

Hudson River Estuary Program Annual Report

April 1, 2008 - March 30, 2009

Background

The Hudson River Estuary Program is a unique regional partnership leading the restoration of the Hudson through implementation of the Hudson River Estuary Action Agenda. Founded on the principles of ecosystem-based management and implemented in ways that benefit both nature and Hudson Valley residents, the mission of the program is to:

conserve the natural resources for which the Hudson is legendary, promote full public use and enjoyment of the river and clean up the pollution that affects our ability to use and enjoy it.

The Hudson River Estuary Program was established in 1987 in response to passage of Section 11-0306 of the Environmental Conservation Law, known as the Hudson River Estuary Management Act. Acknowledging, "...that the Hudson River estuary is a distinct and valuable ecosystem...and that its management as a distinct ecosystem is essential to the well-being of the people of the state," this act directed the Department of Environmental Conservation (DEC) to develop a comprehensive program for the estuary from the Troy dam south to the Verrazano Narrows, including the river's tidal tributaries and shorelands.

Now entering its 22nd year, the Hudson River Estuary Program has been recognized as a model for its comprehensive watershed approach, and has become DEC's blueprint for implementing ecosystem-based management not only in the Hudson River Valley, but for other regions of the state as well. The program continues to earn its reputation as an active program that delivers a regionally focused, partnership-based approach to resource management that is based on sound science, adaptive response, local capacity building, and a commitment to accountability by tracking progress and maintaining clear goals for the future.

This report highlights some of the more significant challenges and changes seen in the estuary and throughout the Valley over the past year and provides a summary of the status of our work on the *Hudson River Estuary Action Agenda's* 12 goals. During 2008, the Estuary Program made significant progress in meeting its objectives, framed as "how much- by when" targets. Program staff continued to be engaged in a variety of activities to be completed by the end of 2009 in celebration of the Hudson-Fulton-Champlain Quadricentennial, as well as initiatives designed to meet the program's long-term goals set for 2020.

The Estuary Program is headquartered in DEC's Region 3 Office, New Paltz, NY and is administered by the Hudson River Estuary Coordinator.

A. Observed Changes in the River and on the Land

Water Quality

Basic water quality in the river remained steady in 2008, supporting the ecosystem and meeting water quality standards for a variety of human uses. In general, water quality is very good for most of the estuary except after rainfall, when combined sewer systems overflow. Pathogens remain a problem in the Capital region for the increasing use of the Hudson River for water contact recreation. Sewer facility upgrades and disinfection projects funded in recent years are slowly coming on line and will be delivering improvements to this area. Downriver, there were a few incidents of raw sewage discharge from failures at the regional sewage treatment facility in Yonkers this year. These were quickly brought under control. Our ability to monitor localized conditions on a more frequent basis has improved, with actions taken in 2008 by both the state and partner organizations. As a result, pollution control is expected to become more nuanced in the future. Although the Hudson receives heavy loads of nitrogen from sewage treatment plants and from run-off throughout the watershed, turbidity in the river prevents this pollution from causing problems such as algae blooms that might affect oxygen levels.

Chemical contaminants such as PCB, DDT and dioxin remain virtually unchanged in river sediments this year, a legacy of pollution discharges that were banned after the mid 1970s. The planned pilot project to remove PCBs on the upper Hudson will start in 2009 and is expected to result in long-term reductions in PCB in the estuary. Atmospheric mercury is now known to be a problem.

Water quality in our streams has been exhibiting a gradual decline in many high-quality streams, while showing a bit of improvement in our most degraded streams. High-quality stream degradation is likely due to nonpoint-source stormwater impacts, as well as possible aging infrastructure. Improvement of low-quality streams is likely due to upgrades in wastewater treatment facilities.

Living Resources

In response to coast-wide recovery efforts in the 1980s and on-going fine tuning of fishing regulations, the striped bass population remains robust in the Hudson. A moratorium on fishing for Atlantic sturgeon, imposed in the Hudson in 1996 and coast-wide in 1998, appears to have halted the decline of sturgeon in the Hudson. Because this fish has such a long life cycle, the first step toward recovery is expected to take at least 40 years. It is now ten years since the moratorium was imposed, and the population in the estuary appears to be showing signs of recovery. The juvenile index has doubled since

the baseline years of 1990-1996. Over 100 adult sturgeon were caught and tagged this year, the most that have been caught in a single spring on the estuary since periodic monitoring began in 2006.

The Hudson's American shad stock plummeted to a historically low level in 2002 which continues to the present. In 2008, DEC's Hudson River Fisheries Unit recorded the lowest number of juvenile shad since it began monitoring in 1980. Mortality on adults remains high, although directed river and ocean fisheries were reduced. Further research is needed to understand why the stock remains depressed. Ocean by-catch (or incidental catch) of shad in fisheries directed at other species may be contributing to the decline. For young larval shad, food items are scarce, down 50%, as the result of zebra mussel filtration, according to our research partners at the Cary Institute of Ecosystem Studies. Now fully established in the estuary, Zebra mussels arrived in this ecosystem in 1991 and now consume significant amounts of phytoplankton (microscopic floating plants) which greatly reduces zooplankton (microscopic floating animals) as an available food source for fish.

River herring stocks in the estuary also appear to be at risk. From 2000 to the present, fishery monitoring and report data indicate a decline; fishing effort is increasing while catch has decreased. Juvenile indices for both species (alewife and blueback herring) are erratic. It is thought that herring, like shad, may be affected by ocean by-catch and by zebra mussels reducing larval fish food.

Similarly, American eel apparently continue to be greatly reduced from former levels. The cause is a matter of speculation at this time but may be a factor of over-fishing, loss of tributary habitat, or changes in the ocean due to warming temperatures.

Relative abundance of blue crab is lower than has been observed in the last four years. It is not clear what is driving the change.

In 2008 research partners at the State University of New York at Stony Brook have found that oysters are growing and surviving well when placed in cages in a number of localities in Haverstraw Bay. In all but one of the five localities they investigated, oyster larvae settled from the plankton, and juvenile oysters were found cemented to shells held in settling bags of oyster shell. These larvae likely came from living natural oyster populations nearby.

Habitat

DEC's marine biologists and partners began monitoring submerged aquatic vegetation (SAV) in 1995. A 2002 inventory showed a smaller acreage of water celery. A third inventory was underway this year, which will provide new information about SAV trends. Possible loss of SAV is a concern due to its importance in supporting food webs and oxygen production in the ecosystem. Results from the third inventory are anticipated

in 2009. A sixth year of SAV volunteer monitoring took place, with 18 volunteer monitors spending 125 hours visiting 19 sites to collect data.

Shorelines became the focus of a new research program exploring the functions of several different natural and engineered shoreline types. This information will be used to inform shoreline management and sea level rise adaptation planning.

In 2008, research partners at Cornell University completed their report on the status of birds on the landscape and in the watershed. Overall, wetland, forest, and shrubland bird species richness has declined from 1985-2005, which may be attributed to increases in urban land cover and fragmentation of remaining habitats over the same time period. Across the entire region, urban area increased about 1% per year, and 52% of Hudson Valley towns north of the New York City metro area showed increases in urban land cover.

The effect of climate change on plants and animals has been documented along with changing weather patterns at the Mohonk Preserve. Records at the Preserve show that spring is arriving earlier, summers are growing hotter and longer, and winters have become warmer. In response, some spring flowers are blooming earlier and some birds are migrating further north and arriving earlier than they did in the 1930s. Researchers working at DEC, the NYS Biodiversity Research Institute, and the Black Rock Forest Consortium are concerned about increasing levels of mercury found in area wildlife and trends of decline in oak forests. DEC has documented serious declines in bat populations over the last several years, and declining amphibian diversity continues to be a major concern for this region - a response to loss of woodland pool habitats and habitat fragmentation.

Invasive and exotic species

The year 2008 saw the introduction of Northern Snakehead fish into the Hudson River watershed and the emergence of Chinese mitten crabs as a pervasive invader of the estuary and tributary streams. Snakeheads were found in the Wallkill River drainage basin and were most likely released into the environment from animals purchased in the marketplace. An aggressive competitor, it could change the species composition of the watershed and spread to other water bodies, if it becomes established. DEC mounted an eradication program which is thought to have been successful, however it was clear that breeding populations of this fish had been established.

In 2008, Chinese mitten crabs, initially discovered in late 2007 in the estuary, were found in many tributaries; the known range now extends from the Sparkill Creek (Piermont Marsh (rm 25) up to Albany (rm 139). This species is too widespread to be eradicated. Because of its diet and burrowing habits, changes to the ecology of tidal habitats and tributary streams are expected.

Zebra mussels, introduced to the Hudson in 1991, are now widespread and appear to be a food source for blue crab and freshwater drum, a fish which is appearing in the river in small numbers in recent years. The effect of Zebra mussels on the food web has been pervasive, affecting growth of small larval fish. Zebra mussels originated in Eastern Europe and came to the United States in ballast water via shipping on the St. Lawrence River. They most likely made it to the Hudson estuary in 1991 via an angler's boat. On land, mile-a-minute vine and other invasive plants continue to spread. Work continues to determine how the ecosystem is responding, and how these species introductions will affect our ability to meet ecological recovery targets.

B. 2008 Program Highlights

In May, Governor David Paterson announced enhanced action on two priorities from the Action Agenda – American shad recovery and the Hudson River Environmental Conditions Observing System (HRECOS). At the Governor's instruction, DEC will examine the myriad impacts on American shad both in the Hudson and in the ocean in order to determine the most effective means of halting further decline of the population. He endorsed an American Shad Recovery Plan that will take an ecosystem approach, looking at food webs, habitat and sources of mortality. In response, the Hudson River Foundation issued a 2008 call for proposals to support research related to the Recovery Plan to begin in 2009. The Governor's support for HRECOS will sustain a network of real-time sensors at seven stations on the estuary operated by academic and research partners.

For the 2009 Hudson-Fulton-Champlain Quadricentennial, Commissioner Grannis announced plans for "Legacy Projects" that will deliver lasting environmental improvements. DEC will focus on conserving land, improving water quality, and sustaining at-risk populations of fish such as American shad. While the state budget crisis puts a cloud over legacy program plans, many partners have offered to contribute their resources and expertise, allowing legacy planning for 2009 to continue.

The New York Ocean and Great Lakes Ecosystem Conservation Council convened this year to complete a report to the Governor and the Legislature that advances a statewide suite of actions taking an ecosystem-based management approach. The Hudson River Estuary Program was identified as a model for the development of regional programs in other locations around the state. Estuary Program staff and Hudson River Estuary Management Advisory Committee members (HREMAC) participated in discussions with the Council as it developed its report to the Governor and Legislature. The Council formed an Ocean Working Group that included representation from the Estuary Program and has recommended a comprehensive approach to ocean and estuary management.

The *2005-2009 Action Agenda* set deliberately ambitious goals and targets, making clear that the state could not meet the identified objectives alone. The *Action Agenda* establishes a shared vision and a framework for cooperation. It aims high. With help from

literally hundreds of partners, we now expect to meet many of our *Action Agenda* targets for 2009, and most projects are well underway. Notable exceptions are:

- a. expensive projects that currently exceed available funding, such as land acquisition, swimmable water quality, scenic studies, benthic and shallow water mapping and habitat assessment
- b. projects where external factors influence our success, primarily American shad recovery, where previously unknown causes of concern are now apparent.

This year a number of new reports and fact sheets were posted on our web site. We continue to build our network of partners who help us meet the goals and targets of the *2005-2009 Estuary Action Agenda*. The Estuary Grant Program celebrated its 10th year in 2008. It has funded hundred of projects throughout the Hudson Valley.

2008 Program Highlights by Goal

Goal 1 Signature Fisheries

In the face of a continuing American shad decline, DEC biologists worked with the Hudson River Estuary Management Advisory Committee (HREMAC) and the recreational and commercial fishing communities to design a program that reduces mortality on adults but maintains a minimal fishery. New regulations established a 3-day commercial fishing week (Sunday-Tuesday), prohibited commercial shad fishing north of the Rip Van Winkle Bridge in Catskill, and reduced the number of American shad that recreational anglers can keep from six down to one per day. In light of the continued, alarming decline of American shad, additional measures will be developed next year for implementation in 2010.

The Hudson River Fisheries Unit continued to monitor the numbers of juvenile sturgeon and track the movements of adult Atlantic sturgeon using a variety of sonic, satellite and external tags. New information, gained from partnerships with the Hudson River Foundation and the Pew Institute of Ocean Studies, shows that adult sturgeon move south when they leave the river, concentrating close to shore. Satellite tags recovered in 2008 show that fish from the Hudson moved into Chesapeake Bay and Delaware Bay with some going as far south as Georgia. One fish went as far north as Nova Scotia. Sonic-tagged fish led biologists to a previously unknown sturgeon spawning area near the mouth of Wappingers Creek.

In 2008, DEC piloted citizen monitoring of the arrival of glass eels and river herring (alewife and blueback herring). A new Atlantic States Marine Fisheries Commission (ASMFC) proposal for regulations to govern harvest of river herring went through public comment in 2008 and is likely to move forward in 2009.

Striped bass populations are stable. No new regulatory action was taken in 2008.

Goal 2 River and Shoreline Habitats

Marine biologists and partners continued to study functions of natural and engineered shoreline types, with the long-term goal of promoting engineering solutions that will sustain habitat values while also protecting human communities and infrastructure. In 2008, The Hudson River National Estuarine Research Reserve (HRNERR) received a major grant which will support further research on shoreline functions, sea level rise impacts, and comparative costs of different shoreline types as sea level rises. This project will culminate in the development of guidance for municipalities on the best shoreline treatments to use as sea level rises.

Progress was made on the estuary-wide mapping of estuary tidal wetlands and submerged aquatic vegetation, and detailed habitat community mapping of Hudson River Research Reserve sites, with services on all three projects provided by Cornell University. Detailed river bottom maps, developed in prior years in cooperation with the Lamont Doherty Earth Observatory of Columbia University, were used in 2008 to correlate the movements of tagged sturgeon to in-river habitat types.

A number of habitat restoration projects were underway in 2008. The third year of a pilot project was conducted to reduce Phragmites, an invasive wetland plant. The project to date has achieved a 95% reduction level in Tivoli North Bay using an approved herbicide. An experimental eel trap-and-pass device on the Saw Kill Creek was deployed for a third year. This cost-effective approach allows young eels, migrating from the Sargasso Sea, to navigate further upstream beyond stream barriers, such as dams, to desirable habitat areas. This method has proved to be successful and will be replicated at other sites in future years. In partnership with the Hudson River Natural Resource Damage Assessment Trustees (NRD), staff used new geographic information technologies to compare 1907 and 1911 US Army Corps of Engineers (ACOE) maps with current conditions in order to identify potential sites for restoration. DEC documented shallow braided-river channels and back water habitats that have been lost to past dredging and dredge-spoil deposition practices. In 2008, a request for proposals was developed by the NRD Unit to initiate a habitat restoration plan for the river in 2009.

The Hudson River Estuary Training Program, in partnership with a variety of organizations, provided training to nearly 750 people, who altogether, attended 5,378 hours of training in project design and evaluation, native plants, invasive plants, Chinese mitten crab science and management, ecosystem-based management, Hudson River ecology, and nuisance geese population stabilization.

Goal 3 Plants and Animals of the Hudson River Valley

In 2008, the Estuary Program launched a monitoring initiative with Cornell University that will regularly assess threats to biodiversity and the integrity and sustainability of ecological communities in the Hudson River estuary watershed. This program is being used as a pilot for the New York State comprehensive wildlife monitoring strategy, and builds on partnerships with national monitoring programs and citizen scientists. In addition, the Estuary Program is partnering with the NY Natural Heritage Program to identify and map habitat connections for 25 wildlife species in decline. The results of this study will be shared with municipalities to identify areas most vulnerable to wildlife loss from habitat fragmentation and climate change, and will inform regional open space planning. Estuary Program funds leveraged \$285,000 from the US Fish and Wildlife Service for these projects.

In 2008, the program continued to raise the capacity for municipalities to conserve their local natural resources. The program assisted over 25 municipalities with developing open space plans, watershed plans, and conservation ordinances. Our land-use and conservation training programs have now reached over 550 community leaders. In partnership with Hudsonia Ltd., three community groups mapped 9,000 acres of significant habitats in the Town of Hyde Park; the Towns of Berne and Knox; and the Towns of New Paltz and Lloyd, and the Village of New Paltz. Partnerships with Cornell University trained over 30 local planners in computer mapping techniques and over 35 local planners, landowners, and natural resource professionals to recognize and conserve woodland pool wetlands. More than 80 municipal leaders, developers, consultants, conservationists, landowners, and agency staff attended a biodiversity and smart growth conference in April, and more than 100 convened in October to explore the science and policy of protecting small wetlands. Estuary Program staff completed a new publication to help municipalities implement conservation planning called “Conserving Natural Areas and Wildlife in Your Community: Smart Growth Strategies for Protecting the Biological Diversity of New York’s Hudson Valley.”

With help from the Estuary Program and its partners, municipalities implemented significant new conservation programs in 2008. The Shawangunk Mountain Regional Partnership finalized its Regional Open Space Plan, which was unanimously approved by 11 participating municipalities. The Town of Clinton passed a zoning amendment to protect wetlands smaller than 12.4 acres, and draft Wetlands and Watercourse Protection Standards are under review by the Town of Woodstock. The Town of Coxsackie adopted a new Comprehensive Plan and the use of Natural Resource Protection Standards, and an inter-municipal Natural Resource Inventory was completed in the Towns of Montgomery and Wallkill. Orange County Water Authority drafted a Moodna Creek Watershed Conservation and Management Plan. Estuary staff contributed a great deal of time and effort to identify important habitats and landscape connections, provide technical assistance, and raise local capacity in support of these partnership programs.

Goal 4 Streams and Tributaries of the Hudson River Estuary Watershed

The Estuary Program, through its partnership with the Pace Land Use Law Center trained over 40 local leaders in land use and natural resource conservation this year. A volunteer stream monitoring program through Hudson Basin River Watch has resulted in approximately 50 sites being assessed for water quality conditions by local volunteers, students and municipal decision makers. Planning is underway to develop a model watershed program that will integrate conservation of ground water, surface water and source water to provide for the dual needs of the ecosystem and the human uses it supports. A stream barrier mitigation program is under development.

Watershed groups are actively planning and implementing watershed conservation projects in approximately 12 tributaries. Engaging over 750 volunteers on 50 projects, the Estuary Program's Trees for Tribs project has planted over 7,000 shrubs and trees on over 22,000 feet of streambank this past spring and fall. In partnership with the Hudson River Watershed Alliance, the Estuary Program facilitated a gathering of all the watershed conservation groups in the Hudson River watershed to document collective needs and celebrate our mutual progress of elevating watershed awareness. As evidence of the success of the Estuary Program's support to local watershed capacity-building, the Saw Mill River Coalition received a Targeted Watershed Grant from EPA for \$890,000. The Estuary Program has provided education for more than 30 local governments and watershed groups on local laws and techniques to reduce stormwater impacts on local water resources through low impact development, better site design, and floodplain management.

Goals 5 & 6 Land Acquisition and Scenic Resources

The NYS Department of Agriculture and Markets awarded 12 Municipal Agricultural and Farmland Protection Planning Grants in the Hudson Valley in 2008. DEC has conserved more than 860 acres along or in sight of the Hudson River. Since 1999, more than \$1.4 million dollars have been awarded in Estuary grant funds for the protection of habitat, scenic resources and open space.

This year the Estuary Program expanded GIS map coverage to include a data layer of the viewshed of the Hudson River. This can be combined with existing Scenic Areas of Statewide Significance data, to identify potentially valuable acquisition target areas. In addition, more comprehensive records of lands currently protected by both public and private conservation organizations are being gathered and entered into the GIS database. This will facilitate the analysis of sites which can help maintain habitat connectivity throughout the region.

Staff from DEC, NYS Office of Parks, Recreation and Historic Preservation (OPRHP), and NYS Office of General Services (OGS) have met several times with land trusts from the Hudson Valley to discuss future land conservation and stewardship efforts. DEC

submitted a grant application to the US Forest Service to conduct outreach to local governments in the lower Hudson Valley on forest stewardship.

Goal 7 Public Access

In 2008, DEC created access to the river in one of the few remaining communities that had none, the Town of Livingston, by purchasing a property which will be managed as state forest. This was the first step in meeting Commissioner Grannis' Quadricentennial Legacy goal for conserving shoreline property and creating river access.

This year, the Estuary Program also released a CD map of fishing access sites. Press coverage in the NY Post resulted in hundreds of requests for information. The Estuary Program launched an interagency review of deepwater docking needs and will partner with the NYS Department of State to address these needs. A fishing pier at Turkey Point, Ulster County, is being improved to provide access for the disabled, another DEC Quadricentennial Legacy Project.

Goal 8 Interpretation and Education

The number of schools using the Hudson for classroom study continues to increase as the Estuary Program provides more field experiences, teacher training programs, and curriculum materials. Lesson plans developed by the program and posted on our website in 2008 now allow teachers to use the river as a context to teach basic math, writing and social science skills in accordance with state learning standards. Lesson plans currently target grades 3-5 and convey basic information about the river from historic accounts, DEC monitoring programs and other sources. New lesson plans are continually being developed. Through the Estuarine Research Reserve, a hands-on science program for middle school, high school and post secondary school is also now available and was expanded in 2008. This year, the Cary Institute of Ecosystem Studies launched a web-based curriculum for high school classes developed with the support of an estuary grant. This resource enables students to investigate how the river responds to changes in the ecosystem over time, using actual field data from the river.

The annual Day in the Life of the River event, a field experience which coordinates student observations along the length of the estuary from Troy to New York City, was attended by nearly 2,700 students, from over 60 schools at more than 50 sites. This event brings students to the river and puts their local learning in the context of the entire estuary through web posting and discussion of results. The data students collect are used in their classrooms. Now in its sixth year, this event exposes teachers to the river, trains them in basic river assessment skills and helps students visualize what they learn in school.

For the new pilot citizen science program, designed to track glass eel migration into tributaries (see Goal 1), Estuary Program educators recruited and supervised high school students to conduct the monitoring and gain experience in actual scientific research in the field.

Through its partnership with Teaching the Hudson Valley, the Estuary Program reached 150 teachers attending the annual summer teacher institute with information on the history of the river environment and biodiversity. An additional 200 educators attended the Estuary Program's own training workshops.

The Norrie Point Environmental Center, in Dutchess County became the new headquarters of the Hudson River National Estuarine Research Reserve (HRNERR) in 2007, with renovated conference and classroom facilities. In 2008 the Reserve completed a laboratory renovation.

The *Hudson River Almanac*, an online journal of citizen observations, completed its fifteenth year as an ongoing source of natural history information and education to 2,000 subscribers in the Hudson River watershed.

Goal 9 Waterfront revitalization

In 2007, the Estuary Program updated the *Action Agenda* to add a new emphasis on urban greening. In partnership with DEC's Division of Lands and Forests and others, the Estuary Program secured a US Forest Service grant to launch a pilot green infrastructure project in New York City on Newtown Creek, focusing on the use of rain gardens, green roofs and other methods to capture stormwater before it enters storm sewers, as ways to reduce overflow problems. The NY-NJ Harbor Estuary Program helped bring in the state of New Jersey as a partner in this project. The Department of State announced 15 Local Waterfront Revitalization Program Environmental Protection Fund grants totaling \$3.8 million in 2008.

In 2008, the Hudson River Valley Greenway approved a new Greenway Compact Plan, Putnam County Pathways. The Greenway also designated 5 new public access kayak launch sites, allocated over \$63,000 for improved waterfront access or facilities, and deployed 65 custom kayak storage racks along the waterfront from Albany to New York City.

Goal 10 Water Quality for Swimming

In 2008, the Environmental Protection Fund legislative language for Water Quality Improvement Projects, was revised, which will enable swimmable water quality projects on the Hudson as well as green infrastructure projects in river cities to be eligible for funding. The Estuary Program collaborated with DEC's Division of Lands & Forests and Division of Water on a successful \$364,000 US Forest Service grant to design, install and develop local stewardship for green infrastructure in environmental justice communities in the New York City area, and transfer the tools developed to other urban areas.

The Estuary Program (through its annual pathogen monitoring program) and Division of Water reviewed the Capital District municipalities' 2008 pathogen modeling effort for combined storm sewers, wastewater treatment plants and the river. Generation of the pathogen model is required by the Clean Water Act for mitigation of combined sewage overflow (CSO) inputs. Upgrades at more than 40 wastewater treatment plants were underway during 2008 to institute effluent disinfection. Many of these will be completed in time for the 2009 swimming season.

Through a partnership with the Lower Hudson Coalition of Soil & Water Conservation Districts, the Estuary Program has supported technical assistance and training for the Stormwater Phase II program for ten counties in Hudson River estuary watershed. This program has also supported demonstration rain gardens in three counties and monitoring of "Greenstreets" in New York City to determine the effectiveness of these practices in reducing stormwater runoff.

Goal 11 Pollution Reduction

Under the direction of the NY-NJ Harbor Estuary Program, the assessment phase of the Contamination Assessment and Reduction Project (CARP) was completed, providing new insights, models, and tools for reducing pollutants throughout the estuary. A model is now available that can predict how different portions of the harbor will respond to remediation efforts. The model points to upper Hudson PCBs as the most significant contaminant source and the one most responsive to remediation. An interactive spreadsheet was created to assist managers in developing Total Maximum Daily Load (TMDL) requirements to reduce continuing sources of pollution. CARP also identified several tributaries to the Hudson that appear to be contributing greater amounts of sediments than previously thought. Monitoring stations are now in place on river tributaries, and DEC is seeking funds to begin the monitoring program and data analysis to confirm the sediment estimates and to continue to track the levels of contaminants being discharged to the system. CARP results are also being used to plan sediment remediation actions in connection with the comprehensive ecosystem restoration program for New York Harbor. The recently released Regional Sediment Management Plan for the NY-NJ Harbor Estuary Program recommends the further use of CARP information to implement many of its recommended actions.

Goal 12 Celebrate Progress and Partnerships

The Estuary Program completed its first full year of implementation of performance measures which track progress towards meeting the Program's goals and targets. We also celebrated Estuaries Day in September as co-sponsors of the Hudson River Valley Ramble, in partnership with the National Heritage Area.

Hudson River Estuary Advisory Committee

As part of our effort to create transparency and accountability for our program, we seek regular guidance and involvement from the Hudson River Estuary Management Advisory Committee (HREMAC), which serves as the Estuary Program's primary point of contact with the public. During 2008, the committee met three times, and provided specific comments on the development of proposed American shad regulations, and the development of the Ocean and Great Lakes Council's plans to further ecosystem-based management approaches for the State's coastal areas. Subcommittees of HREMAC met with program staff throughout the year to review our plans for each Action Agenda goal; they have been instrumental in developing a system of performance measures that are now being used to track progress on program targets.

The committee gained several new members: John Dorritie, Hudson Valley Marine Trades Assoc., Bernard Molloy, Historic Hudson River Towns, Jeff Rumpf, Hudson River Sloop Clearwater, Karl Schoeberl, Central Hudson Gas and Electric Corp. Two members resigned; Jeff Clock and Shannon M. LaFrance. Total membership during 2008 was 22.

The Hudson River Estuary Grants Program was initiated in 1999 and provides opportunities for implementing Action Agenda goals at the local level. Over the past nine years, \$11.5 million has been awarded in 342 grants. Announcement of the 2008 estuary grants was delayed due to the state's fiscal crisis.

Our monitoring of progress includes tracing trends in the ecosystem. The Hudson River National Estuarine Research Reserve (HRNERR) established two new high resolution weather and water quality monitoring stations at Tivoli Bays and Piermont Pier in 2008 and coordinated a collaborative partnership to establish HRECOS (see "Highlights" above). There are now seven HRECOS real-time monitoring stations up and running on a pilot basis with six organizations working in partnership with DEC. The HRECOS network now serves as a "backbone" for evaluating trends in environmental conditions in the river that can be related to Estuary Program progress. In addition, HRECOS is: adding to our understanding of extreme events in the Valley and their effects on the

estuary; providing a unique educational tool; extending the work of CARP and the Regional Sediment Management Plan; and providing real-time data to river users.

In 2008, in partnership with DEC Region 3 and the DEC Climate Policy Office, the Estuary Program assisted in developing guidance for local government on actions to take to mitigate and adapt to climate change. Hudson Valley Climate Network meetings provided a forum for coordination of climate action in the valley. DEC participated in the development of climate change scenarios in partnership with The Nature Conservancy's Rising Waters Project and provided significant assistance to help coordinate the efforts of the NYS Sea Level Rise Task Force, which will produce recommendations to the legislature to respond to sea level rise in New York by the end of 2009.

C. Planned and or anticipated regulatory policy changes

The Hudson River Estuary Management Act calls for DEC to report annually on planned and/or anticipated regulatory policy changes which may affect the Hudson River estuarine district. This report is regularly updated and can be found online at <http://www.dec.ny.gov/regulations/36816.html>

Conclusion

This was a year of ups and downs for the estuary ecosystem. Throughout, the Estuary Program's *Action Agenda* provided a platform for DEC and its many partners to take meaningful steps to meet long range goals and to adapt as conditions warrant. As evidenced by this report, the Estuary Program enabled us all to make significant progress in 2008.

In 2009, the process of updating the *Estuary Action Agenda* will produce a new program for 2010-2014. With climate change adding a new set of variables to the equation, the future recognition of ecological trends and our ability to respond adaptively, will become even more important as government and the public work together to insure the protection of the quality of life of Hudson River Valley communities, businesses, and citizens in a changing world.

**Hudson River Estuary Advisory Committee- Members and Ex-officios
March 2009**

Dennis Suszkowski, Committee Chair
Hudson River Foundation

Bill Emslie
Coastal Conservation

Judy Anderson
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Stuart Findlay
Cary Institute of Ecosystem Studies

Allan Beers
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Bob Gabrielson
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Andy Bicking
Scenic Hudson

Sara Griffen
OLANA Partnership

Bill Connors
Federation of Dutchess County Fish and
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Tom Lake
Naturalist/Educator

Gina D'Agrosa
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Chris Letts
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John Dorritie
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Eric Lind
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Bernard Molloy
Historic Hudson River Towns

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Hudson River Estuary Program <http://www.dec.ny.gov/lands/4920.html>

Hudson River Estuary Advisory Committee

<http://www.dec.ny.gov/about/46924.html>

Hudson River Events <http://www.dec.ny.gov/public/33037.html>