Presented to the Hudson River Estuary Management Advisory Committee and the NYS Legislature December 2020
in accordance with the provisions of the Hudson River Estuary Management Act, NYS Environmental Conservation Law Section 11-0306

NEW YORK STATE | Department of Environmental Conservation

2015 – 2020
HUDSON RIVER ESTUARY PROGRAM COORDINATOR'S REPORT

Andrew M. Cuomo, Governor | Basil Seggos, Commissioner

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PUBLISHED 2021

Please note: Photos of people without masks were taken before the Covid-19 pandemic.

MESSAGE FROM DEC'S COMMISSIONER AND HUDSON RIVER ESTUARY COORDINATOR

It's hard to imagine what New York State would be like without the Hudson River. The river played an integral role in the founding, development, and growth of our state, and continues to be a vital environmental, economic, and recreational resource.

The Hudson River Estuary Program has been an effective means to ensure the river is healthy and its shoreline communities, including low-income and communities of color, can enjoy the many benefits it provides, from boating and paddling to scenic vistas, to supporting regional businesses and organizations.

This Report highlights the actions DEC's Estuary Program is taking to help protect, restore, and improve the Hudson and benefit the people and communities that depend on this historic, vibrant resource.

You will learn more about efforts to improve its fishery and ecosystem, and its resiliency; promote and ensure its continued vitality; and build on the amazing recreational opportunities it offers. As the name of this report noted, DEC's Estuary Program serves as a coordinator, working closely with communities to advance an agenda that will guide smart actions moving forward.

I am proud of the program's efforts and am especially happy that it is committed to educating young people about the Hudson, helping to connect them to this vital resource and encourage them to be strong stewards of the river and New York's natural resources.

Through strong partnerships developed with municipalities, organizations, schools, and citizens, the Estuary Program has established a forward-looking, ambitious, and effective strategy that will improve river access and water quality, while also addressing challenges due to climate change.

The Hudson has been and will continue to be an important and productive resource. DEC's Estuary Program is committed to planning, policy, education, environmental justice, and outreach to ensure this historic resource will remain a key part of our present and our future.

Basil Seggos,
Commissioner

Fran Dunwell,
Hudson River Estuary
Coordinator

OUR MISSION

The Estuary Program's staff and partners work to achieve the following benefits for the public:

- **Clean Water**
- **Resilient Communities**
- **Vital Estuary Ecosystem**
- **Estuary Fish, Wildlife, and Habitats**
- **Natural Scenery**
- **Education, River Access, Recreation, and Inspiration**

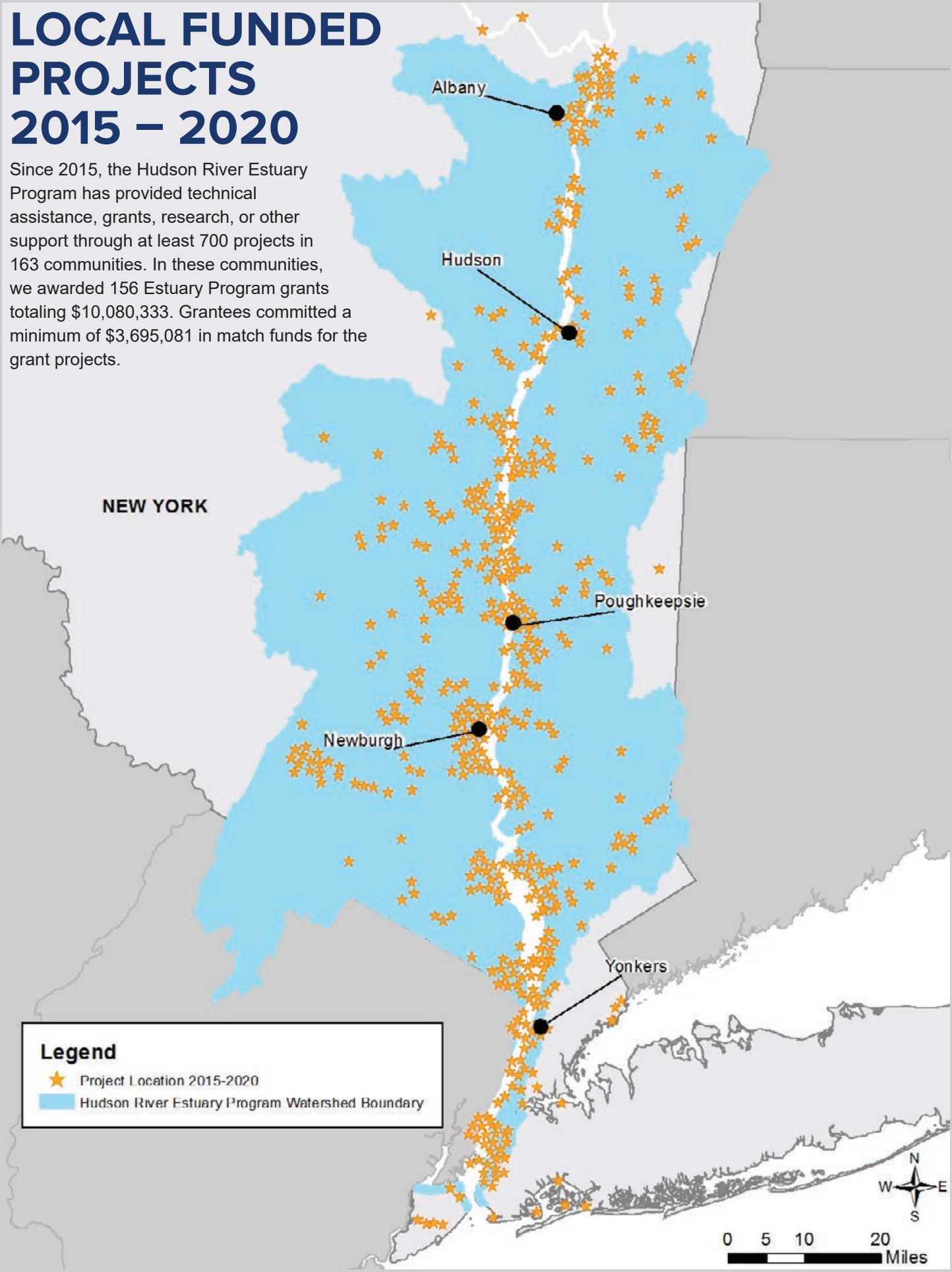
Estuary Program Advisory Committee

- Stuart Findlay, Cary Institute of Ecosystem Studies, Committee Chairman
- Allan Beers, Rockland County
- Andy Bicking, Scenic Hudson
- Peter Brandt, U.S. Environmental Protection Agency
- Janet Burnet, Ramapo River Watershed Council
- Diana Carter, NYS Office of Parks, Recreation and Historic Preservation
- Noreen Doyle, Hudson River Park Trust
- Todd Erling, Hudson Valley Agri-Business Development Corporation
- Jamie Ethier, NYS Department of State
- Paul Gallay, Riverkeeper, Inc.
- Lucille Johnson, Vassar College and Environmental Consortium of Colleges and Universities
- Scott Keller, Hudson River Valley Greenway
- Suzette Lopane, Westchester County
- John Mylod, commercial fisherman
- Rob Pirani, NY-NJ Harbor and Estuary Program
- George Schuler, The Nature Conservancy
- Shino Tanikawa, NYC Soil and Water Conservation District
- Audrey Van Genechten, NYS Department of Health
- Peter Weppler, U.S. Army Corps of Engineers

The New York State Department of Environmental Conservation's (DEC's) **Hudson River Estuary Program** helps people enjoy, protect, and revitalize the Hudson River. The program provides assistance, grants, and scientific research to empower citizens, communities, and agencies to make informed choices.

LOCAL FUNDED PROJECTS 2015 – 2020

Since 2015, the Hudson River Estuary Program has provided technical assistance, grants, research, or other support through at least 700 projects in 163 communities. In these communities, we awarded 156 Estuary Program grants totaling $10,080,333. Grantees committed a minimum of $3,695,081 in match funds for the grant projects.



2015 – 2020 BY THE NUMBERS

CLEAN WATER

- We **ASSESSED CULVERTS AND BRIDGES** at **59.7% OF ROAD-STREAM CROSSINGS** (more than 10,600 sites) in the watershed.
- **27 COMMUNITIES** have completed county and local **CULVERT MANAGEMENT PLANS**.
- **10 STREAM RESTORATION PROJECTS** underway or completed, **RECONNECTING OVER 33 MILES STREAM HABITAT**.
- Trees for Tribs staff and over **2,500 VOLUNTEERS** planted more than **20,000 NATIVE TREES AND SHRUBS ON 8 MILES OF STREAM**.

LEARN MORE:

https://www.dec.ny.gov/lands/5098.html

MIGRATORY FISH

- 2018 marked the **30th YEAR OF TRACKING** and analyzing the dynamics of the **MIGRATORY FISH POPULATIONS**.
- Stock assessments were completed to manage the **SUSTAINABILITY OF 4 SPECIES: RIVER HERRING, STRIPED BASS, AMERICAN SHAD AND ATLANTIC STURGEON**.
- Staff have **COLLECTED BIOLOGICAL DATA** from over **60,000 ADULT AND 1.2 MILLION YOUNG-OF-YEAR RIVER HERRING**
- We **TAGGED THE 25,000th STRIPED BASS** in 2016 as part of the **COASTAL COOPERATIVE TAGGING PROGRAM** with the U.S. Fish and Wildlife Service.

LEARN MORE:

https://www.dec.ny.gov/animals/6945.html

RIVER HABITATS

- **25 ACRES OF TIDAL RIVER HABITAT** have been restored, including **REMOVING INVASIVE SPECIES FROM 17 ACRES. 5 ACRES OF OYSTER HABITAT WERE CREATED AND 3 ACRES OF SIDE CHANNEL WERE RESTORED.**

LEARN MORE:

https://www.dec.ny.gov/lands/4915.html

RIVER ACCESS

- **26 ESTUARY ACCESS GRANTS TOTALING $2,165,353**, were awarded to local governments and nonprofit organizations to enhance access for **FISHING, SWIMMING, BOATING, WILDLIFE-RELATED RECREATION, AND RIVER VIEWING** in their communities.
- Of these, **19 GRANTS** supported projects **IN DISADVANTAGED URBAN NEIGHBORHOODS**.

LEARN MORE:

https://www.dec.ny.gov/lands/5088.html

NATURAL SCENERY

- From 1987 through 2019, DEC and OPRHP have **CONSERVED 10,195 ACRES** along or in sight of the Hudson River to **PROTECT HABITAT** for plants, birds, and wildlife, and to **PROVIDE VIEWS** of the Hudson for residents and visitors **FOR GENERATIONS TO COME**.
- **NINE COMMUNITIES** created **SCENIC RESOURCES INVENTORIES**

LEARN MORE:

https://www.dec.ny.gov/lands/5094.html

CONSERVATION AND LAND USE

- **65 WATERSHED COMMUNITIES** in the Hudson Valley used technical assistance and grants to incorporate **BIOLOGICAL DATA AND CONSERVATION PRIORITIES** into local land-use planning.
- Of these, **33 COMMUNITIES** developed plans and policies to **CONSERVE NATURAL RESOURCES AND WILDLIFE HABITAT**, including completing natural resource inventories, comprehensive plans, and open space plans, and establishing critical environmental areas (CEAs).

LEARN MORE:

https://www.dec.ny.gov/lands/5094.html

RIVER EDUCATION

- More than **2,600 EDUCATORS TOOK PART IN OUR PROGRAMS**. Our lesson plans have been used in over **90% OF SCHOOL DISTRICTS** that border the estuary, and have been **DOWNLOADED** more than **382,900 TIMES**.
- More than **131,621 PEOPLE** experienced the Hudson through hands-on **FIELD PROGRAMS, SCHOOL PROGRAMS, TEACHER WORKSHOPS, EVENTS, AND PLACE-BASED-EDUCATION PROGRAMS**.

TO PARTICIPATE:

https://www.dec.ny.gov/lands/5102.html

CLIMATE RESILIENCY

- **120 WATERSHED COMMUNITIES** in the Hudson Valley have taken the **CLIMATE SMART COMMUNITIES** pledge.
- Of these, **67 COMMUNITIES** are working on strategies to **CONSERVE FLOODPLAINS, SHORELINES**, or **FREE-FLOWING STREAMS**, and 13 have adopted plans to **MANAGE FLOODING AND HABITAT**.
- **14 RIVERFRONT COMMUNITIES** have leveraged more than **$20 MILLION** in funding for **CLIMATE RESILIENCY PROJECTS**.

LEARN MORE:

https://www.dec.ny.gov/lands/39786.html

Scott Snell

RESILIENT COMMUNITIES

Introduction

In 2015, the Hudson River Estuary Program set out to assist six or more riverfront communities to take direct actions on climate risks, such as adapting to flooding and sea-level rise, while improving the policy guidance available to all communities. We committed to increasing the Hudson Valley Region's leading participation in New York's Climate Smart Communities (CSC) program, aiming to have 100 communities take the CSC pledge and 50 complete climate adaptation actions. The following are some of our successes, including a few highlights from 2020:

Envisioning Resilient Waterfronts

Cornell University students studying landscape architecture have assisted six communities in addressing sea-level rise and flood risks through a unique Climate-adaptive Design studio (**https://wri.cals.cornell.edu/hudson-river-estuary/climate-change-hudson-river-estuary/climate-adaptive-design/**

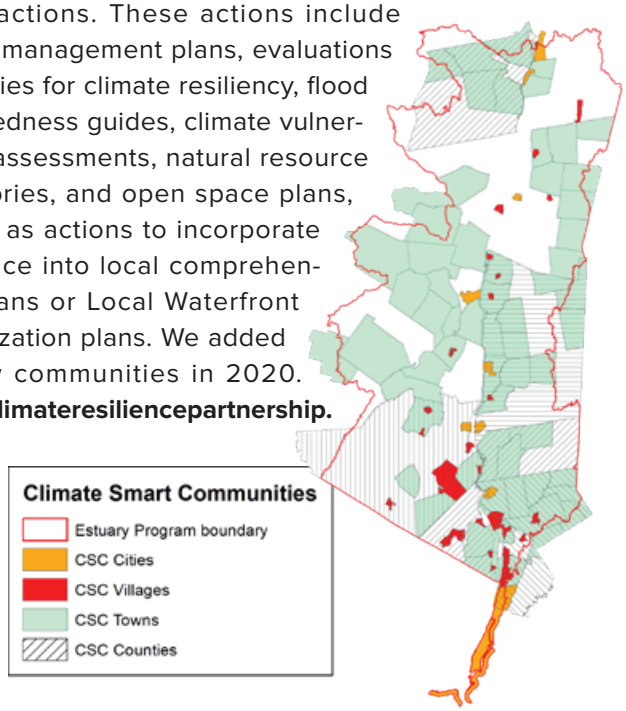
The students interacted with community representatives throughout the design process in Catskill, Kingston, Piermont, Hudson, Ossining (town and village), and NYC's Randall's Island. This project also piloted inclusive engagement strategies, such as displaying waterfront maps with bilingual comment cards in the Ossining Public Library entrance.

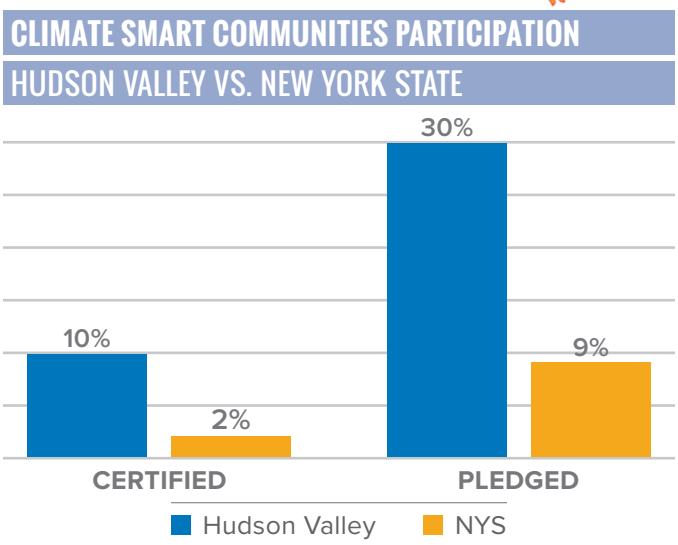
In 2020, Kingston and Piermont advanced their resilient waterfront conceptual designs to develop plans with 30% engineering designs (**https://www.dec.ny.gov/press/117138.html**). Both communities completed pre-application meetings with DEC permits staff.

Helping Communities Adapt to Climate Change

© Peter Carr – USA TODAY NETWORK

The Estuary Program helps communities complete **adaptation actions** featured in the **NYS Climate Smart Communities** (CSC) program, with outreach and assistance from NEIWPCC and Cornell, and with Estuary grants. Since 2015, this assistance has dramatically increased the number of municipalities taking the pledge and achieving CSC certification. The Hudson Valley Region now leads participation in the state's Climate Smart program with a total of 120 pledged, 26 certified, and 72 communities adopting at least 154 climate adaptation actions. These actions include culvert management plans, evaluations of policies for climate resiliency, flood preparedness guides, climate vulnerability assessments, natural resource inventories, and open space plans, as well as actions to incorporate resilience into local comprehensive plans or Local Waterfront Revitalization plans. We added 10 new communities in 2020. (**www.climateresiliencepartnership.org**)





Cooperative Extensions Help Communities Build Resiliency

DUTCHESS COUNTY

Our support to complete Climate Smart actions can help a municipality make progress and leverage additional state funding on resilience-related work. In 2020, the city of Beacon became one of seven local governments in the state to achieve Silver level in the Climate Smart Communities Certification Program, after Dutchess County Cornell Cooperative Extension (CCE) helped the city complete a Climate Smart Plan through a partnership with the Estuary Program. In 2019, the city hired a climate smart coordinator and completed a culvert management plan. In 2020, Beacon continued working with CCE to create a Climate Resilience Vision through a regional effort with Dutchess County and eight other municipalities, made possible through Climate Smart Communities funding.

GREENE COUNTY

In 2020, the Village of Athens took the Climate Smart pledge, appointed a coordinator, established a Conservation Advisory Council, the first of its kind in Greene County, and received state funding from the Hudson River Valley Greenway to update their joint town and village Comprehensive Plan. This update will include climate resiliency measures, address sustainability, and include a community-wide Climate Resilience Vision that is currently being developed with assistance from Columbia-Greene CCE. This work builds on the village's 2018 resilient policy evaluation, funded by the Estuary Program.

ULSTER COUNTY

In 2020, with our support, Ulster CCE assisted Saugerties to incorporate climate resilience into their joint Town and Village Comprehensive Plan update, which received state funding from the Hudson River Valley Greenway. The Town worked with Ulster CCE in 2019 to complete a resilient policy evaluation, and participated in a "Community Resilience Building" vulnerability assessment workshop with The Nature Conservancy and Hudson River Watershed Alliance.

Collaborating on Resiliency and Environmental Justice

The Estuary Program regularly convenes agency and nonprofit partners to advance climate-adaptation and resiliency in the region. Since 2015, one group which comprises NYSDHSES, DOH, DOS and DOT, has provided guidance and support to local governments through initiatives that help implement the NYS Community Risk and Resiliency Act, and the Climate Leadership and Community Protection Act.

We also worked with partners to update the climate-adaptation and resilience chapter of the NYS Climate Smart Communities (CSC) certification program (**https://climatesmart.ny.gov/**), including methods for relocating infrastructure outside the floodplain, using green infrastructure, and protecting source water. We helped launch a new working group with the DEC offices of Climate Change and Environmental Justice to collaboratively address the themes of justice, diversity, equity, and inclusion throughout the CSC certification program.

To promote nature-based solutions, the Estuary Program helped the NYS Department of State (DOS) to develop the Statewide Shoreline Monitoring Framework (**https://www.dos.ny.gov/opd/monitoring.html**) guidance and the State Flood Risk Management Guidance (**https://www.dec.ny.gov/docs/administration_pdf/crrafloodriskmgmtgdnc.pdf**), which were both released in 2020.

Impact on Resilient Hudson Valley Communities

Since 2015, 53 municipalities and counties have received in-depth technical assistance from the Estuary Program and have leveraged over $20 million in additional funding for climate resiliency projects. We have educated over 18,000 municipal staff, volunteers, researchers, and decision-makers on climate adaptation via trainings, *Adaptation Inspiration* videos (**https://tinyurl.com/CSCvideoSLR**) and more.

BY THE NUMBERS | 2015 - 2020

Over
$20 MILLION
FUNDING LEVERAGED*
*Funds awarded to our technical assistance communities for climate resiliency projects

66 Local governments received
IN-DEPTH TECHNICAL ASSISTANCE
(36 on Hudson River main stem)

58 municipal
VULNERABILITY ASSESSMENTS
completed

35 CLIMATE ADAPTATION AND LOCAL WATERFRONT PLANS created or updated with NYSDOS

Over
18,000
PARTICIPANTS EDUCATED
on climate adaptation via trainings, videos and more

173
ADAPTATION ACTIONS COMPLETED
- wastewater engineering
- zoning analysis
- flood guides
- culvert plans...and more

CLEAN WATER

Hudson River Estuary

INTRODUCTION

In 2015, DEC set a goal to help communities reduce the number, frequency, and volume of sanitary sewer overflows (SSOs) and combined sewer overflows (CSOs) by developing and implementing long-term control plans. We aimed to help communities develop asset management plans to prioritize investments in at-risk wastewater infrastructure. We also set out to upgrade the Hudson River Environmental Conditions Observing System (HRECOS) to provide real-time data for a wider variety of uses, including flood response, navigation, and education. The following describes our progress in reaching these outcomes and shares highlights from 2020.

REDUCING SSOs AND CSOs

Stormwater events can overwhelm wastewater infrastructure, causing SSOs and CSOs that release untreated wastewater into waterbodies. DEC helps communities reduce these events through infrastructure changes and control plans. There are now 24 CSO and SSO systems in the Hudson River Estuary watershed under consent order to fix infrastructure problems.

Sewage Pollution Right to Know (SPRTK) records specify the number of SSOs occurring in the Hudson River Estuary and its watershed. Since 2015, only one location has had chronic SSOs (more than five per year) caused by infrastructure problems. DEC monitors the release of effluent from CSOs by permitted wastewater treatment facilities and communities. Long Term Control Plans (LTCP) are used to evaluate and characterize wastewater infrastructure to develop alternative strategies and actions to reduce overflow events. Eight of the 9 CSO facilities in the estuary have approved LTCPs that are being implemented, and all 9 communities are taking steps to reduce effluent flow. All 11 NYC CSO watersheds are counted here as a single facility. The Albany Pool has three wastewater treatment facilities servicing local communities with CSOs, including Albany, Troy, Rensselaer, Cohoes, Watervliet, and Green Island. The City of Newburgh's LTCP was approved in 2016, and the Village of Catskill's LTCP was approved in 2018. New York City submitted 11 LTCPs, with nine approved by DEC to date.

DEVELOPING ASSET MANAGEMENT PLANS TO PRIORITIZE INFRASTRUCTURE INVESTMENTS

Asset management plans help communities assess aging, failing, and at-risk wastewater infrastructure to prioritize maintenance and reduce failures. In December 2015, DEC announced the Municipal Sewage System Asset Management pilot program, which supported the development of such plans for six facilities or sewer districts in Bethlehem, Carmel, and Yonkers. The Estuary Program also provided a grant to Catskill to develop an asset management plan. All participants now have an asset management plan in place.

ENVIRONMENTAL MONITORING IN THE HUDSON RIVER ESTUARY

Continuous monitoring of environmental conditions is essential to observe water quality in real time, capturing rapid events that traditional monitoring cannot. The Hudson River Environmental Conditions Observing System (HRECOS) is a partnership between state, university, and nonprofit organizations devoted to monitoring and improving water quality. The network ranges from Utica to Rexford on the Mohawk River, and extends southward from the Port of Albany to the NY/NJ Harbor on the Hudson River. Several stations have monitored water quality since 2008. There are currently 16 permanent stations that provide water quality and meteorological data publicly available at **https://hrecos.org/** and **https://ny.water.usgs.gov/maps/hrecos/**, including several maintained by the Hudson River National Estuarine Research Reserve (HRNERR). HRECOS provides baseline data needed for applied research and modeling by scientists and resource managers. These data have been used to investigate river sedimentation and extreme storm events, as well as supplementing research focusing on fisheries and oyster populations. Beyond scientific research, the Port of Albany station provides a real-time view on river currents that is needed for safe commercial and recreational navigation. In addition, educators have used HRECOS to develop interactive lesson plans, and educational displays have been installed at the Hudson River Park's Pier 84 and Piermont Pier Park to inform park visitors.

IMPROVING WATER QUALITY IN THE MAJOR METRO AREAS

Improvements to water quality are the result of specific actions taken by local, state, and federal governments. The North River Sewage Treatment Plant on the Hudson in New York City (NYC) came online in 1986, and by 1991 was treating 170 million gallons with secondary treatment, a major victory for water quality in the lower estuary. In recent decades, conditions have significantly improved for fish and other wildlife. However, CSOs have been a persistent problem for water quality, especially in the metro New York region and the Capitol District. When it rains, combined sewer systems, which collect both stormwater and wastewater, cause sewage treatment plants to exceed their capacity and overflow. In 2012, DEC and New York City signed an agreement to develop a citywide plan for CSOs. This agreement should reduce CSO discharges into NYC waters by approximately 8.4 billion gallons annually. In 2008, DEC partnered with the Capitol District Regional Planning Commission to address more than 100 CSOs in the Albany region. Updated permits now require municipalities in this area to achieve water quality suitable for swimming. State grants have provided funding to help meet these requirements. The plan, announced early in 2014, is expected take 15 years to implement and cost $136 million.

Darcy Valenzuela

Hudson River Estuary Watershed

INTRODUCTION

In 2015, the Estuary Program set out to assess 50 percent of road-stream crossings and tributary streams in the estuary watershed for their ability to pass flood flows, and to help six or more municipalities use this information to prioritize and replace undersized flood-prone culverts and bridges. the Estuary Program also committed to help remove 10 or more barriers that limit the movement of river herring and American eel, and to conserve three or more miles of priority streamside areas. The following describes our progress in reaching these outcomes and shares highlights from 2020.

HELPING COMMUNITIES RESTORE AND PROTECT TRIBUTARY STREAMS

Working with landowners and local partners, the Estuary Program built the capacity of municipalities and watershed groups, supporting the implementation of many on-the-ground restoration, management, and monitoring projects. We assessed 59 percent of road-stream crossings for their ability to pass aquatic life and flood flows and helped communities implement flood-reduction strategies. More than 10 stream restoration projects are underway or completed, and several more are underway or in the planning stages.

The breadth of our work on tributaries extends beyond on-the-ground projects. Through grants and technical support, we've worked with partners on a variety of projects from the northern estuary to its southern reaches. We helped the City of Troy remove a dam on the Wynants Kill, restoring historic spawning habitat for herring. We helped the Rensselaer Plateau Alliance assess watershed conditions and plan for flood resiliency on the Poestenkill. In the mid-Hudson Valley, we partnered with the Wallkill River Watershed Alliance to provide four years of intensive monitoring to help develop a restoration plan to reduce harmful algae blooms (HABs). We assisted the Dutchess County Soil and Water Conservation District in restoring water quality and habitat by removing the Shapp Pond dam on the Wappinger Creek. Further to the south, the Estuary Program partnered with the Moodna Creek Watershed Intermunicipal Council to prepare for potential flooding events through an alert system. Riverkeeper received an Estuary grant to monitor the Sparkill Creek, a tributary to Piermont Marsh.

SOCIALLY DISTANT FIELD WORK

In 2020, Estuary Program staff and more than 300 volunteers planted over 3,420 native trees and shrubs at 21 sites along more than one mile of streams. To ensure the safety of this Trees for Tribs activity during the pandemic, program staff carefully planned how to deliver the plants, stage the site, and instruct volunteers how and where to plant, using new video instructions. Such streamside plantings help protect water quality, fish, and wildlife, and reduce erosion and flooding.

The culvert prioritization project also continued, with adjustments for the coronavirus pandemic. Training, normally conducted in groups, became one-on-one trainings using masks and multiple sets of tools. Despite the challenges, we assessed more than one thousand culverts for their ability to allow fish and flood flows to pass. We also developed and presented webinars and virtual trainings about stream conservation, which drew more than 600 participants.

CONNECTED AND RESILIENT STREAMS: FROM PLANS TO IMPLEMENTATION

Over the past six years, the Estuary Program and partners assessed over 10,600 road-stream crossings (culverts and bridges) using a regional protocol. These field efforts, combined with the development of culvert management plans, have provided municipalities with additional tools to plan for climate change resilience while restoring habitat for fish and wildlife. To date, county and local management plans have been completed in 27 communities. These plans help manage culvert infrastructure, prioritize replacements, and attract new funding sources. With DEC support, communities used these plans to right-size five culverts, reconnecting nearly four miles of stream habitat and mitigating localized flooding. Several more culvert replacements are in the design and planning stages. In addition, four dams were removed, restoring over 33 miles of connected stream habitat. We prioritized sites for streamside restoration and, with partners, planted more than 20,000 trees and shrubs on eight miles of Hudson River tributary streambanks.

A CLEAN WATER PLAN FOR THE WALLKILL RIVER

DEC staff continue to collect water quality data in the Wallkill River, a tributary to the Rondout Creek and Hudson River. There have been significant harmful algae blooms (HABs) in the Wallkill, likely driven by excess nutrients in the water as well as other factors (e.g., temperature, and ponded water from dams). DEC has monitored water quality from 2017 to the present, in order to develop a total maximum daily load (TMDL) model for the nutrient, phosphorus. The TMDL model is in the early stages of development and will be used to help manage future nutrient inputs into the river. Citizen groups continue to monitor for excess nutrients at four locations, assessing a host of water quality and habitat parameters to help develop a restoration plan.

MIGRATORY FISH

Introduction

DEC has been managing the migratory fishes of the estuary since the 1980s, in collaboration with other coastal states through the Atlantic States Marine Fisheries Commission (ASMFC). The status of each major species has been very dynamic, influenced both by local and coastal conditions. In response to trends evident in 2015, the Estuary Program set out to ensure that Atlantic sturgeon and American shad would begin to make measurable progress toward recovery, while striped bass, which had been fairly abundant for 30 years, would show a reverse from their recent decline. We also sought to evaluate whether river herring are sustainable at current levels.

Management begins with a coast-wide stock assessment, which compiles monitoring results for each species, usually every five years. Using available science to identify impacts, management plans are developed and policies are implemented to attain them. Through technical and research assistance obtained by collaborating with multiple universities, the Estuary Program has informed and guided these management plans. The following describes our progress, with highlights from 2020.

Increasing Trend for River Herring in the Hudson

A 2017 ASMFC river herring assessment update showed increasing trends in abundance for alewife and blueback herring. However, the overall coast-wide population is depleted relative to historic levels. Our research is evaluating spawning and nursery habitat restoration opportunities, as well as river herring population potentials.

Mixed Signals for Atlantic Sturgeon

A 2017 ASMFC benchmark stock assessment found the coastwide and NY Bight populations were still depleted, and that ocean bycatch and vessel strikes may be affecting fish from the Hudson and Delaware rivers. In 2020, a new estimate determined that the abundance of spawning Hudson River Atlantic sturgeon may not have changed much since the moratorium was put in place in 1996. However, juvenile Atlantic sturgeon abundance has been trending upward since 2011. Research is helping us better understand and protect sturgeon habitat and determine sources and causes of adult mortality.

Recovery Elusive for American Shad

A 2020 stock assessment found that Hudson River American shad continue to show few signs of recovery since the fishery closure in 2009, and the stock remains depleted. Annual monitoring continues to record numbers below the recruitment failure level. Recruitment is the number of young-of-year fish that have entered the Hudson River population. Major threats to American shad recovery include mixed stock harvest in Delaware Bay, mixed stock bycatch in ocean fisheries (mixed stock includes Hudson River fish), and impingement and entrainment of shad eggs and larvae at water withdrawals. The interstate Delaware River Sustainable Fishing Plan implemented a modest mixed stock harvest limit in the Delaware Bay, which, for the first time, limits the number of Hudson shad that can be harvested there. Research is underway to help understand which ocean bycatch fisheries present the biggest threats to American shad recovery in the Hudson. An updated American Shad Recovery Plan will be completed in 2021 and will identify the highest priority actions for shad recovery.

Striped Bass Need Protective Management

When a 2018 striped bass stock assessment found that East Coast stock was overfished, DEC adopted new regulations to protect the female spawning stock in the Hudson River. With coast wide declines continuing, in 2020 ASMFC adopted a plan requiring states to reduce striped bass removals by an additional 18 percent and mandated the use of circle hooks when using live bait. Research on circle hooks, including that by the Estuary Program in 2001, has shown that fish caught with circle hooks are less likely to die after being released than fish caught with traditional J-hooks. New regulations implemented in April, 2020 do not permit anglers to keep a fish over 40 inches. They may keep only one fish between 18 and 28 inches.

Scott Snell

RIVER HABITATS

Introduction

In 2015, in partnership with the HRNERR, we set a goal to increase the quantity and quality of several river habitat types, and to design and complete new sustainable shorelines projects. We aimed to inform and train 1,000 property owners, engineers, and municipal staff to manage eroding shorelines through best ecological practices. We also pledged to continue working with industrial facilities to avoid or mitigate river habitat impacts from water withdrawals.

Restoring a Variety of Habitat Types

Following the near-complete loss of submerged aquatic vegetation (SAV) after Tropical storms Irene and Lee in 2011, the Estuary Program, the HRNERR, and Cornell collaborated on research to map and analyze the rate of recovery of this key habitat. This research found that only about 56 percent has returned. There are currently 1,835 fewer acres of SAV than in 1997, the most recent baseline date prior to the storms. (For more on this see our *State of the Hudson 2020* report). In 2015 and 2016, in partnership with the Cary Institute of Ecosystem Studies (IES), Marist College, and regional high schools, we piloted a planting of SAV at the Norrie Point Environmental Center and successfully demonstrated the potential to restore water celery (*Vallisneria americana*).

Year	Hectares of SAV	Acres of SAV	Comparison Years	SAV Change (HA)	Percent Change SAV
1997	1,802.0	4,452.7	—	—	—
2002	1,760.1	4,349.9	1997 – 2002	-41.8	-2.3%
2007	1,342.1	3,316.5	2002 – 2007	-418.0	-23.8%
2014	482.7	1,192.0	2007 – 2014	-859.9	-64.0%
2016	1,091.5	2,697.2	2014 – 2016	608.8	126.1%
2018	1,059.2	2,617.3	2016 – 2018	-32.2	-3.0%

There are over 1,800 acres less SAV habitat today than 20 years ago.

In 2015-2017, DEC also worked with the New York State Thruway Authority (NYSTA) to design and construct a side channel at Gay's Point, near Stockport, providing habitat for resident and migratory juvenile fish, including shad. In 2018, also with NYSTA, DEC began oyster reef restoration pilot projects near Tarrytown, where they now provide habitat for a variety of estuarine fish and for oyster larvae. DEC removed invasive phragmites at Stockport Flats and Tivoli Bays to restore native plant habitat at these two tidal wetlands. In 2020, the U.S. Army Corps of Engineers completed a three-year Hudson River Habitat Restoration Feasibility Study in collaboration with the NYS Department of State (DOS) and DEC. The study recommends three potential sites: Moodna Creek fish passage (removing three barriers); Town of Bethlehem's Henry Hudson Park (restoring wetland and shoreline); and Schodack Island State Park (restoring a wetland and side channel).

Audrey Vanecken

Completing Sustainable Shoreline Projects and Designs

In 2020, DEC completed the Ferry Landing sustainable shorelines project, which stabilizes a severely eroding shoreline at Nutten Hook, a popular fishing and river viewing site in Stuyvesant, Columbia County. A combination of riprap and plantings will improve habitat and increase the property's resilience to sea-level rise, storm surge, and wave action from coastal storms. DEC also constructed an ADA-accessible fishing pier, designed to meet the wide range of water levels that occur along the estuary. The pier has quickly become a popular spot for local anglers and provides access to the river for people of all abilities. DEC, in partnership with NEIWPCC, also funded the design and engineering for sustainable shoreline projects at Dockside Park in Cold Spring, Hudson Shores Park in Watervliet, and Nyack Beach State Park. Implementation funds are being provided by other agencies for the sites at Cold Spring (OPRHP) and Watervliet (NYSDOS).

Best Management Practices (BMPs) – Training and Implementation

The HRNERR Estuary Training program has informed more than 3,000 conservation practitioners about best practices for managing eroding shorelines. These practices include constructing sloped shorelines with vegetative and rock features that mimic natural Hudson River shorelines, rather than installing bulkheads. DEC staff continue to encourage permit applicants and landowners to enhance ecosystem function with these features. There are eight new projects using BMPs since 2015, including project sites in Yonkers (Avalon Bay, Palisades Point), Haverstraw (Haverstraw Bay Park), Peekskill (Peekskill Landing Park), Beacon (Long Dock Park), Marlborough (Milton Landing Park), Poughkeepsie (One Dutchess Avenue), and Starbuck Island in Watervliet.

SEND

Rendering of Dockside Park sustainable shoreline.

Monitoring

HRNERR deployed sondes to measure water temperature, specific conductivity, salinity, dissolved oxygen, depth, pH (acidity), and turbidity (sediment) every 15 minutes at its sites at Iona Island (river mile 45) and Ferry Landing (river mile 125). Iona data provides information on the location of the salt front (dilute seawater) to help monitor its potential advance due to sea-level rise, which may change river dynamics and affect fish populations. Ferry Landing water quality data helps monitor nearby SAV beds and the side channel restoration at Gay's Point.

River Impacts from Water Withdrawals

Of the 17 industrial facilities known to use water from the tidal Hudson for cooling, 10 have installed fine screening on the intake to minimize mortality to fish, and seven are in the process of selecting such equipment or are planning to install this technology in the next few years. Today over three billion gallons of water daily are permitted to be withdrawn from the Hudson River. The planned closure of the Indian Point Nuclear Power Plant in Buchanan in 2021 will reduce water withdrawals by an additional one billion gallons per day. All new industrial facilities are required to operate a closed-cycle cooling system, which recirculates 95 percent of the water used.

CONSERVATION AND LAND USE

Introduction

In 2015, we continued our commitment to improving our understanding of the watershed through conservation science, and ensuring that communities have access to current, science-based information and tools to inform local decision-making and conservation planning. We committed to providing assistance to 75 municipalities, with at least 30 of them taking action on practices, plans, and policies. We also set a land protection target of 15,000 acres in the watershed. The following describes our progress in reaching these outcomes and shares highlights from 2020.

TESTIMONIAL

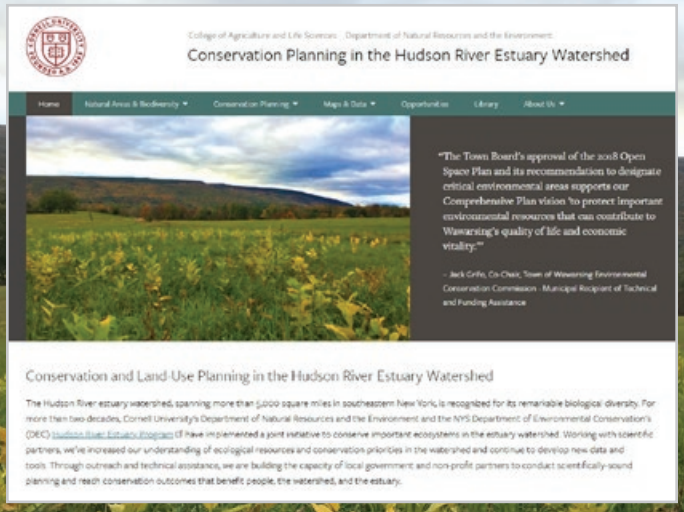
"It is a joy to have been introduced to this hidden world beneath our feet and provide a small amount of protection to such fascinating creatures."

—Kurt Larson, 5-year Amphibian Migrations & Road Crossings volunteer

Empowering Communities With Science

Since 2015, the Estuary Program has improved our understanding of the watershed through conservation science, and has provided access to this information for planning and decision-making.

- A new website, *Conservation Planning in the Hudson River Estuary Watershed*, compiles two decades of biodiversity research and conservation planning guidance from the Estuary Program and Cornell University's Department of Natural Resources and the Environment. The site provides all municipalities, as well as land trusts, watershed groups, and other partners, with information to help them achieve local conservation goals, while supporting the estuary ecosystem. More than 30 pages provide in-depth resources on watershed habitats, the role of municipalities in conservation planning, biological data and interactive mappers, opportunities to receive assistance, success stories, and news from communities in the watershed: **https://hudson.dnr.cals.cornell.edu**.
- We continue to collaborate with the New York Natural Heritage Program (NYNHP) to update and develop biological data sets for the watershed, including Natural Heritage Important Areas for conserving rare plants, rare animals, and ecological communities (2018), and large forest patches, core forests, and a forest condition index (2019). A recent NYNHP analysis will characterize changes to watershed forests since 1995. Data descriptions and download information are available at **https://hudson.dnr.cals.cornell.edu/maps-data/biological-data**.
- The interactive Hudson Valley Natural Resource Mapper, launched by the Estuary Program in 2018, provides an online platform to share new data sets as they become available. The Mapper now has over 40 geographic data sets relating to the estuary, streams and watersheds, wetlands, forests, biodiversity, scenery, and recreation: **https://www.dec.ny.gov/lands/112137.html**.



Connecting Habitats Through Planning

Preserving natural connections between habitats is critical for wildlife movement and climate adaptation. The Estuary Program encourages communities and land trusts to prioritize regional and local habitat connections. Inter-municipal outcomes of this work include a joint project of the Town of Red Hook and Villages of Red Hook and Tivoli to apply habitat linkages as criteria for land protection in their 2016 Community Preservation Plan. In 2019, the Town of Wawarsing adopted two CEAs to highlight the significance of large, contiguous areas of habitat including a large wetland complex and a regionally important landscape connection between the Catskill Mountains and the Shawangunk Ridge. In 2020, Columbia Land Conservancy and the Hudson Highlands Land Trust initiated Estuary Grant projects to develop connectivity plans to conserve wildlife habitat and water quality.

VOLUNTEERS HELP AMPHIBIANS

This year, migration conditions arrived in the watershed in mid- to late-March, and 110 volunteers surveyed roads throughout the watershed, assisting 2,757 amphibians safely on their breeding journeys. Referring to COVID, one volunteer of our Amphibian Migrations and Road Crossings Project shared, "Helping the amphibians is something we can still do, and it feels really good!"

Virtual Outreach

In 2020, with social distancing requirements in effect, the need to deliver web-based outreach gained momentum, and participants quickly adapted to remote learning opportunities. New online trainings, virtual field trip videos, and a Conservation and Land Use 101 webinar series attracted hundreds of municipal officials each month, providing opportunities to build capacity for conservation planning within New York's home rule system. We also produced a new video to showcase how communities can use Critical Environmental Area (CEA) designation to increase conservation of important ecological areas. Recordings from past webinars are available at **https://www.dec.ny.gov/lands/120539.html**, and the CEA video can be viewed at **https://youtu.be/PrB-0CvRNJM**.

TESTIMONIAL

"The NRI will be tremendously helpful in creating an Open Space Inventory and Plan, which will ensure Beacon has the necessary resources for smart future city planning."

—Mayor Lee Kyriacou, City of Beacon

From Planning To Policy

Since 2015, the Estuary Program has provided technical and/or funding assistance to 65 watershed communities to create natural resource inventories (NRIs), set conservation priorities, or pursue policy strategies to protect the lands and waters they care about most. We focused especially on NRIs, a foundational planning tool which municipalities can use to make informed decisions, educate their residents, and prioritize natural areas they want to conserve. NRIs are also valuable for climate adaptation planning and are a priority action in the NYS Climate Smart Communities program.

Of the municipalities we assisted, 33 reached important milestones in conservation planning:

- 16 municipalities and 3 counties completed NRIs
- 13 municipalities and 1 county created an open space inventory, open space plan, or conservation plan, or designated a critical environmental area (CEA)
- 3 municipalities started a Conservation Advisory Council.

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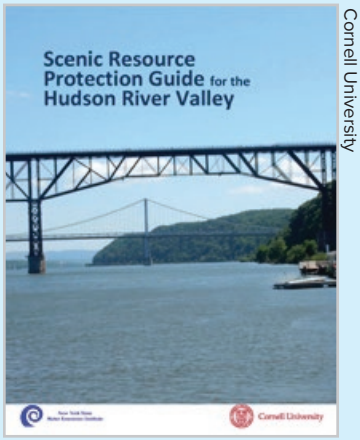
NATURAL SCENERY

Introduction

In 2015, we set out to ensure that all communities in the estuary watershed have online tools and information to help manage and publicize their local scenic resources and to provide training to six or more pilot communities. We committed to helping shoreline property owners manage river vistas in ecologically sound ways through guidance and two demonstration projects. We also set a land conservation target of 2,000 acres along the estuary shoreline in the coastal zone. The following describes our progress in reaching these outcomes and shares highlights from 2020.

Helping Communities Protect Their Scenic Landscape

To provide all Hudson River estuary watershed communities with information on how to protect their world-class scenery, the Estuary Program partnered with Cornell University's Department of City and Regional Planning to publish a guidebook for municipal officials and planners. Since 2016, Cornell has worked with nine pilot communities to create scenic resources inventories and has advised municipal officials on how to use scenery data in their decision-making. The lessons learned from those projects served as the foundation for the guide, which explains methods for inventorying scenic resources and highlights examples of how municipalities have used home rule authority in scenic resource protection. *The Scenic Resource Protection Guide for the Hudson River Valley* is available online.

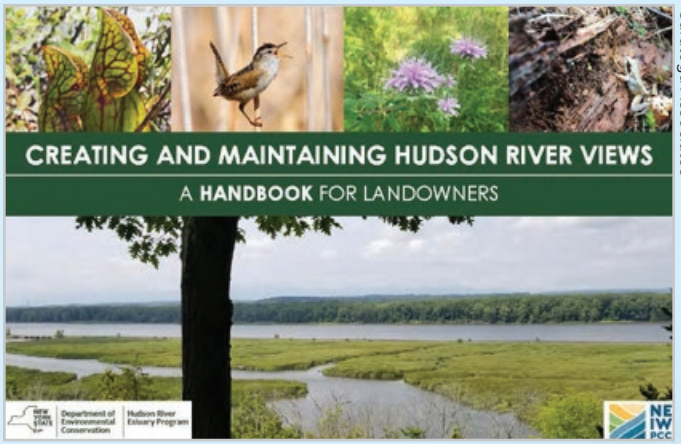


Cornell University

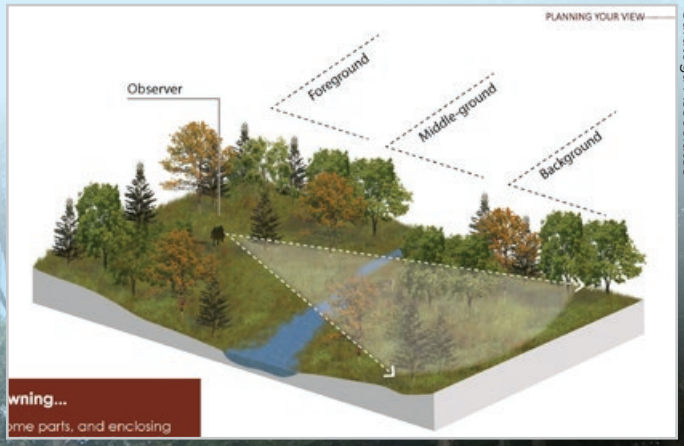
The Scenic Resource Guide for the Hudson River Valley is a comprehensive guide to the protection of the visual environment in the estuary watershed.

Creating Nature-Friendly Vistas

Landowners close to the Hudson River often clear trees and shrubs to enjoy beautiful views of the river and landscape beyond. To avoid negative impacts to wildlife habitat and water quality, the Estuary Program published a handbook in 2020 demonstrating best management practices for creating a view to the Hudson River. This handbook explains the process for planning and creating a new view through engaging graphics and real-life local examples. Demonstration projects were planned and implemented at two historic sites, where visitors can now observe new views to the Hudson River. These sites are highlighted in three virtual training sessions, where landowners may learn best practices and try constructing their own views using interactive web tools. *Creating and Maintaining Hudson River Views: A Handbook for Landowners* is available online, as is the recording of the training sessions: **https://www.dec.ny.gov/lands/120538.html**



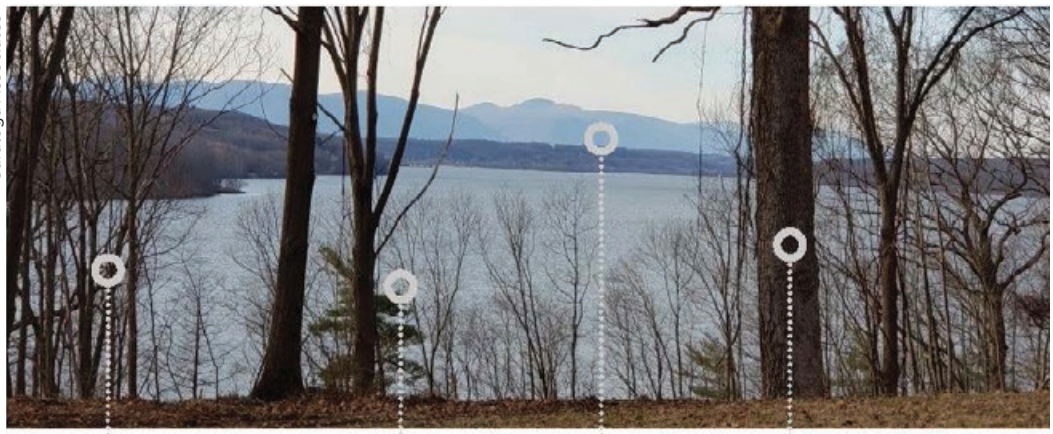
Saratoga Associates



Saratoga Associates

This handbook demonstrates best practices for the creation of nature-friendly views to the Hudson River and beyond.

The newly-created, nature-friendly view from the Point at Mills-Norrie State Park.



Saratoga Associates

Scenic Hudson

Bringing Nature-Friendly Vistas To Life

In 2020, demonstrations of the best practices explained in *Creating and Maintaining Hudson River Views: A Handbook for Landowners* were created at two sites: *The Point* at Mills-Norrie State Park and on the *Blithewood Estate* at Bard College. At *The Point* – the location of a nineteenth-century mansion currently undergoing restoration – five historic views once enchanted the Hoyt family and their visitors. Over a hundred years later, these once open vistas had reverted to dense forest. In the spirit of Calvert Vaux, the famous landscape architect who first designed the site, the Estuary Program demonstrated naturalistic techniques for restoring a view of the Hudson River and distant Catskill Mountains. In addition to using best practices for clearing as few trees as possible during the creation of the restored view, Estuary Program staff and volunteers planted 200 short trees and shrubs where larger trees were removed. These plants will create wildlife habitat on site and stabilize erodible soils, but won't grow tall enough to obscure the newly created vista.

Protecting River Scenery

Since the creation of the Hudson River Estuary Program in 1987 through 2019, the NYS Department of Environmental Conservation and State Office of Parks, Recreation, and Historic Preservation have acquired more than 10,190 acres within the Hudson River Coastal Zone.

DID YOU KNOW?

Nate Nardi-Cyrus

Did you know that six stretches of the Hudson River were the first designated Scenic Areas of Statewide Significance (SASS) in New York? These mapped river front areas – found between the Capitol Region and the Hudson Highlands – serve to protect important scenic resources from adverse impacts from state and federal actions. SASS can also be a starting point for local municipalities to protect these resources further, using their home rule authority.

Pierce Johnston/ScenicHudson.org

Quarry Waters, protected by Scenic Hudson in 2019, includes about a mile of scenic Hudson River shoreline, which is planned as future NYS park land.

RIVER ACCESS

Introduction

Today, nearly every community along the tidal Hudson has some form of access to the river. In 2015, we focused our *Action Agenda* on ensuring that people of all abilities can access the river, and on helping communities improve the resiliency of their sites to flooding and sea-level rise. We committed to improving river access at state facilities and to assisting 10 local partners make improvements to their river access sites, including at least four in disadvantaged communities. Our goal was to update web-based information about the location and features of these sites. The following describes our progress in reaching these outcomes and shares highlights from 2020.

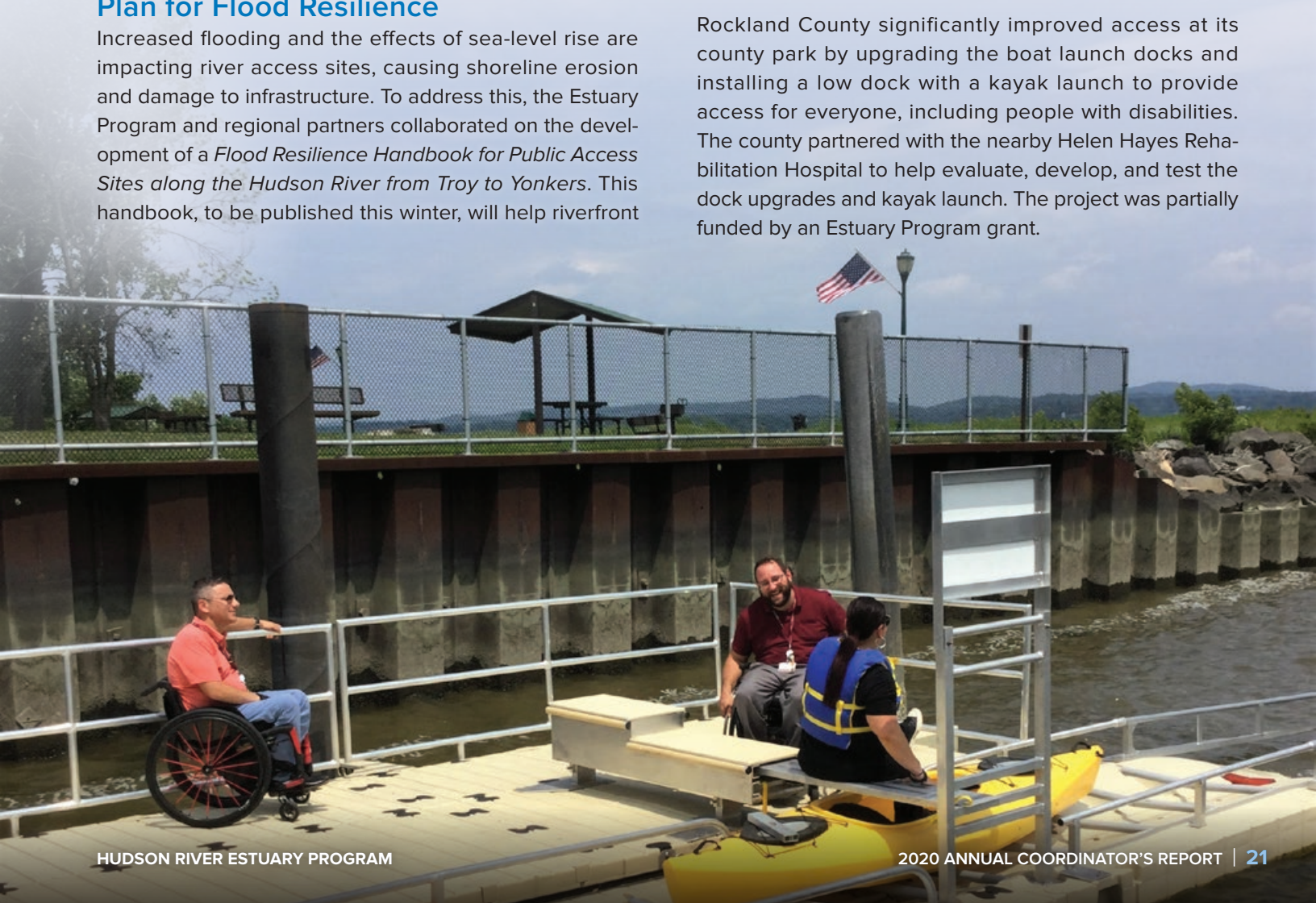
Helping Site Managers Plan for Flood Resilience

Increased flooding and the effects of sea-level rise are impacting river access sites, causing shoreline erosion and damage to infrastructure. To address this, the Estuary Program and regional partners collaborated on the development of a *Flood Resilience Handbook for Public Access Sites along the Hudson River from Troy to Yonkers*. This handbook, to be published this winter, will help riverfront communities plan for the future resilience of access sites along the estuary. The handbook outlines a six-step planning process, provides guidelines and strategies, and features local case studies illustrating what can be done to reduce climate change impacts at these sites.

Improving Access for People with Disabilities

The City of Kingston took steps in 2020 to improve accessibility for people with disabilities at the Kingston Point Beach, including installing an accessible beach mat, purchasing beach wheelchairs, improving changing rooms, and designated accessible parking. Kingston Point Beach is one of only two active swimming beaches on the tidal Hudson. These improvements implemented the recommendations of Estuary Program accessibility studies of Hudson River sites with Cornell University (2012), and on-site assessments by the Northeast ADA Center for Accessibility in 2017.

Rockland County significantly improved access at its county park by upgrading the boat launch docks and installing a low dock with a kayak launch to provide access for everyone, including people with disabilities. The county partnered with the nearby Helen Hayes Rehabilitation Hospital to help evaluate, develop, and test the dock upgrades and kayak launch. The project was partially funded by an Estuary Program grant.




Chris Bowser


Nancy Beard

Experience A Tidal Marsh in Manhattan

As part of an overall ecosystem-based design for public access at Pier 26 on Manhattan's west side, Hudson River Park built a Tide Deck with an overhanging walkway to provide visitors with views of a constructed tidal marsh. Completed in 2020, the 15,000-square-feet, rocky marsh has been planted with native shrubs, trees, and grasses. The Estuary Program provided grant funding for this unique feature.

2015-2020 Highlights

- Twenty-six estuary access grants, totaling $2,165,353, were awarded to local governments and nonprofit organizations to enhance access for fishing, swimming, boating, wildlife-related recreation, and river viewing in their communities. These grants helped communities improve accessibility and the resiliency of sites to flooding and sea-level rise. Nineteen of these grants supported projects in disadvantaged urban neighborhoods in New York City, Kingston, Albany, Yonkers, Esopus, Cortlandt, Sleepy Hollow, and Tarrytown.


Karl Beard


Karl Beard

- In 2018, the Estuary Program released the Hudson River Natural Resources Mapper **https://www.dec.ny.gov/lands/112137.html**, which includes a data layer with more than 100 Hudson River access sites and descriptions of site features and contact information.
- Cornell University, the Northeast ADA Center, and New York Sea Grant provided training and information to Hudson River communities about the Americans with Disabilities Act (ADA) and its application to Hudson River access sites. Cornell produced a handbook, *What Businesses Need to Know* along with three fact sheets on accessible routes, portable toilets, and picnic tables. The documents are available on the Access to the Hudson River page at DEC's website (**https://www.dec.ny.gov/lands/5088.html**).

  Communities and municipalities are beginning to evaluate access to the Hudson on a regional scale. The Rensselaer Land Trust inventoried existing public access opportunities and created a plan for the entire Rensselaer County shoreline. The Town of Esopus partnered with Scenic Hudson to develop *the Esopus Riverfront: Access and Connections Study* to jointly evaluate opportunities for new and improved access to the Hudson River and Rondout Creek. The City of Albany received an Estuary Program grant to study and develop an access and connection plan for its Hudson River shoreline to improve existing sites using sustainable shorelines techniques and to evaluate potential new sites.

EDUCATION

Introduction

In 2015, we set out to help residents of the Hudson Valley understand and appreciate the estuary ecosystem and take action to conserve its resources. We planned to improve facilities at five or more sites that offer river education, and strengthen local stewardship of estuary resources through community science projects. We also set out to encourage 80 percent of school districts within the watershed to incorporate Hudson River learning and to annually connect 10,000 students to the river. The following describes our progress in reaching these outcomes, and shares highlights from 2020.

Improving Sites for River Education

Estuary grants have supported new or upgraded facilities for 10 riverfront centers. The west side of Manhattan, once slated to be a highway, is now a major hub for river access and education. Estuary Program support to the Hudson River Park Trust and The River Project has helped upgrade education, lab and classroom facilities that allow thousands of students to experience the Hudson firsthand. At Pier 26, residents and visitors now are able to experience a salt marsh, constructed by Hudson River Park Trust. Planning is also ongoing at Pier 26 for an "Estuarium" (estuary aquarium) with live fish and interactive educational exhibits. Other projects underway include new or improved interpretive centers and programming in Brooklyn, Yonkers, Verplanck, Beacon, Kingston, and Troy.

Strengthening Stewardship Through Community Science

Since the Hudson River Eel Project (**https://www.dec.ny.gov/lands/49580.html**) began in 2008, we have trained nearly 6,000 volunteers to use scientific field methods to catch, count, and release upstream more than one million juvenile eels. This project provides population estimates of American eels, a species of concern along the Atlantic coast. It also helps build awareness of the need to protect eel habitat by removing barriers such as dams that block these fish from migrating to upper reaches of streams, where they grow to maturity. Many students who participated in eel research have been inspired to pursue college majors in science. Programs such as the Student Conservation Association (SCA) and AmeriCorps also facilitate community science and stewardship. Since 2015, the Estuary Program has hosted 34 SCA positions for recent college graduates. SCA members educate thousands of students, plant streamside trees, and promote sustainable shorelines awareness. In some cases, SCA educators are working with students from the very schools these educators once attended, and many of the students go on to careers with DEC or local environmental organizations.

TESTIMONIAL

"I really enjoyed the community science aspect the eel project. It's magical to watch students begin to feel a connection to the natural environment where they live."

—Aidan Mabey, former SCA member

Working with School Districts and Colleges

Since 2015, more than 2,600 educators participated in our teacher trainings and conferences. Estuary Program lesson plans have been used in over 90 percent of the districts that border the estuary. Our lesson plans have been downloaded 382,900 times. With the HRNERR, we offer Teachers on the Estuary (TOTE) programs, which combine field research with science curriculum, and The Institute Discovering Environmental Scientists (TIDES), a summer research program for a dozen high school and college students. 97,295 people have participated in education programs including 66,281 students. Twenty area colleges now partner with the Estuary Program to study the Hudson.

TESTIMONIAL

"Kevin, a former student of mine, spoke with me about remembering going to the Hudson many years earlier, and how this trip got him very interested in the Hudson. He is a junior who is in considering an environmental program for his college career."

—Skip Hoover, Poughkeepsie High School science teacher

Connecting Students to the River

During the annual Day in the Life of the Hudson and Harbor (**https://www.dec.ny.gov/lands/47285.html**), nearly 5,500 students and teachers head to 80 waterfront sites from New York Harbor to Troy and the lower Mohawk River with seine nets, minnow pots, and water testing gear to collect data and study the fish and invertebrates, track the river's tides and currents, and examine water quality and chemistry. Additional outdoor programs include Science on the River, the Great Hudson River Fish Count, and participating in partner events, such as the Clearwater Festival and Hudson River Park Trust's Submerge festival. From 2015 through early 2020, our programs engaged 84,629 people in these academic and public education programs.

Education During the COVID-19 Pandemic

When the COVID-19 pandemic caused the closure of schools, Estuary Program educators began producing short videos about the Hudson River and offered distance learning opportunities to classes. The Virtual River, **https://wri.cals.cornell.edu/hudson-river-estuary/education/virtual-river-students-teachers-and-families/**, is an estuary education series that provides short videos with lesson plans and home activities. Since March, the series has been viewed more than 20,500 times. DEC Facebook Live programs, which are posted biweekly on YouTube, have been viewed over 232,000 times since April. Two hundred teachers participated this summer in the Teachers on the Estuary virtual field program on climate change, which was offered twice due to high demand. Environmental educators in New York City, Piermont, and Staatsburg showed the fish they caught while seining for the Day in the Life of the Hudson and Harbor during three DEC Facebook Live events, and videos filmed at 30 sites during the event have been edited and produced into three videos, now available to teachers and students. **https://www.dec.ny.gov/lands/47285.html**


Hudson Valley Drones


Ingrid Haeckel


Hudson Valley Drones

Help us protect the Hudson and learn more about DEC's Hudson River Estuary Program.
Find out how you can become a partner in conservation.

Phone: (845) 256-3016 | Email: hrep@dec.ny.gov | Web: www.dec.ny.gov/lands/4920.html