants filter nutrients out of the water, reducing the amount available to fuel nuisance (and sometimes toxic) algae and other aquatic plants. Since installation of the islands, the community has seen a reduction in overall nitrogen levels in the lakes. In the summer, vibrant blooms such as swamp rose mallow provide visual interest in these floating mini-gardens.

HOW IT CAME TOGETHER

Boating and fishing are important pastimes for the several thousand residents who make up the Hideout community. With six lakes and ponds under management, maintaining good water quality at a reasonable cost and in an environmentally friendly way is a high priority. The floating wetland islands were envisioned through the collaboration of the community's Lakes Committee, its Environmental Manager, and consulting engineers Princeton Hydro. The goal of the project was primarily to beautify the landscape. The team opted to try this nature-based approach as a means of achieving that goal while reducing the need for chemical algae controls.

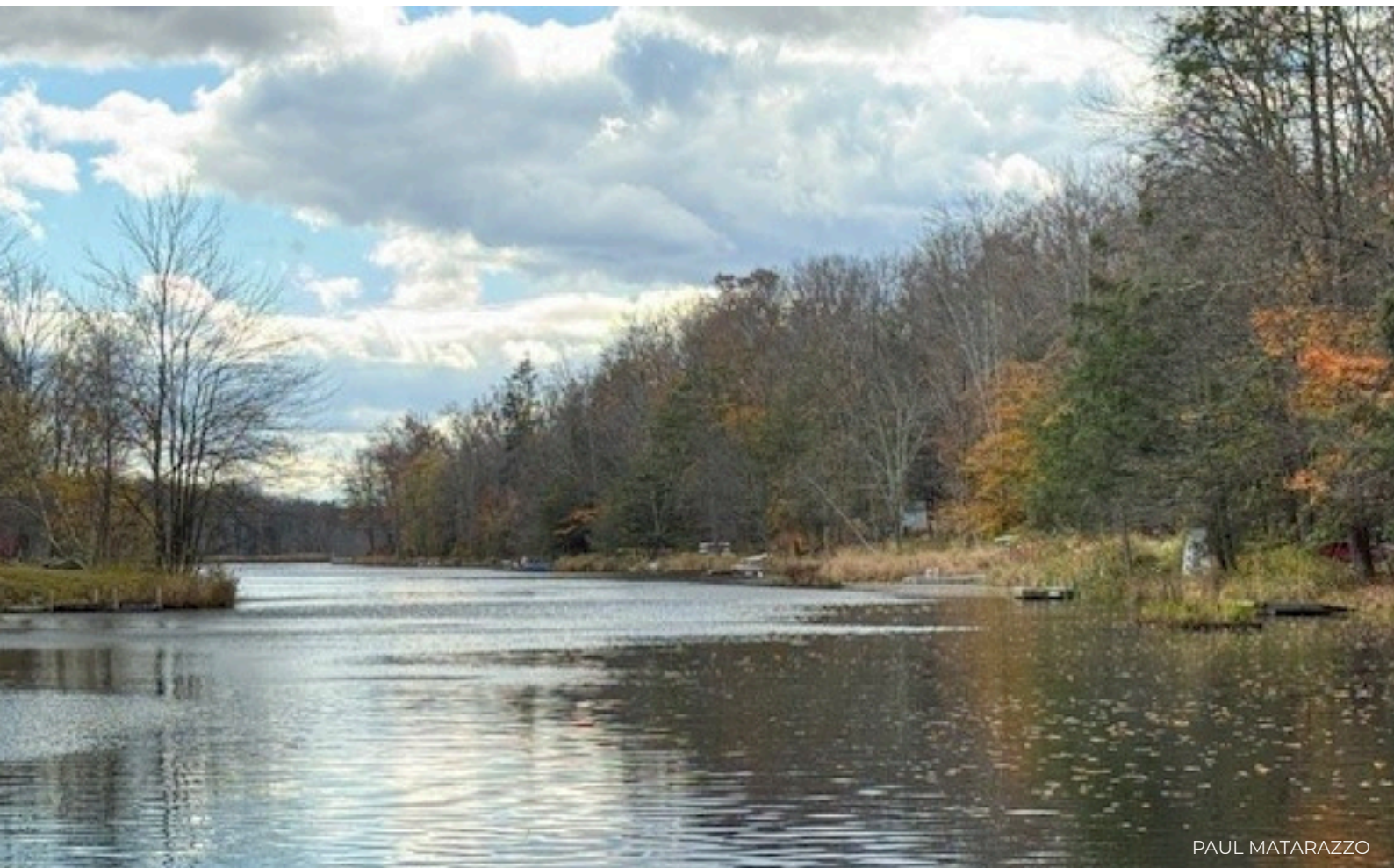
ECOLOGICAL IMPROVEMENTS

Flowering plants growing in the floating wetland islands attract pollinators with their summertime blooms. Turtles and snakes can sometimes be found as well, and underneath, fish use the submerged root zone as cover to hide from predators. Reduced nutrients in the lake leads to clearer water, and less chemical treatment for algae means healthier conditions for people as well as animals.



HOW IT WAS FUNDED

While the full design and construction cost of the seven floating wetland islands was not available for this case study, the construction cost of the island bases, plants, and installation for three floating wetland islands was approximately \$22,000. These funds were provided by the Home Owner Association's annual budget that is generated by community dues and amenity income.



CASE STUDY THEMES

These case studies highlight the potential for nature-based solutions to solve flooding and water quality problems while providing important recreational and community development opportunities. The following have emerged as common themes across the case studies to be considered for application to other projects and locations.

HOLISTIC DESIGN

Projects like these are most beneficial when they are developed holistically, with input and collaboration among local government departments and community groups, and designed expressly to serve multiple purposes at once.

PRIORITIZING COMMUNITY BENEFITS

Nature-based solutions should solve a problem or provide a benefit that is tangible and visible to the local community. Especially for larger projects that require a commitment of local funds, it can be helpful to ensure that ecological improvements are paired with a public use improvement (such as a fishing pier paired with fish habitat restoration).

STATE GOVERNMENT GRANTS AND REGULATIONS

Pennsylvania's leadership on nature-based solutions is owed in part to several important grant programs as well as unique strategies chosen to implement the Clean Water Act. Notably, the Pennsylvania Department of Environmental Protection's Growing Greener grant program provides flexible funding for planning and design of nature-based solutions--aspects of the project lifecycle that can be otherwise difficult to fund.

STORMWATER UTILITY AND HOA FEES

Several of these case studies were paid for at least in part by local funds raised from stormwater utilities (sometimes known as collaboratives or districts) and home owner association fees. Dedicated local funding can provide critical match to grant programs, and can allow the local government much more flexibility in how it implements projects to meet local needs.



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Life Depends on RiversSM

American Rivers is championing a national effort to protect and restore all rivers, from remote mountain streams to urban waterways. Healthy rivers provide people and nature with clean, abundant water and natural habitat. For 50 years, American Rivers staff, supporters, and partners have shared a common belief: Life Depends on Rivers. www.AmericanRivers.org