



Hudson River Estuary Program

HUDSON RIVER ESTUARY PROGRAM 2015 COORDINATOR'S ANNUAL REPORT

Presented to the Hudson River Estuary
Management Advisory Committee March 2, 2016

In accordance with the provisions of the Hudson River Estuary Management Act,
NYS Environmental Conservation Law 11-0306



A Program of the New York State Department of Environmental Conservation

In cooperation with several state and federal agencies, as well as private partners

Andrew M. Cuomo, Governor

Basil Seggos, Acting Commissioner

Table of Contents

About the Hudson River Estuary Program	1
How’s the Ecosystem Doing?	1
Delivering on Statewide Priorities	2
Collaborating with Other Agencies.....	3
Partnerships and Progress to Achieve <i>Action Agenda</i> Priorities	4
Clean Water	4
Resilient Communities	5
Vital Estuary Ecosystem	6
Estuary Fish, Wildlife and Habitats	7
Natural Scenery	8
Education, River Access, Recreation and Inspiration	8
2015 Summary by the Numbers	10
Building Local Ladders of Stewardship: Estuary Grants and Funds Leveraged	10
Partnerships.....	10
<i>Action Agenda</i> Benefits	10
• Clean Water	10
• Resilient Communities	11
• Vital Estuary Ecosystem	11
• Estuary Fish, Wildlife, and Habitats	11
• Natural Scenery	11
• Education, River Access, Recreation and Inspiration.....	12
Hudson River Estuary Management Advisory Committee Members and Ex-officios.....	13

About the Hudson River Estuary Program

Created by state law in 1987, the Hudson River Estuary Program develops knowledgeable and effective stewards of the estuary and its ecosystem using an understanding of ecology as a foundation for all of its work. The program encompasses the Hudson River from the Verrazano Narrows in New York City to the head of tide at Troy and includes the surrounding valley and watershed. The Estuary Program is guided by an *Action Agenda*—a shared vision for the future of the Hudson and its watershed, as well as opportunities for action as defined by diverse groups of people who live and work along the river and in its watershed.

The *Hudson River Estuary Action Agenda 2015 – 2020* focuses on six key benefits of a healthy estuary: clean water; resilient communities; vital estuary ecosystem; fish, wildlife, and habitats; natural scenery; and education, river access, recreation, and inspiration. It specifies the challenges we face and identifies practical solutions that can be carried out by 2020 through the collaboration of federal and state agencies, municipalities, organizations, other stakeholders, and citizens working together.

The outcomes included in the Action Agenda are measurable and achievable and build on a strong record of progress in each of our core areas of expertise. The *2015 Coordinator's Report* highlights the first year of implementation of the updated *Action Agenda*.

How's the Ecosystem Doing?

In 2015, there were some promising signs for the health of the Hudson River estuary. Submerged aquatic vegetation (SAV), which had all but disappeared after Tropical Storms Irene and Lee, began to show modest signs of reemergence. The number of juvenile Atlantic sturgeon was the highest since DEC started monitoring populations in 2006, and the trend shows an increasing abundance of these fish. This may indicate the start of a recovery, as these juveniles may be offspring of the protected-year classes—those spawned after the harvest moratorium was established in 1996. There was also an encouraging increase in numbers of young American shad in 2014 and 2015 after a near collapse in 2002. These numbers, however, remain historically low.

We continued our work on understanding the response of fisheries and aquatic habitats of the Hudson River to extreme weather, and DEC worked to identify lands likely to be inundated by sea-level rise. The permanently conserved Vosburgh Swamp tidal wetland complex was expanded with the addition of 167 acres of the wetland area and a substantial portion of the wetland's watershed.

DEC is working with the New York State Thruway Authority (NYSTA) on the feasibility and engineering of a side-channel restoration at Gay's Point in Columbia County, a first-of-its-kind restoration of fish spawning, forage, and refuge habitat in the upper Hudson River estuary.

Contamination from sewage pollution in the Albany Pool is projected to decrease significantly now that two disinfection systems are operational, and, this year, General Electric completed the dredging of 2.75 million cubic yards of PCB-contaminated sediment from a 40-mile stretch of the Hudson between Fort Edward and Troy. After an extensive survey, the invasive aquatic plant *Hydrilla* was not found in the Hudson River estuary, although it has become established in the Croton River and bay and remains a threat.

Congress unanimously passed legislation in 2015 banning the use of microbeads and micro-plastics starting in 2017 (with a complete ban by 2019). We are planning research projects with Cornell University on these new contaminants to try to understand the extent of their spread in the Hudson.



Juvenile Atlantic Sturgeon, NMFS Permit #16436-D1

Work began on the Community Risk and Resiliency Act (CRRA), which requires state agencies to consider future physical climate risks caused by storm surges, sea-level rise or flooding in certain permitting, funding, and regulatory decisions. Estuary Program staff are taking a central role in helping DEC develop green infrastructure, climate adaptation, and natural resource guidelines for the CRRA.

The year 2015 also marked the 25th anniversary of the Americans with Disabilities Act (ADA); fittingly, DEC announced a new initiative with the Office of State Parks and Historic Preservation (OPRHP) to assess all state-owned river access sites for accessibility to people of all abilities. We reported on the health of the estuary in the *2015 State of the Hudson*, and more than 300 people gathered at the Hudson River Summit in April 2015 to discuss progress and consider new ways to collaborate on conserving and restoring the Hudson River estuary. At the Summit, DEC announced the availability of \$1.5 million in Hudson River Estuary grants to help local partners protect water quality, stream habitat, and natural resources and to increase resiliency to flooding in the Hudson River watershed.

In partnership with Cornell University and the New England Interstate Water Pollution Control Commission, our staff provided training and technical assistance on climate resiliency for communities, which included instruction on dams and stream/road crossings, attended by transportation staff and highway personnel. We documented undersized culverts, prioritized wastewater facilities in need of repair along the estuary, and provided strategies to adapt to current and future flooding. We also published a guidebook titled *Creating a Natural Resources Inventory*, and provided training and technical assistance to local land-use decision-makers in the estuary watershed to help protect important forests and wetlands.

In an ongoing effort to nurture Hudson River stewards for the future, Estuary Program education staff continued to foster appreciation of nature and the outdoors among young people and the public through place-based programs and resources in Hudson Valley schools, and field programs such as Day in the Life of the Hudson River Estuary, the Great Hudson River Fish Count, and the Glass Eel Migration Project. This year, program staff collaborated with the Rensselaer Plateau Alliance and DEC Division of Lands and Forests to secure a U.S. Forest Service grant that awarded \$5.45 million to protect 12,348 acres of priority headwater forest on the Rensselaer Plateau.

Delivering on Statewide Priorities

Governor Andrew M. Cuomo has made a more resilient New York one of the highest priorities of his administration, directing investments to help coastal communities adapt to climate change, improve infrastructure for storm and flood risk, and restore protective natural features. Many of our programs have helped meet these goals through regional action. Waterfront Flooding Task Forces supported by DEC's Estuary Program and Scenic Hudson resulted in flood resilience plans adopted by local governments in



Catskill Village

(Photo: Jeff Anzevino)

Kingston, Catskill, Piermont, and Stony Point. We are continuing our work with these coastal communities this year, providing tools and technical assistance to help implement the recommendations.

DEC awarded \$1.1 million in Hudson River Estuary grants to help local partners protect water quality, stream habitat, and natural resources and to increase resiliency to flooding in the Hudson River watershed. We also continued our research to understand the response of fisheries and aquatic habitats of the Hudson River to extreme weather, and DEC worked to conserve lands likely to be inundated by sea-level rise.

In 2015, the Governor expanded *NY Open for Fishing and Hunting*, emphasizing a commitment to provide urban access and access for non-boating anglers and people with disabilities. We awarded an Estuary EJ Access Grant to the City of Kingston to construct a fishing pier on the Rondout for use by residents of inner-city neighborhoods, and announced an agreement with the Office of State Parks and Historic Preservation (OPRHP) to assess state river sites for accessibility.

The Governor also emphasizes the importance of forests to the health and economic well-being of New Yorkers. Sustainable forestry practices help create jobs, protect open space and habitat, reduce carbon emissions, and increase New York's resilience to climate change. This year, program staff wrote the successful US Fish and Wildlife grant that awarded \$5.85 million to protect 12,348 acres of priority headwater forest on the Rensselaer Plateau.

Collaborating with Other Agencies

A key element of our program is our collaboration with other state and federal agencies to carry out the important work of conservation and restoration of the Hudson River estuary. Highlights for 2015 include:

- **NYS Department of State (DOS), NYS Energy Research and Development Authority (NYSERDA) and the Hudson River Greenway (Greenway)** participated in many of our projects to assist waterfront communities in preparing for sea-level rise and flooding. DEC also worked with DOS on its resilience planning process under the Governor's New York Rising program.
- **NYS Office of Parks, Recreation, and Historic Preservation (OPRHP):** DEC and OPRHP are collaborating on an assessment of state sites for accessibility to people of all abilities, identifying infrastructure that needs improvement. We completed sustainable shoreline design projects at two state parks: Dockside in Cold Spring, and Nyack Beach.
- **Hudson River Valley Greenway:** DEC completed new public access and public amenities at the Nutten Hook Unique Area at Stockport Flats, the northernmost site of the Hudson River National Estuarine Research Reserve (HRNERR). An ADA-accessible path and kayak launch are soon to be completed. The site is the latest addition to the Hudson River Greenway Water Trail.
- **US Army Corps of Engineers:** Partners Restoring the Hudson, a collaboration of non-profit organizations in consultation with federal and state agencies, is working to create a federally recognized Hudson River Comprehensive Restoration Plan for the estuary from the Troy dam to the Tappan Zee. The group is helping DEC and the NYS Department of State (DOS) work with the Corps of Engineers to reactivate a dormant federal authorization for the restoration plan.
- **Hudson River Valley National Heritage Area (HRVNHA):** DEC and HRVNHA launched a partnership project with Landscape, an online conservation mapping partnership between the National Geographic Society and NatureServe, to host and share information about the scenic resources of the Hudson Valley.
- **US Geological Survey (USGS) and NYS Canal Corporation:** DEC partnered with other state, local, and federal agencies including USGS and the NYS Canal Corporation to install a real-time HRECOS water-quality monitoring station on the Mohawk River at Ilion, NY to provide data that will improve water quality.
- **Department of Health (DOH):** DEC continued to assist DOH and a variety of partners with Hudson River fish advisory outreach. DEC includes an order form for fish advisory publications with shipments of regulation guides. Arm-of-the-Sea Theater presented "Hook, Line & Sinker" during Science on the River on National Estuaries Day at the Norrie Point Environmental Center. The family-friendly performance about the Hudson River features large-scale masks and puppet characters and live music. The play celebrates the art of fishing, while offering advice about eating fish from the river.



Arm of the Sea Theater

Photo: Michael Nelson

- **National Park Service (NPS), DOS, NY Sea Grant, Greenway, OPRHP, Cornell Employment and Disabilities Institute (EDI)** and other partners participated in a DEC-organized workshop, “Access for Everyone,” to discuss initiatives to improve access to the estuary for people with disabilities. New York Sea Grant, in collaboration with Cornell University’s Industrial and Labor Relations (ILR) School, continued to track progress on the Hudson Estuary Accessibility Project, evaluating improvements made to access sites and identifying future needs of site managers.
- **The NYS Interagency Climate Adaptation Work Group**, facilitated by our program staff, coordinates 13 state agencies—the Environmental Facilities Corporation, NYS Department of Public Service, State University of New York, NYS Department of Agriculture & Markets, Dormitory Authority of New York, DEC, NYSERDA, DOS, DOT, DOH, NYS Office of the Attorney General, NYS Department of Homeland Security and Emergency Services, and the Port Authority of NY and NJ—to develop informational tools and guidance for community vulnerability assessments and adaptation planning.

Partnerships and Progress to Achieve *Action Agenda* Priorities

The year 2015 was notable not only for our accomplishments in advancing the region’s ability to prepare for and be resilient to extreme weather on the estuary and in the watershed, but also for advancing the other goals of the *Hudson River Estuary Action Agenda* through many partnerships. Below are a few highlights.

Clean Water

- **Protection of Water Sources:** In cooperation with DEC, the Hudson Valley Regional Council held two workshops for local planners, planning boards, conservation advisory councils, watershed groups, and other stakeholders on regulatory and non-regulatory options to protect drinking water sources, and on sustaining water resources in watersheds. They produced the guidance manual *Strategies for Sustainable Tributaries* and five fact sheets on water resource policies.
- **Swimmable Water Quality:** In 2015, we completed our wastewater treatment plant analysis, identifying and prioritizing facilities along the estuary most in need of repair and asset management planning. The wastewater infrastructure database is key to evaluating facilities for DEC’s asset management pilot program, which will improve or repair operating systems to reduce sewage contamination, support recreational uses, and protect public health and drinking water sources.
- **Sewer Overflow Control Plans:** Long-term control plans are developed or are in the process of being developed for New York City and all Hudson River communities with combined sewer overflows (CSOs). We are emphasizing green infrastructure planning and implementation to alleviate the impacts of CSOs and sanitary sewer overflows in our communities. The City of Yonkers, Siena College, and the Albany Water Board received funding for green infrastructure planning projects to reduce CSOs in Yonkers and Albany.
- **Watershed Management:** We identified and mapped high-quality Hudson River tributary streams to establish their importance for protection and watershed management. In 2015, many new watershed groups formed or were re-established: the Wallkill River Watershed Alliance, the Pocantico River Watershed Alliance, the Saw Kill Watershed Community, and the Catskill Creek Watershed Awareness Project. Riverkeeper, the Hudson River Valley Watershed Alliance and several of the new watershed groups continued to monitor recreation-related parameters in both the Hudson and its tributaries and to identify sources of pathogens in the Hudson and at the small watershed and stream-reach scale. DEC is using this data to identify and remediate sewage discharges.



Sleepy Hollow Beach

(Photo: Tracy Brown)

Resilient Communities

- **River Shoreline Flood Resiliency Plans:** The City of Kingston, the Villages of Catskill and Stony Point, and the Town of Piermont are implementing the recommendations of their Waterfront Flooding Task Forces, including revising land-use policies, reviewing wastewater infrastructure needs, and updating Comprehensive Emergency Management Plans, Local Waterfront Resilience Plans, and Brownfield Opportunity Area Plans. The waterfront task forces are led by Scenic Hudson and the Consensus Building Institute who are working with us to help these communities identify and apply for funding from federal and state programs. The Village of Catskill completed a Resilient Waterfront Design Studio with assistance from Cornell University landscape architecture students who developed designs that incorporated the needs of pending revitalization projects.
- **Restoration Plan Outreach:** The Nature Conservancy, Historic Hudson River Towns, the Hudson River Watershed Alliance and Scenic Hudson, with DEC support, collaborated on community workshops to gather project ideas for the Hudson River Comprehensive Restoration Plan.

- **Community Risk and Resiliency Act:** We are helping the Office of Climate Change, DOS, OPRHP, and DOT develop permitting guidance and strategies to reduce risk of flooding and prepare for sea-level rise using natural and nature-based features. We are all assisting in developing model local laws to protect and conserve floodplains, wetlands, and habitats.

- **Real-time Monitoring of Water Quality:** A new, real-time Hudson River Environmental Conditions Observing System water-quality monitoring station was built on the Mohawk River at Ilion, NY through a partnership with other state, local, and federal agencies.

DEC will use the station's data

to assess the effectiveness of CSO Long-term Control Plans (LTCP) and to develop a Total Maximum Daily Load (TMDL) for the Mohawk River. Improved water quality is a key goal of the Mohawk River Basin Program.

- **Right-sizing of Culverts:** DEC awarded three Hudson River Estuary grants totaling \$380,000 for culvert replacement projects to help restore aquatic habitat in tributary streams of the Hudson River estuary, reduce localized flooding, and improve water quality. More than 1,500 stream/road crossings in the Hudson River estuary watershed below the Troy dam have been assessed for their ability to pass flood flows and risk of failure. Several municipalities have used this information to prioritize and replace undersized flood-prone culverts and bridges, using habitat-friendly, flood-resilient approaches that restore natural stream flows and stream bottom conditions.
- **Trees for Tribs:** We helped DEC expand Trees for Tribs statewide, planting over 6,500 plants in seven major watersheds and establishing new partnerships in the Susquehanna, Genesee, Bronx, and Housatonic watersheds. We also continued a multi-year restoration and education project along the Kaaterskill Creek and created a tree maintenance guide and provided maintenance training to improve the success of projects to protect Hudson tributary streams.



Climate Adaptation Design in Catskill

(Photo: Libby Zemaitis)

- **Climate Smart Communities:** Sixty Hudson River estuary municipalities are now Climate Smart Communities, and 25% of those have implemented an adaptation strategy found in the Certification Manual, including actions to conserve their floodplains, shorelines, and/or stream flows.
- **Municipal Conservation Assistance:** We provided tools, training, technical and financial assistance to local land-use decision-makers in 132 of the 260 municipalities in the estuary watershed to help protect important forests and wetlands in Greene, Columbia, Ulster, Orange, Rockland, and Westchester counties. Program staff wrote the successful US Fish and Wildlife grant that awarded \$5.85 million that will protect 12,348 acres of forest on the Rensselaer Plateau and published *Creating a Natural Resource Inventory* to help communities improve natural resource-based planning, including habitat and open space inventories and plans.

Vital Estuary Ecosystem

- **Sustainable Shorelines:** Sustainable shoreline demonstration project designs were completed for projects on State Park lands in Cold Spring and Nyack, and one has begun for the Ferry Landing site at Nutten Hook in Stockport Flats in the Town of Stuyvesant. With the Cary Institute for Ecosystem Studies, we published the handbook *Managing Shore Zones for Ecological Benefit* to help educate shoreline designers and managers about best practices for the use of nature-based and natural features for shoreline stabilization.
- **Habitat Restoration:** DEC is working with the New York State Thruway Authority (NYSTA) on the feasibility and engineering of a side-channel restoration at Gay's Point in Columbia County, a first-of-its kind restoration of fish spawning, forage, and refuge habitat in the upper Hudson River estuary. Other projects include oyster reef restoration and tidal marsh management planning in Haverstraw Bay.
- **Habitat Enhancement:** The Hudson River National Estuarine Research Reserve (HRNERR) also designed, constructed, and installed experimental fish habitat-enhancement devices on a steel bulkhead in Rhinecliff, NY. The devices are designed to withstand high waves and strong currents and provide refuge for small fish, while allowing use of the bulkhead as a stage for commercial and private vessels. DEC staff and researchers from the Cary Institute monitored the experiment.
- **Aquatic Invasive Species (AIS):** Although the invasive aquatic plant *Hydrilla* has become established in the Croton River, Croton Bay, and Croton Reservoir, no *Hydrilla* was found at other locations of the Hudson River estuary during an extensive survey. This is good news and may indicate there is a chance to eradicate it from the system before it becomes widespread in the estuary.
- **Submerged Aquatic Vegetation (SAV):** Volunteers documented a recovery in SAV cover since its near-complete disappearance in 2011 following Tropical Storms Irene and Lee. With 190 observations from 13 sites throughout the estuary, the percentage of points where SAV was positively identified was roughly double what had been seen in 2014 and 2013. Grants from the Hudson River Foundation will help assess the potential for SAV restoration.



Valesinaria for SAV restoration project

(Photo: Steve Stanne)

Estuary Fish, Wildlife and Habitats

- **Striped Bass:** A coast-wide stock assessment by the Atlantic States Marine Fisheries Commission resulted in a mandated coast-wide 25% reduction in harvest. In spring 2015, striped bass regulations in the Hudson were changed for the first time since 1987. Preliminary data from the annual juvenile abundance survey for striped bass show 2015 young-of-year production to be slightly above the historical average, ranking 14th in 31 years of the survey. The survey occurs in the lower, brackish portion of the Hudson River—the preferred habitat for young-of-year striped bass. The year 2015 was the second consecutive year above the historical average, a result that has not occurred since the 1993 and 1994 seasons.



- **Atlantic Sturgeon:** In 2015, we conducted the annual juvenile abundance survey for Atlantic sturgeon, the only one conducted on the East Coast. The crew captured a total of 551 Atlantic sturgeon, the most ever captured during surveying. It has been 19 years since the harvest moratorium was established in 1996. These juvenile fish may be the offspring of the protected-year classes and may indicate the beginning of recovery in the Hudson.
- **American Shad:** Since the 2010 closure of the recreational and commercial fishery, the Hudson River stock is showing minimal signs of recovery. However, the preliminary 2015 relative index value (young-of-year American shad per seine haul) was the second highest since 2005, and the third highest since the stock collapsed in 2002. Though these are promising results, for perspective, the pre-collapse mean (1980-2001) was 24.1 young-of-year American shad per seine haul, while 2014 and 2015 values were 14.1 and 6.1. Analysis of American shad sonic-tagged data from 2009-2012 showed that some fish make long migrations north and south while in the river. Prior to this study, biologists thought that once fish moved into the river and to the “spawning area,” they stayed in the vicinity, spawned and then left.
- **River Herring:** Research from the 2013 sonic tagging of alewives and blueback herring showed variable results. The 2015 index value for alewives was the eighth highest in the 36 years of the survey; however, the index value for blueback herring ranked 29th, which is a concern. We added a digital video camera and PIT tag array to the fish counter installed in Black Creek to better track fish movement. PIT tags give each fish a unique number and help to determine whether fish move through the counter multiple times.
- **Habitat Use:** In 2015, DEC continued to make progress on characterizing the bottom of the Hudson River, understanding where fish spend time in the river and exploring linkages between fish locations and habitat types. Progress was also made on four sonic tagging projects to determine habitat use: adult sturgeon analysis, American shad analysis, striped bass tagging and tracking, and largemouth bass tagging and tracking.
- **Habitat Restoration Plan:** We completed and released the *Hudson River Estuary Habitat Restoration Plan*, which is now the foundation of restoration efforts currently underway in the estuary. The plan provides a roadmap for restoring tidal shorelines and shallows and for taking action to facilitate fish passage up the Hudson’s tributaries.
- **Conserving Habitat Corridors:** We wrote the successful \$5.85 million US Forest Service grant that will protect 12,348 acres on the Rensselaer Plateau.

Natural Scenery



Cornwall Bay from Storm King Mountain

(Photo: Steve Stanne)

- **Conservation of scenic vistas:** State and conservation partners protected 7,000 acres of important open space lands within the watershed below the Troy dam.
- **Local scenic resources:** We partnered with the Hudson River Valley Greenway and five land trusts (Rensselaer Land Trust, Columbia Land Conservancy, Walkkill Valley Land Trust, Winnakee Land Trust, and Orange County Land Trust) to help identify, prioritize, and conserve local scenic resources that are critical to the vistas and viewsheds of the Hudson Valley.
- **Online access to information about scenic resources:** More than 1,500 vistas, trails, and parks that have been identified as having scenic value are accessible online through Landscape (www.landscape.org/new-york) and the Hudson Valley Natural Resource Mapper (<http://hudson.dnr.cals.cornell.edu/mapper/>). DEC is creating a web mapper in 2016.

Education, River Access, Recreation and Inspiration

- **Day in the Life of the Hudson River Estuary:** The 13th Day in the Life of the Hudson was the biggest to date. With the help of 43 partners, 5,146 participants from 109 schools and education institutions analyzed water chemistry, measured tides and currents, and caught and identified fish at 81 sites from New York Harbor to the Mohawk River. Teacher training workshops preceded the event, and data collected by students during the day were made available to teachers and students for analysis in the classroom.



- **Glass Eel Migration Study:** This spring more than 500 volunteers helped scientists and educators catch, count, and release over 49,000 juvenile American eels at ten sites from Staten Island to near Albany. The tiny fish, known as “glass eels,” arrive each year on their journey from the Sargasso Sea to estuaries and watersheds along the entire East Coast. Drastic declines in eel numbers over the last few decades make outreach and monitoring essential for the conservation of this critical species. A variety of volunteers—high school students, college interns, community volunteers, families—strap on waders to check cone-shaped nets every day in April and May. The eels are released above dams, and the information is submitted to New York State to support national management efforts.

- **Recreation for All Abilities:** Adaptive fishing equipment was purchased in 2015 for use during free I Fish NY events at sites all along the estuary. The equipment includes right and left-handed “Strong Arm” rod holders and fishing pole holders for anglers who use wheelchairs.

- **River Access:** DEC announced an agreement with the Office of Parks, Recreation and Historic Preservation (OPRHP) at the April 2015 Hudson River Summit to work collectively on increasing access to the Hudson River, including access for underserved (EJ) communities and for people with disabilities. OPRHP began assessing state sites for accessibility and needed infrastructure improvements.



(Photo: Nancy Beard)

- **Improving Boating Access:** The Hudson River Maritime Museum repaired a section of its deep-water docks and installed a new, more accessible canoe, kayak, and rowing dock on the Rondout Creek in Kingston, with funding from a Hudson River Estuary Grant. The new dock significantly improves access to the Hudson for non-motorized boaters, particularly adult and senior rowers and paddlers, as well as high school rowers.



- **Marina Access:** In 2015, the DEC Dredge Team, working closely with the Hudson River Boat and Yacht Club Association (HRBYC), launched the Hudson River Dredge Bundling Project. This project seeks to combine, or “bundle,” several small marina dredging projects to share costs, achieve economies of scale, and facilitate efficient regulatory reviews and approvals. Five marinas located between Yonkers and Cold Spring are participating and are in the process of applying for dredging permits.

- **Hudson River Summit:** More than 300 people gathered at the Hudson River Summit in April 2015 to focus on building successful collaborations to implement the *Hudson River Estuary Action Agenda 2015-2020*. DEC and Historic Hudson River Towns hosted the conference.

2015 Summary by the Numbers

Building Local Ladders of Stewardship: Estuary Grants and Funds Leveraged

- Nearly **\$2,442,000** in funds were leveraged by our program to assist partner projects.
- **20** Estuary grants were made in 2015, totaling **\$1,087,409**, including projects that will help implement *Action Agenda* targets for tributary and stream restoration, improved stewardship of resources and access and education.
- **9** Estuary grants were completed in 2015, totaling **\$ 341,775**, including projects that help implement *Action Agenda* targets for biodiversity, watersheds, access, and education.
- **2** NEI RFPs were awarded in 2015: Hydrilla Monitoring in the Hudson River Watershed and Owner Outreach for Mitigation of Priority Hudson River Estuary Biologically Important Barriers.

Partnerships

15 state agencies and **6** federal agencies collaborate to achieve our goals.

- **12** research and academic institutions participate in Estuary Program projects.
- **58** school districts from NYC to Troy regularly participated in our programs in 2015.
- **14** tributary watershed groups work with us to achieve regional goals.
- More than **2,500** community organizations and volunteers have participated in our programs.

Action Agenda Benefits

Clean Water

- At least **350** volunteers donated **1,400** hours to the Hudson Estuary Trees for Tribes program, planting **3,212** trees and shrubs at 32 sites and restoring 10.5 acres along 1.3 miles of stream.
- Trained volunteer participants contributed **68** hours of monitoring at **40** Hudson River watershed sites as part of WAVE, a statewide citizen-science water-quality monitoring project.
- More than **7,000** visits were made to the Hudson River Environmental Conditions Observing System (HRECOS) homepage. The system now has **13** operational sites within the watershed from the Mohawk River to New York City.
- Upwards of **360** HRECOS volunteer hours were donated in 2015, including help to install the Ilion (Mohawk River) station, attend meetings and trainings, and maintain HRECOS stations throughout the year.
- More than **730** culverts were assessed for their capacity to pass flood flows in ten watersheds. Up to **170** biologically important dams and culverts were identified through partner-assisted projects aimed at mapping undersized and biologically important stream/road crossings. All these crossings have been entered into the North Atlantic Aquatic Connectivity Consortium's regional database and are now scored for their passability.
- **2** barrier removal projects have begun at the following sites: Klein Kill in Esopus, and the tributaries to the Roeliff Jansen Kill in Ancram.



Resilient Communities

- **60** Hudson Valley communities have signed the Climate Smart Pledge, with **5** new communities, (Town of Chatham, Village of Maybrook, City of Rye, Village of Wappingers Falls, Town of Wappinger) signing on in 2015.
- **7** Climate Action plans are complete, and 4 are in progress in the region.
- **25** Adaptation Actions (PE7) are complete, and 11 are in progress in the region.
- **4** Flood Task Force final recommendations have been completed, and 27 are in process or ongoing.
- **13** agencies participated on the Interagency Adaptation Working Group.
- More than **645** people were introduced to natural resource-based planning issues. We trained **305** local officials and other decision-makers on environmental review, field assessment, and the use of maps and conservation principles in land-use planning. We provided in-depth assistance or funding to **15** municipalities for natural resource and open space inventory projects, and **3** new practices, plans, or policies were drafted that will conserve priority lands and waters to benefit people and the estuary.



Vital Estuary Ecosystem

- The Upper Hudson PCB project was completed in 2015. As many as **2.75** million cubic yards of PCB-contaminated sediments, containing an estimated **300,000** pounds (**150** tons) of PCBs, were removed from the upper Hudson between Fort Edward and Troy by General Electric.
- Submerged Aquatic Vegetation (SAV) monitoring volunteers documented a recovery in SAV cover since its near-complete disappearance in 2011 following Tropical Storms Irene and Lee. With **190** observations from **13** sites throughout the estuary, the percentage of points where SAV was positively identified was roughly double what had been seen in 2014 and 2013.
- **30** Hudson River Estuary Program and partner trainings provided more than **129.5** hours of science-based training and **3,882** contact hours to more than **746** municipal officials, members of watershed groups, agency staff, and conservation partners on topics related to climate change, sea-level rise, water resources, habitat conservation, and land-use and watershed planning. In addition, **78** presentations given by Estuary Program staff and partners reached **2,341** people.
- More than **20** municipalities received in-depth technical assistance to build capacity for science-based land use, resiliency, and watershed planning.

Estuary Fish, Wildlife, and Habitats

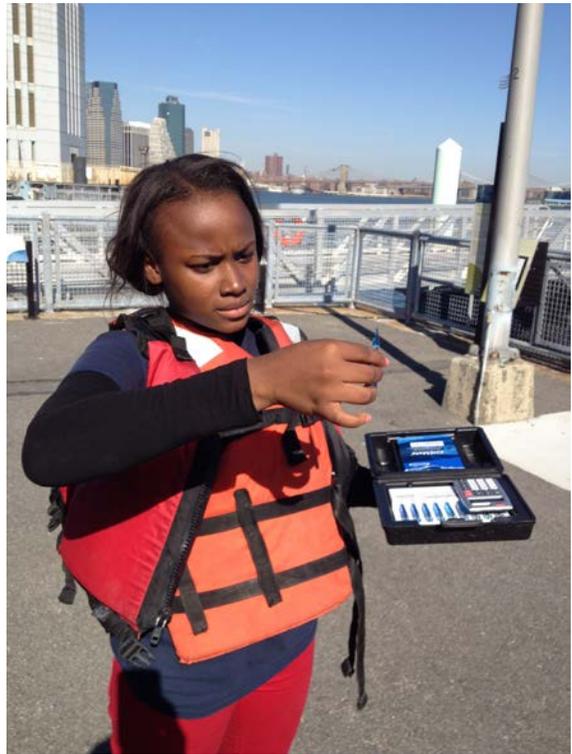
- More than **550** juvenile Atlantic sturgeon were captured in the annual juvenile abundance survey, the highest number of Atlantic sturgeon in the 10-year history of the survey.
- Upwards of **215** people signed up for the volunteer Cooperative Angler Program, an increase of **317.6%** (68 people) over the 2014 season.

Natural Scenery

- **7,000** acres of open space lands were conserved by the state and conservation partners within the estuary watershed working toward our *Action Agenda* conservation goals.
- **1,500** acres on or along the shores of the estuary were conserved by the state working toward our *Action Agenda* conservation goals.

Education, River Access, Recreation and Inspiration

- More than **90,500** downloads of Hudson River lesson plans were recorded in 2015 from our website.
- Upwards of **13,000** people (including **8,881** students) attended educational programs of the Estuary Program and HRNERR to learn about the ecosystem.
- Four major river-related partnership events reached more than **55,456** people, including:
 - **130** educators through Teaching the Hudson Valley (July)
 - **180** people through Science on the River Day (September)
 - **5,146** people at **81** sites through Day in the Life of the River (October)
 - **50,000** participants in 220 Hudson River Ramble events hosted by **150** partner organizations. These events included **30** estuary-themed attractions.
- More than **1,046** volunteers contributed over **3,599** volunteer hours while participating in citizen science and stewardship programs at more than **84** sites. These programs included monitoring for migrating eels and amphibians, submerged aquatic vegetation, and water quality. More than **26** sites, including forests, wetlands, riparian buffers, stream sites and Trees for Tribes, were monitored by volunteer professionals.
- Upwards of **49,450** young-of-the-year glass eels were caught and released by **522** volunteer citizens and students from over **36** organizations following ASMFC protocols. Approximately **1,752** people learned about eels in the classroom and other group presentations.
- Nearly **9,700** *Hudson River Almanac* subscribers received the e-Almanac in 2015.
- **25** *Hudson RiverNet* issues released in 2015 reached **8,988** subscribers.
- More than **50** research project publications, reports, and database updates to the Web were produced in 2015, including:
 - *The State of the Hudson 2015*. Hudson River Estuary Program/DEC and NYS Water Resources Institute/Cornell University. Steve Stanne, lead writer and project manager. April 2015.
 - *Creating a Natural Resources Inventory: A Guide for Communities in the Hudson River Estuary Watershed*. Department of Natural Resources, Cornell University, and New York State. Department of Environmental Conservation, Hudson River Estuary Program. Ithaca, NY 102 pp. Haeckel, I. and L. Heady. 2014.
 - *New Hudson River Estuary Natural Resources Mapper* <http://hudson.dnr.cals.cornell.edu/mapper/>
 - “Mapping the Migration of American Eels,” Chris Bowser and Rebecca Houser, *Currents: The Journal of Marine Education*, Fall 2015.
 - *How’s the Water? 2015 Fecal Contamination in the Hudson River and Its Tributaries*. http://www.riverkeeper.org/wp-content/uploads/2015/06/Riverkeeper_WQReport_2015_Final.pdf (Monitoring and report funded by NEIWPC and Estuary Grants) Riverkeeper. 2015.
 - *Building Local Capacity for Conservation and Land-Use Planning in the Hudson Valley: Evaluation of the Hudson River Estuary Program’s Biodiversity Outreach Program*. Human Dimensions Research Unit Publ. Series 15-8. Dept. of Nat. Resources, Coll. Agric. and Life Sci., Cornell Univ., Ithaca, NY. 191 pp. Allred, S., Stedman, R., Tse, C. and M. Mullen. 2015.



(Photo: Chris Bowser)

Hudson River Estuary Management Advisory Committee Members and Ex-officios

HREMAC Members

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HREMAC Ex-officios

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| <ul style="list-style-type: none"> • Tom Baudanza NYC Department of Environmental Protection • Peter Brandt US Environmental Protection Agency • Diana Carter NYS Office of Parks, Recreation and Historic Preservation | <ul style="list-style-type: none"> • Mark Castiglione Hudson River Valley Greenway • Noreen Doyle Hudson River Park Trust • Jamie Ethier NYS Department of State • Nordica Holochuck NY Sea Grant | <ul style="list-style-type: none"> • Regina Keenan NYS Department of Health • Rob Pirani NY-NJ Harbor and Estuary Program • Peter Weppler U.S. Army Corps of Engineers |
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