



# New York State Department of Environmental Conservation

Governor, Eliot Spitzer

Commissioner, Pete Grannis



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## Hudson River Estuary Program Annual Report

April 1, 2006 - March 30, 2007



**New York State  
Department of Environmental Conservation**

**Hudson River Estuary Program**

**Annual Report  
for the Period  
April 1, 2006 - March 30, 2007**



The Hudson River Estuary Program  
New York State  
Department of Environmental Conservation

Commissioner, Pete Grannis  
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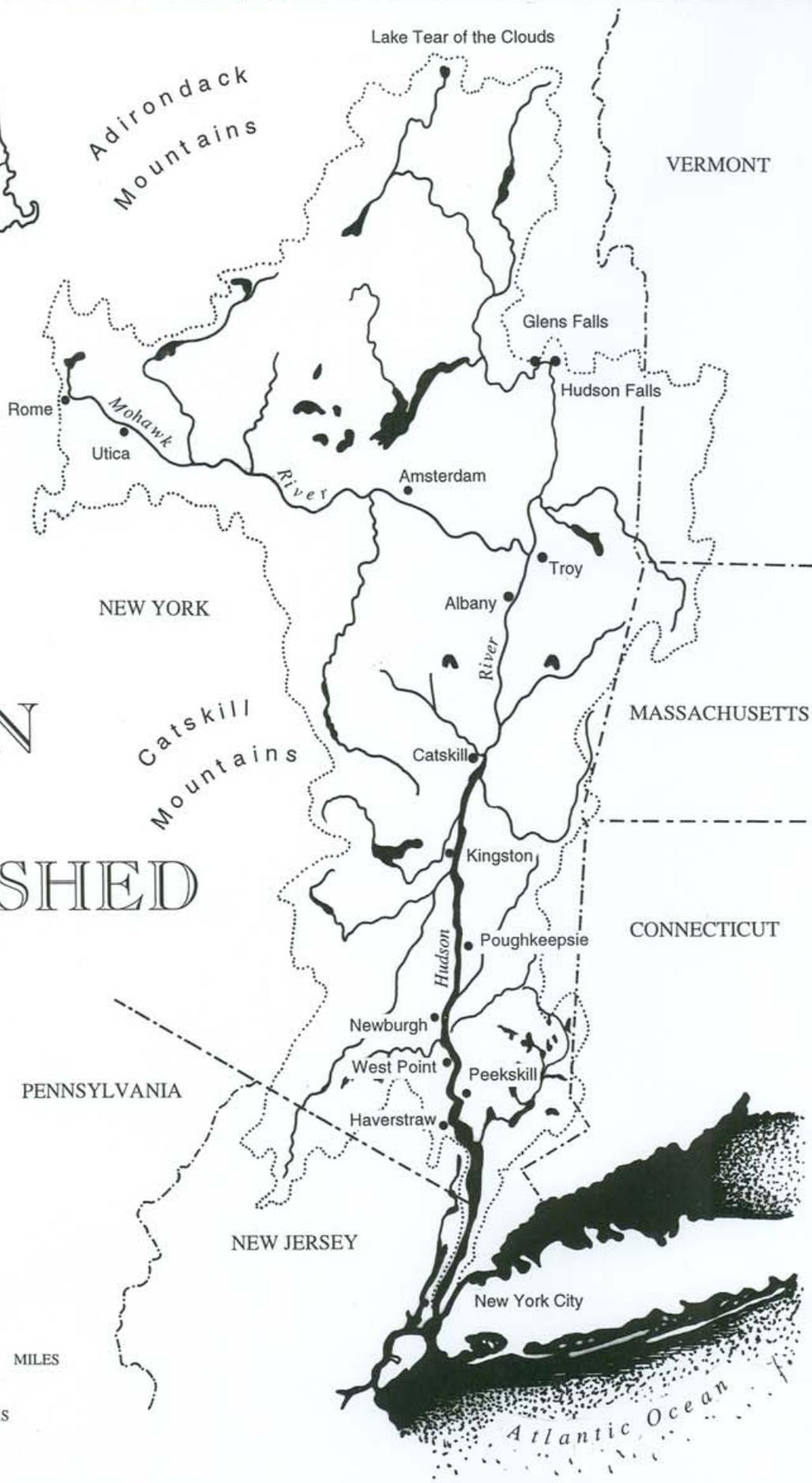
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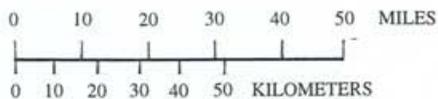
# THE HUDSON RIVER WATERSHED

Base from U.S. Geological Survey  
digital data 1:2,000,000, 1972



## KEY

- ..... Watershed Boundary
- State Boundary



**New York State**  
**Department of Environmental Conservation**  
**Hudson River Estuary Program**  
**April 1, 2006 - March 31, 2007**  
**Annual Report**

**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 management and implemented in ways that support the quality of life so valued by 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.*

Like so many of America's misused waterways, the rebirth of the Hudson River dates back to the 1960s when passage of the Clean Water Act and other federal and state programs started to turn around society's treatment of its natural resources and began to clean up the most blatant sources of pollution. Early environmental battles waged right here in the Hudson Valley over the protection of the estuary's indigenous fish populations and its world-renowned river scenery, laid the foundation for many of our current environmental quality laws.

During the 1970s, public concern for the stewardship of the estuary's fisheries led to the passage of the Hudson River Fisheries Management Act which, in turn, led to the 1987 passage of Section 11-0306 of the Environmental Conservation Law, known as the Hudson River Estuary Management Act. This act directed the Department of Environmental Conservation (DEC) to develop a Hudson River Estuary Program for the estuary from the Troy dam south to the Verrazano Narrows, including tidal portions of the river's tributaries.

Now entering its 20<sup>th</sup> year, the Hudson River Estuary Program has become DEC's blueprint for implementing ecosystem-based management actions along the estuary and for much of the Hudson River Valley. The program has a reputation for its ability to deliver a regionally focused, partnership-based approach to resource management built on sound science, adaptive practices and the involvement of a committed citizenry.

The Estuary Program actively seeks to engage many partners. State agencies involved in the program include:

- NYS Department of Environmental Conservation (DEC) as project manager
- NYS Office of Parks, Recreation and Historic Preservation (OPRHP)
- NYS Department of State (DOS)
- NYS Office of General Services (OGS)
- NYS Department of Transportation (DOT)
- Palisades Interstate Park Commission (PIPC)
- Empire State Development Corporation (ESDC)
- Hudson River Valley Greenway
- Metro-North Commuter Railroad

The Hudson River Foundation, New England Interstate Water Pollution Control Commission (NEIWPP), Cornell University, the Environmental Consortium of Higher Education and citizen members of the Hudson River Estuary Advisory Committee (HREMAC - Appendix A) are some of our many non-governmental partners.

Local governments throughout the valley and New Jersey also participate. Federal agencies that have a stake in the agenda and participate include:

- Environmental Protection Agency (EPA)
- Army Corps of Engineers (ACOE)
- Department of Commerce, including:
  - the National Oceanic and Atmospheric Administration (NOAA)
- Department of Interior (DOI), the US Fish and Wildlife Service (USFWS)
- American Heritage Rivers Program
- National Heritage Area Program

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

## **Ecosystem-Based Management in New York State**

From its inception, the Estuary Program has strived to recognize, "...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." The need to integrate the many regulatory and governmental components that comprise the management structure responsible for the estuary and its surrounding watershed has been a driving force in the development of the program's approach. Each time the Estuary Program has updated its action plans, it has been able to improve its ability to incorporate an holistic approach, embracing the major components of an ecosystem-based management approach including:

- Place-based focus
- Scientific foundation for decision-making
- Measurable objectives to direct and evaluate performance
- Adaptive management to respond to new knowledge
- Recognition of interconnections within and among ecosystems
- Involvement of stakeholders.

In December 2005, DEC released the *Hudson River Estuary Action Agenda 2005-2009*, which redefined the estuary program's focus under 12 goals and established measurable objectives or "targets" for each. At the same time, the NY-NJ Harbor Estuary Program (HEP) undertook a similar target-setting process for that state and federal initiative. By joining in goal-setting activities, the Estuary Program and HEP have initiated a new level of coordination, resulting in a compatible set of quantifiable targets for the entire length of the estuary. (HEP includes NJ and lower NY harbor [to the Bight] and extends north to Piermont. The Estuary Program extends from the Troy dam to the Verrazano Narrows.)

The Estuary Program has built a remarkable team for the Hudson River, expanding beyond its early focus on river issues and fisheries management to encompass issues that require a truly watershed approach. Through this approach, a shared vision for the river's future has emerged among a diverse array of constituencies including, local, state and federal agencies, regional planners, private businesses, not-for-profits, commercial and recreational anglers and the sporting community.

Many partners have adopted goals of the *Hudson River Estuary Action Agenda for 2005-2009* as their own, and we have fostered hundreds of cooperative projects to achieve these goals. Sustained funding for the program has made it possible to take full advantage of technological advances. Geographic information systems, digital signatures, radio tracking, side-scan sonar and other state-of-the-art equipment and techniques enable the application of scientific approaches that didn't exist 10-20 years ago. The results of this work can be made available to a much broader audience through the Internet.

This report provides a summary of the status of the Action Agenda's 12 goals and highlights the activities of the Estuary Program during the 2006-07 year. During this time, program staff engaged in a variety of activities to be completed by 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.

## **Status of the 12 Goals**

As the Estuary Program has evolved, three major strengths have emerged in areas where the program has been most effective. For the first time, the Estuary Program's overarching, estuary-wide approach to the region has enabled development of regional baseline data for the estuary, as well as for upland plant and animal resources throughout the watershed. In addition, the program's strategy to support implementation of Action Agenda goals at the local level has allowed counties, towns and villages in the Hudson River Valley to take ownership of their resources and help define the future of their communities. Finally, the Estuary Program has developed a sustainable approach to management that builds upon the strengths of the existing structure of government while forming partnerships that expand the reach of the program beyond conventional limitations. What was once a plan is now an active program--with measurable successes and clear goals for the future--implemented by many partners.

Each year, the Estuary Program makes significant progress in fulfilling its mission to protect, conserve and provide beneficial use of the estuary's resources. The following summarizes the goals of the *Hudson River Estuary Action Agenda*, highlighting activities undertaken during 2006-07.

# **Progress on Meeting the Goals of the Hudson River Estuary Action Agenda**

**Goal 1. Signature Fisheries:** Restore the **signature fisheries** of the estuary to their full potential, ensuring that future generations will have the opportunity to make a seasonal living from the Hudson's bounty, to fish for sport and consume their catch without concern for their health.

**Summary:** Through the Estuary Program, DEC has been able to expand its research on the river's signature fish stocks as well as study blue crab for the first time. While striped bass are at a hundred-year high due to state and interstate actions, American shad and Atlantic sturgeon have been in a long-term decline. Herring and eels appear to be decreasing. While continuing long-term monitoring of striped bass and shad, the agency has developed new studies to better understand the natural history of Atlantic sturgeon and the blue crab, one of the last remaining commercial fisheries in the river. Using state-of-the-art technology, and support from research partners, DEC biologists are beginning to learn where sturgeon go in the Hudson and what types of habitat they prefer. Surveys of shad and striped bass have shown which factors contribute most to mortality, informing actions to be taken to better manage these fish stocks. Creel surveys, conducted every 4-5 years, monitor the number of anglers fishing from boats and from shore to assess the recreational fishery in the Hudson. Tagging studies will help understanding of the seasonal movements of crabs in the estuary.

## **2006-2007 Report:**

**Striped bass:** Revisions for regulating striped bass fishing in New York State were proposed this year, including an increase in the size limit to 28", the use of circle hooks when fishing with live bait and a permit for Hudson River charter boats. The daily limit will continue to be 1 fish per person per day. These new regulations should take effect sometime during the winter/spring 2008.

**American shad:** DEC sampling has documented the continued decline in abundance of adult American shad in the estuary and a recent persistent decline in the production of young. DEC is participating with scientists from Atlantic coast states and the Atlantic States Marine Fisheries Commission to characterize shad status coast-wide and identify causes of change. Preliminary results indicate that shad have declined coast-wide and require management action.

## **Atlantic sturgeon:**

**Adult Atlantic sturgeon tagging project:** In partnership with the USFWS, the Atlantic States Marine Fisheries Commission (ASMFC), the Hudson River Foundation, the National Fish and Wildlife Foundation, and the Pew Institute for Ocean Sciences, DEC's Hudson River Fisheries staff began this project in 2006 to better understand Atlantic sturgeon movement and habitat use. Adult sturgeon were fitted with two types of tracking devices: sonic tags that monitor in-river movement and satellite tags that monitor near-shore ocean movement of fish that spawned in the estuary during the spring/summer. This is the first satellite tagging project of its kind on Atlantic sturgeon and is proving to be successful in providing valuable information on seasonal movements of Atlantic sturgeon along the East Coast. Sampling will continue in 2007, during which 17 sonic tags and 20 satellite tags will be attached to spawning adults. In 2006, in-river tracking of sonic-tagged fish identified summer aggregations in the Hudson Highlands. GPS locations will be compared with benthic habitat data to identify preferred habitat.

**Juvenile Atlantic sturgeon project:** Understanding the abundance, behavior, and habitat use of the estuary's juvenile Atlantic sturgeon population is necessary for management of this fish species' recovery. Initial sampling for juvenile sturgeon conducted by the USFWS in 2004 through 2006 resulted in recommendations for future sampling. It was found that juvenile Atlantic sturgeon most often prefer soft/deep areas of Haverstraw Bay in the spring. Recommendations were used to develop the sampling protocol used by the Hudson River Fisheries Unit in the spring 2006 and 2007, and will be used annually in the future. Data collected will be used to develop an annual-juvenile abundance index.

**Blue crab project:** Through the Estuary Program, the Hudson River Fisheries Unit began a multi-year study to tag and monitor returns from both commercial and recreational crabbers from Poughkeepsie to northern New Jersey. Results from this project will help biologists understand the seasonal movement of crabs within and outside the estuary. Returns from commercial crabbers verified that some blue crabs overwinter, and are taken in Raritan Bay, NJ. New regulations, instituted in June 2006, set a 4.5 inch size limit for hard shell crabs, and crab fishers are now required to mark their crab pots and install escapement panels.

**Goal 2. River and Shoreline Habitats:** Conserve, protect and, where possible, enhance critical river and shoreline habitats to sustain a healthy ecosystem and to assure that the life cycles of key species are supported for human enjoyment.

**Summary:** A major accomplishment of the Estuary Program has been development of large-scale, regional, baseline databases for Hudson River habitats. In 1987, the Hudson's habitats had not been comprehensively mapped, making it virtually impossible to protect and manage them. To correct this, the Estuary Program began to measure the size and location of key habitat types and study the value each contributes to the river's ecosystem. Working with many partners, 85 percent of the habitats on the Hudson have now been carefully mapped, creating baseline measurements of deep river bottom, submerged aquatic vegetation (SAV), shoreline structure and tidal wetlands. Biologists now are developing a much better understanding of why and how these habitats are important to the Hudson ecosystem. With this information, studies can begin to measure changes over time, guide development to less sensitive areas and assess the potential for habitat restoration and enhancement.

The Estuary Program, through its public outreach efforts, informs river users about these habitats so that they, too, become good stewards of the river. Estuary Program staff continue to participate in the Hudson River PCB Natural Resources Damages Technical Working Group to provide access to the most current mapping and habitat information and to contribute to discussions of alternatives and information needs.

#### **2006-2007 Report:**

##### **Mapping:**

**Hudson River Estuary Wetland Mapper:** One of the first inventory and mapping tasks undertaken by the Estuary Program was to map the estuary's tidal freshwater wetlands. This project was completed this year with the release of the "The Hudson River Estuary Wetland Mapper," a user-friendly CD that provides access to a complete inventory of the estuary's 2,400 acres of tidal freshwater wetlands between the Tappan Zee Bridge and the Troy dam. The mapper brings together aerial and ground photographs, wetland delineation lines and video and written descriptions for nearly every wetland along the river. This inventory marks the first time that many of these resources have been mapped and described.

**Benthic mapping:** In partnership with Lamont-Doherty Earth Observatory of Columbia University, State University of New York (SUNY) at Stony Brook and the Institute of Ecosystem Studies, baseline maps of

the estuary floor have been completed for 165 miles of river bottom, between the Verrazano Narrows Bridge and the Troy dam. Interpretive maps are available online at the Cornell University Geospatial Information Repository (CUGIR) (<http://cugir.mannlib.cornell.edu/>). This inventory and mapping effort includes high-resolution depth measurements in all water depths greater than four meters that, for the first time, reveal the topography of the estuary floor. Pilot studies have shown that different areas of the estuary floor, characterized by particular sediment types, are home to different benthic invertebrate communities, some of which may be important sources of food for fish.

**Hudson River submerged cultural resources:** An outgrowth of the benthic mapping project was the discovery of several hundred potentially significant shipwrecks and other submerged cultural resources. Underwater explorations from 2004 to 2006 have revealed at least seven nationally significant 18th- and 19th-century sites. DEC has established a multi-agency team to develop a strategy for evaluating and protecting these resources. This team includes DEC, OPRHP, OGS, DOS and the New York State Museum--all of which have overlapping responsibilities for these resources--and NOAA, the Lake Champlain Maritime Museum, the Marine Sciences Research Center at SUNY Stony Brook and other benthic-mapping partners. A draft conservation strategy was outlined in summer 2006.

**Submerged aquatic vegetation (SAV)** and Eurasian water-chestnut beds have been mapped from Troy to Hastings-on-Hudson for two periods: 1995-1997 and 2002. These data are available to DEC staff through the DEC Master Habitat Data Bank. A four-year ecological assessment of SAV habitat was completed, and a report entitled *Ecology of Hudson River Submerged Aquatic Vegetation* detailed the findings of this study. Both the recent inventory and the ecology report are available upon request on a CD entitled *Ecology and Distribution of Hudson River SAV*. These studies show that SAV habitat is important for fish and invertebrates and helps maintain water oxygen concentrations in the Hudson River. Since the initial inventory in 1995-1995, there has been a 9 percent decline in SAV and a 7 percent gain in Eurasian water chestnut coverage. An inventory is scheduled that will use 2007 aerial photography to determine whether these changes are a trend.

**Hudson River shoreline** types on both sides of the estuary from the Tappan Zee Bridge to the Troy dam have been classified and mapped according to a classification system that describes a variety of engineered and natural shoreline types. This will be added to the NYSDEC Master Habitat Data Bank for regulatory, remedial, restoration and resource-management purposes.

**Shallow habitat mapping:** Efforts are underway to map the shallows (<4 m) which constitute one-third of the surface area of the estuary and are important habitats for a wide variety of species and life stages.

**Aquatic habitat mapping:** Staff members are working with partners and researchers to build habitat maps that describe habitat quality for key species, based on the benthic maps. Two avenues are being pursued: invertebrate community mapping and fish habitat mapping. Staff scientists and consultants have established that links exist between distinct benthic biological communities and different physical environments on the river bottom that have been categorized into distinct mapped units. Staff biologists are evaluating whether to seek development of benthic invertebrate maps for the entire estuary. In addition, we are seeking to have consultants and/or graduate students determine whether a similar link exists between existing fisheries data and mapped units of the physical environment.

## **Habitat Restoration:**

**Eel passage experiment successfully completed:** DEC, in partnership with Bard College, piloted a low-cost, removable fish ladder on the Saw Kill, Dutchess County. The ladder was designed to enable American eels, a species in steep decline, to pass over a dam to reach historically accessible habitat. The eel ladder was successful. Staff and volunteers documented the passage of several hundred eels into habitat upstream of the dam. The Hudson River Estuary Program and HRNERR, in partnership with Bard College, plan to continue use of this fish ladder on the Saw Kill. The Estuary Program and Research Reserve will seek to engage other partners to install ladders at additional sites in 2007.

**Habitat restoration plan:** A draft habitat restoration plan is being revised for public release. This plan describes habitat status, restoration priorities and key components of a comprehensive habitat restoration program for the next ten years. The plan focuses on shoreline, fish passage, tidal wetland, submerged shallow and deep-water habitat restoration needs.

## **Public outreach:**

**Norrie Point Environmental Center:** The Hudson River National Estuarine Research Reserve moved into their new headquarters at the Norrie Point Environmental Center in Staatsburg in January 2007. The center, located on the Hudson River, has completely renovated facilities and will allow the Research Reserve to fulfill and expand its education, research, monitoring, stewardship and training functions.

**Estuary Training Program:** The Estuary Training Program has reached more than 1,250 decision-makers on river habitat issues since 2003. Training programs have focused on Hudson River habitat function and protection, soft shorelines, invasive species, visitor use and rising chloride levels in Hudson tributaries, as well as project management training. Assessments of training needs have been conducted for land managers, habitat restoration practitioners, consultants, builders and landscaping professionals.

**Estuary Mapper:** Division of Information Services and Estuary Program staff are developing an integrated web browser to view benthic mapping, submerged aquatic vegetation, Hudson River Estuary wetlands and sediment contaminant measurements. This website is a significantly expanded version of the original public website ([www.benthic.info](http://www.benthic.info)) for benthic mapping information. Once completed, anyone with computer access will be able to look at habitat and contaminant data for the entire estuary or focus on individual features.

**Goal 3. Plants and Animals of the Hudson River Valley:** Conserve for future generations the rich diversity of **plants, animals and habitats** that are key to the vitality, natural beauty and environmental quality of the Hudson River Valley.

**Summary:** Whether it is to enjoy hunting, fishing and outdoor recreation, to know that fish and wildlife populations are thriving in the valley or to protect enough clean water for future generations, people are concerned about natural areas and wildlife conservation. The Hudson Valley is a region with increasing development pressure, and now, more than ever, approaches are needed that allow for growth while conserving the plants, animals and habitats that create a healthy natural environment and sustain our communities.

The Estuary Program has taken a special interest in management of the watershed's ecosystems. The Hudson River is linked to the land through complex food webs, numerous tributaries and interactions between wildlife and the watershed environment. What happens on the land is eventually exported

downstream to the Hudson River Estuary. The watershed's natural habitats and their wildlife create benefits for our communities that include clean and abundant water, flood control and erosion prevention. It's easy to take these things for granted but hard to replace them once they are lost. The Estuary Program's approach promotes planning that decreases the potential for conflict, fosters public input and prevents wildlife from becoming rare or endangered.

Working with the New York Natural Heritage Program and Cornell University, the Estuary Program has initiated studies to determine which natural communities are most worthy of conservation. Using satellite photography and the latest information technologies, these partnerships have produced the most extensive biological survey and habitat mapping of any region of New York State. Scientists continue to monitor reptiles, amphibians, mammals, breeding birds, rare plants, rare animals and exemplary habitats throughout the ten counties that border the estuary. These inventories confirm the importance of the Hudson River Valley as an area that has unique, diverse and abundant wildlife important at regional, state and even global levels.

The Estuary Program has observed a growing interest from communities and individuals in maintaining important natural areas across the landscape. Recognizing that most of the decisions affecting natural resources are made at the local level, the Estuary Program and its partners have reached out to help citizens and local officials by providing assistance to identify and conserve natural areas and wildlife in their communities. With this biological information in hand, decision-makers and planners are empowered to conserve habitats through local action that supplements the state's traditional role, leading to the creation of many innovative and effective public/private partnerships.

#### **2006-2007 Report:**

**Inter-municipal biodiversity conservation planning:** To implement Goal 3 of the Action Agenda, the Estuary Program will assist individuals, non-profit groups and government officials in developing programs that use a variety of methods to conserve our region's natural heritage. Estuary Program staff work with partners to identify landscape areas of the Hudson Valley that contain target habitats of sufficient acreage and configuration to support wildlife populations and their movement across the landscape.

A partnership with Cornell University allows the Estuary Program to provide coordination, technical support and funding for a number of regional conservation planning initiatives. For example, working with Green Assets and the Shawangunk Regional Partnership, the Estuary Program has assisted with identifying and mapping regional priorities for biodiversity and developing corresponding biological recommendations for a regional open space plan for the new Shawangunk Mountains Scenic Byway. Staff will assist with providing training to the participating ridge communities (nine towns and two villages) to incorporate the recommendations into their land-use planning decisions. In 2007, Estuary Program staff will continue to help municipalities identify their significant habitat areas for use in natural resource inventories, open space plans, smart growth initiatives and comprehensive plans.

In another partnership, the Metropolitan Conservation Alliance (MCA) of the Wildlife Conservation Society released a second inter-municipal biodiversity plan with support from the Estuary Program. The plan identifies important wildlife species, core habitat areas and connecting habitat corridors within three southern Walkkill River municipalities (Town of Goshen, Town of Chester and Town of Warwick). To complete the plan, MCA held a number of workshops with town officials and will continue to work with the towns and the Estuary Program to implement the plan. In 2007, MCA will release a third biodiversity plan for three northern Walkkill River municipalities and develop guidelines for wildlife-friendly

stormwater management. They also will begin biodiversity studies in Somers and North Castle to expand on previous corridor projects in Westchester County.

**Biodiversity Assessment Training:** A program that works exceptionally well at raising local awareness of natural resources and building local capacity for conservation is offered by Hudsonia, Ltd. For more than five years, the Estuary Program has partnered with Hudsonia to offer a ten-month intensive training and, since 2003, a three-day course on biodiversity assessment throughout the Hudson Valley. Each year, three municipal groups take the ten-month Biodiversity Assessment Training. In 2006, they included the towns of Bedford and Somers (Westchester County), Marbletown and Rochester (Ulster County) and Rensselaerville and Berne (Albany County). The training reached a total of 22 participants representing three counties, six municipalities, and at least five other organizations. All three groups completed draft habitat maps of areas approximately 4,500 acres and larger and presented their findings to Hudsonia and the Estuary Program. To date, more than 200 local community leaders have received Hudsonia training. Hudsonia will offer their training program and short course again in 2007 and will continue to work with past-year graduates to help communities refine and expand their biodiversity assessments and implement conservation strategies.

**Maps and guides for planning:** Information from the New York Natural Heritage Program on the location and condition of important plants, animals and habitats has proven highly valuable to local and state partners engaged in conservation planning. In a project that is nearing completion, the Estuary Program and Natural Heritage Program, have developed maps that define "important areas" where conservation measures are most needed in order to protect rare species and significant ecosystems throughout the valley. The maps have been presented to local land-use decision-makers in Dutchess and Orange counties. A companion set of conservation guides was developed to describe the wildlife and habitats and their conservation needs. To meet local demand for this information, a project was started in 2006 to develop advanced methods for locating wildlife and habitats in portions of the Hudson Valley that have not been thoroughly surveyed.

**Wildlife monitoring:** Working with Cornell University, the Estuary Program initiated a wildlife monitoring program in the Hudson Valley in 2006. Based on a wildlife monitoring plan developed by Cornell, the project began with the monitoring of forest interior songbirds. The program is designed to alert managers and policymakers to changes in the health and sustainability of upland wildlife communities and to better understand threats to biodiversity in the Hudson River Estuary corridor. Of particular interest are the effects of fragmentation and habitat loss on key wildlife populations. In 2007, calling frogs will be added to this monitoring effort.

**Using advanced technology:** Two projects at Cornell are promoting the use of advanced global positioning systems (GPS) and geographic information systems (GIS) technology for wildlife conservation. An effort to digitize the locations of amphibians and reptiles observed during the NYS Amphibian & Reptile Atlas Project (Herp Atlas) was half completed in 2006 and will be finished in 2007. The resulting map with specific locations of frogs, salamanders and turtles will greatly assist with local planning. Another project trained local partners in the use of GPS and GIS during two well-attended workshops to map and analyze natural resource information.

**Extension for Private Landowners:** Initiated in 2005, this series of workshops offered by Cornell Cooperative Extension is designed to engage local landowners in wildlife habitat conservation and train natural resource professionals who interact with landowners. Where possible, the workshops focus on partnering with state and federal cost-share programs available in the Hudson River Valley. Two workshops for landowners were held in 2006, and two were scheduled for spring 2007. The 2007

program will help landowners and foresters recognize and conserve woodland (vernal) pools and become certified "woodland pool stewards."

#### **Goal 4. Streams and Tributaries of the Hudson River Estuary Watershed:**

Protect and restore the **streams**, their corridors and the watersheds that replenish the estuary and nourish its web of life--a system that is critical to the health and well being of Hudson Valley residents and the estuary.

**Summary:** The Estuary Program's watershed outreach initiative aims to promote conservation of streams and tributaries and reduce the effects of land use on these water resources as well as on the Hudson itself. County agencies, universities, local community groups and municipalities have joined in this effort throughout the valley to develop and implement watershed management and conservation plans to protect and restore water resources. Towns and cities are beginning to review their local laws to better align them with water resource management needs and reduce the effects of stormwater and other non-point sources of pollution. As public awareness and understanding of the challenges facing our water resources grows, the interest and will of citizens, government, non-profits and academia can be translated into actions designed to preserve these resources.

The watershed program is engaged in a variety of projects, all falling under a general umbrella related to community-based watershed assessment, stewardship, planning and implementation. Watershed projects engaging local partners and supported by the Hudson River Estuary Program exist on the following streams and rivers:

1. Black Creek (Ulster County)
2. Croton Bay (Westchester County)
3. Esopus Creek (Ulster County)
4. Fall Kill Creek (Dutchess County)
5. Fishkill Creek (Dutchess County)
6. Kinderhook Creek (Columbia Co.)
7. Moodna Creek (Orange County)
8. Normans Kill (Albany County)
9. Onesquethaw-Coeymans Creek (Albany Co.)
10. Patroon Creek (Albany County)
11. Peekskill Hollow Brook (Putnam County)
12. Quassaick Creek (Orange County)
13. Rondout Creek (Ulster County)
14. Saw Kill (Ulster County)
15. Saw Mill River (Westchester County)
16. Wallkill River (Orange and Ulster County)
17. Wappinger Creek (Dutchess County)

#### **2006-2007 Report:**

**Watershed Planning:** Supported through the Estuary Grants Program, 95 municipalities in the Hudson River estuary watershed have been involved in or informed of watershed planning and implementation projects underway in the 17 watersheds listed above. Five of the 17 watersheds have developed and are implementing watershed plans (Croton Bay, Fall Kill Creek, Fishkill Creek, Wallkill River, Wappinger Creek) and two have signed intermunicipal watershed agreements (Saw Mill River and Wappinger Creek.) Watershed planning is taking place in other watersheds, and should be completed in the next couple of years.

**Hudson River Watershed Alliance:** As a founding partner, the Estuary Program continues to participate on the Hudson River Watershed Alliance's steering committee. The alliance was created in 2004 to promote watershed education and protection and has grown to include more than 200 groups from throughout the valley. In November 2006, in partnership with Mohonk Consultations, Inc., the alliance presented a conference entitled, "Connecting People, Water and Wildlife." Presentations made before an audience of 175 explored the interconnections among water resource protection, wildlife habitat conservation and human needs.

**Stream Monitoring:** Through a partnership with Hudson Basin River Watch, the Estuary Program is working with community leaders and watershed groups to assess the health of streams and rivers in the Hudson Estuary watershed. In 2006, hundreds of community leaders and school children were exposed to stream assessment and biology through this partnership. More than 40 stream sites were assessed in numerous watersheds and municipalities. The data was submitted to DEC's Division of Water for inclusion in their stream-monitoring databases and related reporting.

**Barrier (dams and culverts) inventory and assessment:** A methodology to identify, inventory, and characterize dams and culverts, including their function and condition, has been developed during the past two years. The methods, developed for community volunteers and professionals, were piloted in the Fishkill Creek and Moodna Creek watersheds. Upwards of 50 dams were located in the Fishkill Creek, almost double what has been monitored traditionally by the Dam Safety Unit. Many of the 'new' dams identified fall below the Dam Safety Unit's threshold for monitoring. An aerial photograph investigation of the Moodna Creek watershed identified 184 potential dams. This is approximately three times as many dams as were previously recorded and regulated by DEC in the Moodna Creek watershed.

**Riparian mapping for the HRE watershed:** The Estuary Program has initiated an effort to map riparian buffer status/health to establish a baseline for the Hudson River estuary watershed. The goal of this effort is to track trends in buffer health and ultimately develop outreach tools for community watershed groups promoting protection of riparian buffers in their communities. The Estuary Program developed a proposal for federal funding to create a model program for conservation of riparian areas along tributary streams in the estuary watershed. A riparian buffer coordinator was hired in 2007 to further promote the conservation of riparian areas. One of the conservation tools that the coordinator is tracking is the Natural Resource Conservation Service (NRCS) Conservation Reserve Enhancement Program (CREP). Currently there are 1,050 acres of vegetated buffers adjacent to agriculture in the estuary watershed contracted through CREP.

**Stormwater program outreach:** Stormwater management, erosion and sediment control, better site design and control of non-stormwater discharges are tools of watershed protection that address community-wide and site-specific concerns. Throughout the year, the Estuary Program provided outreach, technical assistance and training in using these tools.

**Partnership with soil and water districts:** During 2006, the Estuary Program continued a three-year project with the Lower Hudson Coalition of Conservation Districts (LHCCD) to support stormwater outreach and technical assistance from county soil and water conservation districts (SWCD) to their local communities. The funding has allowed SWCDs to do the following:

- Distribute more than 50,000 stormwater pollution-prevention brochures to homeowners. Brochures developed by the Dutchess County SWCD are being used now by other counties, including Tompkins, Oneida, Monroe and Putnam
- Reach more than 400 contractors and interested citizens through contractor training workshops on erosion and sediment control and stormwater management
- Apply more than 2,000 storm drain markers to heighten awareness of pollution prevention
- Expand webpages with stormwater management information and link municipalities to these sites
- Promote formation of stormwater coalitions to provide support to regulated MS4 communities The intermunicipal agreement developed by Putnam County for their coalition is being used statewide by other counties.
- Provide technical assistance to municipalities on stormwater local laws
- Promote formation of several lake associations in Columbia County
- Support five riparian buffer restoration projects in three counties

**New York State Phase II Stormwater Compliance - workshops for communities:** As part of the state's effort to bring MS4 communities into compliance with stormwater regulations, Estuary Program staff, working with DEC's Division of Water, coordinated and/or presented information about stormwater management control measures at 13 workshops. More than 400 people, including code-enforcement officers, engineers, consultants, highway superintendents, local stormwater staff and local officials attended these workshops. Activities and groups included: stormwater training in Rockland and Albany counties, the Southeast New York Stormwater Conference, the New York Conference of Mayors Public Works School, SUNY ESF Stormwater Training, the NYS Floodplain and Stormwater Managers Association and local board meetings in five municipalities.

**Site designing for natural resources:** A project to promote better site design (aka: low-impact development) principles in communities in the Wappinger Creek watershed, Dutchess County was completed in July 2006. It began with support from a Hudson River Estuary Program grant to the Dutchess County Environmental Management Council to review local codes in the towns of Clinton and Wappinger in relation to better site design principles. Better site design takes an approach that seeks to reduce the amount of impervious cover, increase natural lands set aside for conservation and use pervious areas for more effective stormwater treatment. With assistance from the Estuary Program, the Towns of Clinton and Wappinger continued the project beyond the grant-funded period and came to consensus on proposed local code changes. The Town of Wappinger took the final step in 2007 by adopting through local law 22 of the 36 recommended local code changes. The Estuary Program coordinated printing and distribution of the final recommendations in two documents, one for each municipality. (See Recent Reports/Products of the Program)

The towns of Clinton and Wappinger continued the project beyond the grant-funded period and came to consensus on proposed local code changes. The final recommendations have been printed in two documents, and distributed to the towns of Clinton and Wappinger, Dutchess County, the Builders for the Hudson Partnership and the Hudson River Estuary Advisory Committee.

The Estuary Program is continuing to promote better site design through workshops and presentations to various audiences. More than 350 people attended presentations about better site design this year at the following events:

- Chazen Companies Lunch and Learn sessions
- Hudson Valley Horticulture and Landscapers Association Conference
- Land Use Leadership Alliance Training Program
- Northeast Regional NOAA Coastal Program Managers Meeting
- Rockland County Builders Association
- Sawmill Watershed Coalition
- SUNY ESF Stormwater Training
- Wappinger Creek Watershed Intermunicipal Council
- local board meetings in five municipalities

**Educational materials:** The Estuary Program provided targeted stormwater education materials to estuary watershed communities and groups. These materials include storm-drain markers tailored to individual watersheds, stormwater bookmarks and educational materials provided by DEC's Division of Water and the EPA. In 2005 and 2006, 4,850 storm drain markers were distributed to communities and watershed coalitions in the following watersheds:

1. Black Creek
2. Casper Kill
3. Coeymans Creek
4. East River
5. Esopus Creek (Ulster County)
6. Fall Kill Creek (Dutchess County)
7. Fishkill Creek (Dutchess County)
8. Hudson River
9. Moodna Creek (Orange County)
10. Normans Kill (Albany County)
11. Onesquethaw-Coeymans Creek (Albany Co.)
12. Patroon Creek (Albany County)
13. Peekskill Hollow Brook (Putnam County)
14. Quassaick Creek (Orange County)
15. Rondout Creek (Ulster County)
16. Saw Mill River (Westchester County)
17. Sparkill Creek
18. Wallkill River (Orange and Ulster County)
19. Wappinger Creek (Dutchess County)
20. Woodbury Creek
21. Wynants Kill

According to communities and watershed coalitions, the storm-drain-marker program has generated public awareness about preventing stormwater pollution in areas where volunteers and the public have been involved in the program.

## **Goals 5 and 6: (combined)**

**Goal 5. Land Acquisition:** Conserve key elements of the **human, pastoral landscapes** that define the character of the Hudson River Valley and its historical and mystical setting.

**Goal 6. Scenic Resources:** Conserve key features of the world-famous **river scenery**—the inspiration for the Hudson River School of American painting and for the tales of Washington Irving—and provide new and enhanced vistas where residents and visitors can enjoy Hudson River views.

**Summary:** The people of the Hudson Valley care deeply about the landscape of this region. From its working farms, forested hills and valleys, to its distant views of river and mountain, as well as its many historic villages, towns and cities, the region's strong sense of place serves as an anchor to the region's economic vitality. Authors Washington Irving and James Fenimore Cooper celebrated the Hudson Valley in their literature, while painters of the Hudson River School made it a symbol of spiritual mystery. The river's scenery is varied and ever-changing—from New York Harbor to the cliffs of the Palisades, across the broad expanse of the Tappan Zee and Haverstraw Bay, embracing the drama of the Highlands Gorge, sweeping past the monasteries and estates of the mid-Hudson to the sand beach islands and gateway cities of the state's Capital District.

The rapid pace of change and increase of developmental sprawl is of great concern to this region as more and more people seek to live and work in the Hudson Valley. Protecting the landscape and scenic integrity of the valley, while providing for growth, is an important component of the Estuary Program and engages many partners. Land trusts have a long history in the Hudson Valley, and their vibrant mix plays a key role in the conservation accomplishments of the program.

Since 1996, New York State agencies have conserved more than 4,000 acres of key scenic sites along the shores of the Hudson and have acquired more than 46,000 acres of parkland, wild forest, mountain ranges, working farms and watershed recharge areas throughout the valley. New York State has helped conserve scenic vistas at historic sites such as "Wilderstein," a landscape designed by renowned 19<sup>th</sup>-century architect, Calvert Vaux, one of the creators of Central Park in New York City and "Olana," home of the eminent Hudson Valley painter, Frederick Church.

## **2006-2007 Report:**

**Open Space Conservation:** Land purchases, conservation easements and land transfers are complicated transactions that often taken years to complete. With this goal close to being met, activities during 2006 continued to support the program's target to protect 4,000 acres on or in sight of the river. To date, progress toward meeting the land-acquisition target of 4,000 acres on or in sight of the river by 2006 includes: conservation of 3,600 acres in sight of the river, 1,317.17 acres close to--but not quite in sight of--the river, totaling 4,917.17 acres on or near the Hudson.

In recent years, acquisitions of open space on the estuary have included:

- Arden Point, 9.9 acres
- Eve's Point, 69 acres
- Fishkill Ridge, 1,024 acres
- Montrose, 50 acres of conservation easements, 51.4 acres in fee (DEC)
- Moodna Marsh, New Windsor (DEC), 60 acres
- Rockwood Hall, 88 upland and 35 underwater acres
- Turkey Point, 62 acres (DEC)

**Land transfers:** In addition to acquisitions and conservation easements, the Estuary Program has met its goal of transferring 1,000 acres of land to either DEC or the Office of Parks, Recreation and Historic Preservation (OPRHP) from other state agencies for conservation and recreation purposes. As of 2006-07, more than 1,500 acres have been transferred, with plans for additional transfers to take place in the near future.

**Estuary grants:** The Hudson River Estuary Grants Program offers assistance to municipalities for land acquisition/protection as well as open space planning activities. Grants awarded in 2006 will add 651 acres to the valley-wide total of conserved lands and assist two local communities with the development of open space plans and inventories.

**Goal 7. Public Access:** Establish a **regional system of access** points and linkages so that every community along the Hudson has at least one new or upgraded access point to the river for fishing, boating, swimming, hunting, hiking, education or river-watching.

**Summary:** Getting people to the river has been a major goal of the Estuary Program since its inception. In response to the river's improved water quality, residents and visitors alike have declared the Hudson a desirable place to go fishing, swimming, hiking, boating, bird watching or taking in the magic of an evening sunset. Improving opportunities for public access to the river, while at the same time conserving habitat, is an important element of the state's economic strategy for the region.

Since 1996, the Estuary Program, along with OPRHP, the Hudson River Valley Greenway, Department of State, Hudson River Park Trust and Metro-North Railroad, has been working to establish new or improved river access, including boat launches, docks, piers, railroad crossings, new local parks and waterfront walkways. The Hudson River Estuary Grants Program has been key to the success of this goal, with 58 projects having been awarded between 1999-2006 totaling nearly \$2.5 million. These access sites also serve as great places for public education, furthering the program's goals of involving everyone in stewardship of the river.

## **2006-2007 Report:**

### **Fishing:**

**By boat:** One of the early commitments of the Estuary Program was to develop and/or upgrade eight trailered boat-launch site plus an unspecified number of hand launches for car-top and non-motorized vessels. In 2001, two additional trailered launches were added to the goal, for a total of ten. To date, the Estuary Program has funded or announced funding for the following:

#### Completed Projects:

- Athens upgrade, Greene County, joint project with OPRHP
- Bethlehem new launch, Albany County,
- Cossackie upgrade, Greene County, joint project with OPRHP
- Glasco, V. Saugerties, Ulster County
- Haverstraw, Rockland County
- Mills-Norrie upgrade, Dutchess County, joint project with OPRHP
- Newburgh upgrade, Orange County
- Peekskill upgrade, Westchester County
- Rhinebeck upgrade, Dutchess County
- Schodack Island State Park new launch, Rensselaer County, joint project with OPRHP

#### Projects in Progress:

- City of Beacon upgrade, Dutchess County
- Catskill upgrade-replacement of floating docks, Greene County
- Ingalls Avenue, Troy, Rensselaer County
- Yonkers upgrade-replacement of floating docks, Westchester County

In addition, 18 hand launches have been funded through estuary grants as have multiple locations with floating docks for launching canoes and kayaks and design studies for other sites.

### **From the shore:**

**Across the railroad tracks:** Efforts to address the issue of restricted access for anglers who wish to fish the Hudson from shore caused by the Metro-north railroad tracks, have resulted in development of shoreline access at the Riverdale and Greystone stations. Additional access development at five other stations (Dennings Point, Little Stony Point, Cold Spring Station, Arden Point and Annsville Creek) is complete, and work continues to provide access at Sparta Dock in Ossining.

**Fishing piers:** Through the use of cooperative agreements and grants, the Estuary Program has been working to provide angling opportunities at fishing piers where feasible. Three piers have been completed at Verplanck, Peekskill-Annsville Creek and Rensselaer.

**Fishing access plan:** An interactive CD that shows access to nearly 100 locations on the estuary for shore fishing and boat launching is almost complete. It will be released on trial, with the expectation that the map will be posted to DEC's website and printed in the future.

**Swimming:** The Estuary Program released the findings of its swim study, *Swimming in the Hudson River Estuary, Feasibility Report on Potential Sites*, in June 2005. The report identifies 18 feasible sites for development of swimming beaches on publicly owned lands. Support for the development of swimming facilities is made through the Estuary Grants Program. Grants have been made to build and install a prototype of a floating pool in Beacon and to improve the amenities at Kingston Point Beach.

## **Hiking:**

**Hudson River Valley Ramble:** The Estuary Program has partnered with the Greenway in supporting the Hudson River Valley Ramble since its inception in 2000. The Ramble offers hiking, biking, paddling and educational events featuring the estuary or its tributaries. Hikes and related activities are led by Estuary Program staff, members of the estuary advisory committee and partners from New York City to Troy. In 2006, attendance at the 7<sup>th</sup> Annual Hudson River Valley Ramble exceeded 162,000.

**Goal 8. Interpretation and Education:** Promote **public understanding of the Hudson River**, including the life it supports and its role in the global ecosystem and ensure that the public understands the challenges the Hudson River faces and how they can be met.

**Summary:** The Estuary Program has worked continuously to raise public awareness of the estuary and promote stewardship opportunities for residents and visitors alike. In partnership with the New York State Department of Transportation and the New York State Thruway Authority, the Estuary Program has marked state and county road crossings of the estuary's major tributaries with signs that read, "Hudson River Estuary Watershed" and are illustrated with a profile of the Atlantic sturgeon. As we travel through the valley, these signs remind us that our lives and actions are connected to the river every day. At ten select locations along the river, Estuary Program interpretive kiosks provide river visitors with site-specific information about the river's natural and cultural history.

With staffing by Student Conservation Association AmeriCorps interns, the Estuary Program brings river displays to public gatherings such as the New York National Boat Show, Clearwater's Great Hudson River Revival, shad festivals and Earth Day events, reaching upwards of 20,000 people yearly. Partnering with the Hudson River Foundation, the program's naturalist participates in eagle watches and local shad bakes. The Hudson River National Estuarine Research Reserve offers roughly 15 free canoe trips annually to the public. AmeriCorps interns at DEC's Five Rivers and Stony Kill Farm environmental education centers provide educational programs for the public and for students in schools and at the centers. In New York City, AmeriCorps members teach natural resource concepts and conduct a stewardship project during a 10-week period to more than 350 elementary students in the After School Conservation Club each fall and spring.

Thanks to technical assistance from the Estuary Program, a network of 22 educational sites, both on the Hudson River and in the valley, now offer a continuum of opportunities that no one destination could provide. This network of local museums, floating classrooms, field stations and other environmental education facilities provides hands-on river programs with ever-improving teaching tools. Classroom teachers in the Hudson Valley are increasingly looking to the river and what it can offer in the way of estuarine ecology to enhance their curricula. They recognize the potential value of the Hudson River as a focus of study that can help their students meet state learning standards through engaging programs. Because few school districts have the expertise, funding or time to develop curricula that take advantage of this potential, the Estuary Program has undertaken an initiative to do so with the goal of developing a full range of K-12 curricula about the Hudson by 2009.

The Hudson River Estuary Grants Program provides essential support in implementing education goals. To date, 108 education grants worth \$3,130,722 have been awarded in eight years, supporting the network as well as launching innovative programs such as New York City Audubon's Harbor Herons Eco-tours, the Hudson River Museum's Riverama exhibit (Yonkers), weekend natural history activities at DEC's Kowawese Unique Area (New Windsor) and river- focused education at the Mid-Hudson Children's Museum (Poughkeepsie).

## **2006-2007 Report:**

**Hudson River curriculum:** Estuary Program staff, along with local teachers, principals, the State Department of Education and other partners worked to develop Hudson River curriculum materials that tie to state learning standards for all grade levels. In 2006, curriculum resources developed for grades 3-5 were completed and tested in area schools. The curriculum has been posted on the DEC website and disseminated at workshops and conferences.

**Day in the Life of the Hudson Estuary:** A cooperative effort between the Estuary Program and the Hudson Basin River Watch, "Day in the Life of the Hudson Estuary," is an annual river-long sampling event held in October. This project began in 2003 with 300 students at 13 sites; in 2004, a little more than 1,000 students participated at 17 sites; in 2005 (in a day-long downpour), 650 took part at 24 sites, and in 2006, more than 1,300 students sampled at 37 sites from Breezy Point on the lower bay of New York Harbor to Green Island. This was the first year that participation demand exceeded the Estuary Program's ability to provide facilitators for all sites. Participants continue to be very pleased with the event, citing the enthusiasm and excitement of the students involved and the skills they gain during workshop trainings.

**Teaching the Hudson Valley:** For the fifth year, Estuary Program staff participated in producing the "Teaching the Hudson Valley's" three-day teacher institute during the summer of 2006 and the Teaching the Hudson Valley Grants Program, a partner project with the National Park Service, the Hudson Valley Greenway, the Hudson River Valley National Heritage Area and the Hudson River Valley Institute at Marist College. Fulton's achievements with steam engine technology was a focus of the 2006 summer teacher institute. The 2007 institute will focus on Henry Hudson and exploration.

**The Estuary Program online:** Use of the program's web pages has increased steadily. In 2003, the average daily number of web page visits was 234; in 2006, the number had risen to more than 1,000. A 2006 Google search on "Hudson River Estuary" returned the Hudson River Estuary Program's web page as its top link. The program's ongoing journal of Hudson River natural history observations, *The Hudson River Almanac*, has been distributed electronically since October 2003, its circulation increasing from an initial 140 subscribers to 1,226 by the end of 2006.

**Goal 9. Waterfront Revitalization: Revitalize all the waterfronts** of the valley so that the Hudson is once again the "front door" for river communities, where scenery and natural habitats combine with economic and cultural opportunity, public access and lively "green ports" and harbors to sustain vital human population centers.

**Summary:** The resurgence of the river's vitality has led both state and local interests to the river to strengthen and revitalize riverfront communities and waterfront areas as destinations for tourists and as vibrant places to live and work. In the valley's urban areas, this includes returning dormant waterfronts left vacant by the loss and relocation of heavy industry back to productive use by filling those vacancies with new businesses, a cleaner environment and new recreational opportunities.

Through programs such as the Estuary Program, the New York State Department of State's Local Waterfront Revitalization Program and Environmental Protection Fund grant program and the Hudson River Valley Greenway, the state has assisted local governments, regional organizations, businesses, community organizations and citizens with improving their river waterfronts in ways that both advance economic development opportunities and protect natural and historic resources. Today, increasing numbers of Hudson River communities have improved their waterfronts and returned abandoned

industrial sites to life as parks and trails. Through the Clean Water/Clean Air Bond Act, more than \$7 million has been approved for investigation and cleanup of 13 brownfield sites in the Hudson Valley. Funding for brownfields is available through the Brownfield Opportunity Areas Program, the Environmental Restoration Program, and the Brownfield Cleanup Program. As municipalities adjust to new economic opportunities, many riverfront communities find that environmental conservation plays a key role in their successful redevelopment.

### **2006-2007 Report:**

**Local waterfront revitalization programs:** The New York State Department of State (DOS) is working with 38 communities to prepare and implement local waterfront revitalization programs and other planning initiatives that guide the beneficial use, revitalization and protection of their waterfront resources.

Since 2005, the Village of Haverstraw, the City of Peekskill and the City of Watervliet have completed their local waterfront revitalization programs. Each of these LWRPs has been approved by the Secretary of State. It is anticipated that the Village of Dobbs Ferry's LWRP and the Town of Rhinebeck's LWRP will be approved soon.

**Grants:** Through its FY 2005 and FY 2006 Environmental Protection Fund Grant Program, DOS has provided 34 waterfront revitalization grants totaling approximately \$10.4 million to Hudson River Estuary communities.

**Brownfields:** Six grants totaling \$27.6 million were awarded to municipalities this year under the Environmental Restoration Program to reimburse costs for brownfield site investigation and remediation. Seventeen applications were approved this year for private sector applicants under the Brownfield Cleanup Program. For all brownfield programs (Environmental Restoration, Brownfield Cleanup, and Brownfield Opportunity Areas), 11 projects have completed the Remedial Investigation phase, 23 projects have completed the Remedial Action phase, and 5 brownfield sites were reclassified from active to complete.

**Public outreach:** DOS has completed a multi-media package consisting of a guidebook and video on preparing watershed plans. The guidebook provides a step-by-step watershed planning process for communities to create their own plans to improve water quality.

**Hudson River Valley Greenway:** The Hudson River Valley Greenway has allocated nearly \$4 million for projects within the legislatively defined greenway area, which includes the counties of Rensselaer, Albany, Columbia, Dutchess, Ulster, Putnam, Orange, Westchester and Rockland; portions of Greene County outside the Catskill Forest Preserve; the waterfronts in the Bronx and Manhattan and in the Village and Town of Waterford, Saratoga County. Currently, 91 of 94 eligible riverfront communities and 238 of 266 eligible communities have chosen to become Greenway communities. Forty-four miles were added to the Greenway riverside trails this year, contributing to a total of 546 miles of designated Greenway Trail including 75 individual sites on the 156-mile Hudson River Greenway Water Trail, 147 miles of bicycling trail and 243 miles of other land-based Greenway Trail.

## Goals 10 and 11 (combined)

**Goal 10. Water Quality for Swimming:** Ensure that the **Hudson River will be swimmable** from its source high in the Adirondack Mountains all the way to New York City.

**Goal 11. Pollution Reduction:** Remove or remediate **pollutants** and their sources so that all life stages of key species are viable, people can safely eat Hudson River fish and harbors are free of the **contaminants** that constrain their operation.

**Summary:** In 1965, state voters passed the Pure Waters Bond Act, the first step in what has been a stunning cleanup of the Hudson River. Forty years later, recreational boating and fishing are enjoyed by thousands of people, and a major portion of the river is classified as "A," suitable for drinking water. Yet, trouble spots remain, especially in the urban areas of the Capital District and New York City. Sewage treatment infrastructure is failing in some places and is inadequate in others. Chemicals, such as PCBs, continue to be detected in Hudson River fish, though the levels are declining, and lead, mercury and DDT also affect river life. The disposal of dredged material, needed to keep the New York-New Jersey Port viable, is costly and difficult due to the high level of contaminants in river sediment.

During the last ten years, state programs have targeted pollution trouble spots. More than \$50 million has been spent on water quality improvements. The first ever comprehensive tracking of chemical contaminants has been initiated through a cooperative effort of the NY/NJ Harbor Program and the Estuary Program. In October 2003, at the request of DEC, the entire estuary was designated by the EPA as a "no discharge zone," requiring vessels to use pump-out facilities to manage on-board waste.

### 2006-2007 Report:

**Water quality improvements:** During 2006, the Estuary Program worked with DEC's Region 4 Division of Water to identify the costs of addressing priority combined sewer overflows (CSOs) and seasonal disinfection in the Class "C" waters of the Albany pool area of the upper estuary. Estimates to achieve disinfection for the entire Hudson from the Adirondacks to New York City range from \$20-\$30 million.

In March 2006, \$2 million in state Environmental Protection Fund grants were awarded to the following communities for improvements to existing wastewater treatment facilities:

- Albany County Sewer District
- Village of Castleton-on-Hudson, Rensselaer County
- Town of Coeymans, Albany County
- Town of East Greenbush, Rensselaer County
- Town of New Baltimore, Greene County
- Rensselaer County Sewer District

**Albany Pool Water Quality Sampling:** In order to measure the success of waste-water-treatment improvements, baseline water quality sampling has been conducted in the Albany Pool, with additional sampling planned following completion of water-quality improvement projects. In summer 2006, DEC's Division of Water notified municipalities in the upper reach of the estuary about the disinfection initiative and modifications to discharge permits that will be required as part of this effort.

**Long Term Control Plans:** Municipalities throughout the estuary that still operate combined sewers are now required to adopt long-term control plans. Of the 15 municipalities required to adopt these plans, one has done so to date (City of Yonkers).

**Pump-out Facilities:** Applications are being accepted continuously for the Clean Vessel Assistance Program for marinas, municipalities and not-for-profit organizations to install pumpout and dump station facilities to receive sewage from recreational marine vessels. To date 10 marinas and yacht clubs have completed pumpout projects.

**Sediment monitoring:** To establish a more cohesive understanding of the dynamics of sediment flow in the estuary and the effect of upstream inputs to the harbor, the United States Geological Survey and DEC's Division of Water, in partnership with the Estuary Program, initiated a plan to expand its current sediment-monitoring program on the Hudson by installing additional sediment gauges at the mouths of tributaries flowing into the estuary between Troy and Poughkeepsie. Out of nine planned sediment gages, four are in place as of this annual report.

**Contaminant Assessment:** Pollution reduction in the Hudson River Estuary contributes to reduced sediment contamination in the New York/New Jersey Harbor. In order to assess the contributing contaminants to the entire system, the Contaminant Assessment and Reduction Program (CARP) has conducted a multimillion-dollar contaminant sampling and modeling project to identify and quantify the source of contaminants, establish baseline levels of contaminants in water, sediments and fish tissue, and predict future conditions. The CARP model was completed this year, and it is currently being applied to determine what the total maximum daily load (TMDL) values should be for various pollutants of concern. A regional sediment management workgroup has been formed to study and recommend ways to reduce the quantity and improve the quality of sediments in the New York/New Jersey Harbor.

**Goal 12. Celebrate Progress and Partnerships:** Track our progress and **celebrate** our successes!

**Summary:** Partnership building has become an increasingly important component of the Estuary Program's strategy to meet the *Action Agenda's* goals. During 2006, several new partnerships were pursued while the Estuary Advisory Committee and Estuary Grants Program took on expanded roles. The Estuary Program, in partnership with DEC's Climate Change Policy Office is taking the lead in reaching out to Hudson Valley municipalities to foster a dialogue on the issue of climate change, thus setting the stage for the rest of New York State.

#### **2006-2007 Report:**

##### **Partnerships:**

**Hudson River Estuary Management Advisory Committee (HREMAC):** The Advisory Committee has served as the Estuary Program's primary point of contact with the public since its inception in 1996. During 2006, the committee took an active role in development of the *2005-2009 Action Agenda* and related budgetary needs. During the year, the committee gained five new members: Bill Connors, Dutchess Federation of Sportsmen; Shannon M. LaFrance, environmental attorney; Bill Emslie, Coastal Conservation Association; Sara Griffen, Olana Partnership, and David VanLuven, The Nature Conservancy, Eastern NY Chapter. Total membership is now 23. (See Appendix A.)

**Hudson River Estuary Grants:** The Hudson River Estuary Grants Program was initiated in 1999 and provides opportunities for implementing *Action Agenda* goals at the local level. Grants are available to municipalities and not-for-profits in five categories: education, open space, access, watershed management and community stewardship. To date, 300 grants totaling nearly \$10 million have been awarded to these local efforts. Requests routinely exceed the amount available each year, illustrating the

importance of this source of funding to local community efforts. The 2006 estuary grants were announced on October 11, 2006 and included 34 grants for a total amount of \$1.4 million.

**Hudson-Fulton-Champlain Quadricentennial Commission** is a special undertaking whose efforts will come to fruition in 2009 in celebration of the 400th anniversary of Henry Hudson's voyage up the river. In August 2006, the full commission voted to adopt the *Hudson River Estuary Action Agenda* and the Lake Champlain Basin's *Opportunities for Action* as guiding visions for legacy projects. A Legacy Project committee co-chaired by Fran Dunwell (Hudson River Estuary Program) and Carol Ash (NYS Office of Parks, Recreation and Historic Preservation) began developing proposals for lasting projects to be implemented by 2009.

**Integrating science into land-use decisions:** In partnership with the Land Use Law Center at Pace University, the Estuary Program offers training for municipal officials, watershed groups and community environmental activists on New York land-use law, highlighting how natural resource protection measures can be integrated into land-use decisions. During 2006, more than 100 Hudson Valley community leaders were trained through support from the Estuary Program. This program is designed to put needed technical, planning and process tools in the hands of local leaders whose decisions create the land-use patterns that will determine the quality of life, the economy and the environment of communities in the Hudson River Valley and tri-state region.

**Builders for the Hudson partnership:** The Estuary Program has begun a collaboration with the Builders Association of the Hudson Valley, Mid-Hudson Pattern for Progress, the mayors and supervisors associations of Dutchess and Orange counties, the Hudson River sloop "Clearwater" and several other interested parties. The partnership's mission is to "provide a framework within which environmental, economic and municipal leaders can talk about, plan for, support and/or implement collaborative strategies that balance and integrate environmental conservation and "smart" land use planning with housing and economic opportunities within the Hudson Valley." At the request of the partnership, the Estuary Program and DEC's Division of Water provided a training session on Better Site Design and stormwater regulations to the members of the Builders Association.

**Garrison Institute "Conversations":** During 2005-2006, the Garrison Institute sponsored "Care for Creation in the Hudson River Valley," a year-long series of 'conversations' aimed at bringing together Hudson Valley environmentalists and faith communities to inform and broaden one another's points of view, with a goal of finding a common ground of shared values to preserve and protect the river and the valley. The 12 goals of the *Action Agenda* formed the basis for the conversations' agendas. Participants developed a statement of shared values and committed actions that will form the basis for future meetings and actions. This collaboration exposed a new audience to the *Action Agenda*, furthering its reach into the valley's extended community.

**Hudson Valley Climate Conference:** Estuary Program staff worked with DEC's Climate Change Policy Office to organize a one-day conference, held on December 4, 2006, for local decision-makers exploring the issues of climate change in the Hudson Valley. The goal of the conference was to present emerging knowledge regarding the potential effects of climate change on human and natural communities and provide local leaders with insights to help them plan for and manage these effects. The conference was co-sponsored by the Hudson River Environmental Society.

### **Tracking progress:**

**Tracking Estuary Program Progress:** In 2006, the Estuary Program began developing a plan to better measure and report on its targets to the public. "Goalkeepers", performance measures, and work plans have been established for each of the 12 goals in the Estuary Action Agenda, and future projects needed

to meet each target have been identified. Tracking will be coordinated with the state budget calendar, as well as the Estuary Program's advisory committee meetings. Twenty-eight percent of the 451 performance measures developed by the Goalkeepers and their subcommittees have existing tracking programs to measure progress, as reflected by some of the data in this annual report.

**Information management system:** The Estuary Program continued to move forward with the development of a database to manage information about all program projects since 1996. Database development is nearly complete. This system will be accessible to project managers and DEC staff and will provide valuable information on project status, reports and deliverables and metadata. New procedures were developed for contract approval and payment processes to insure that information generated by Estuary Program projects is properly inventoried, archived and disseminated to key repository sites. Partnerships with academic institutions are being explored that would allow non-sensitive data sets to be made available on publicly accessible and reliable servers.

**State of the Hudson report:** Staff are developing a concept for a report on the state of the Hudson River Estuary Watershed, to be distributed as an insert in regional newspapers. The report will cover 15-20 important ecological trends in the river and watershed based on data already being collected by existing monitoring programs. It will help us get across key messages about the progress that has been made toward the river's health, and it will serve as an opportunity to focus on key issues for the river's future.

## **Recent Reports/Products of the Hudson River Estuary Program:**

***The Hudson River Estuary Action Agenda, 2005-2009*** was completed in late 2005 and released in early 2006. The *Action Agenda* outlines the program's 12 major goals and five-year and long-term targets. Available online at: <http://www.dec.ny.gov/lands/5104.html>

***Report on 10 Years of Accomplishments***: A full-color, 24-page, glossy report outlining the accomplishments of the program during its first ten years was prepared by HREP and designed by DEC. The report is designed to provide the general public with background information and an overview of the program's accomplishments.

***Swimming in the Hudson River Estuary: Feasibility Report on Potential Sites***, NYS Department of Environmental Conservation, NYS Office of Parks, Recreation and Historic Preservation, 2005. This report identifies 18 feasible sites for development of swimming beaches. Available online at: <http://www.dec.ny.gov/lands/5452.html>

***Hudson River Estuary Wetland Mapper CD***: The Wetland Mapper is designed to be a user- friendly tool, allowing both advanced and first-time GIS users to access a complete inventory of the Hudson Estuary's estimated 2,400 acres of tidal freshwater wetlands located between the Tappan Zee Bridge and the Troy dam. It includes aerial photos, wetland delineation lines, ground photos, helicopter videos and written descriptions for nearly every wetland along the river down to one-half acre in size. For many of these areas, this inventory marks the first time that these resources have been mapped and described.

***Wildlife and Habitat Conservation Framework: An Approach for Conserving Biodiversity in the Hudson River Estuary Corridor***, 2006. This report describes 25 geographic areas within the valley that have particular significance for biodiversity in the Hudson River Valley and identifies voluntary, non-regulatory strategies for conserving wildlife and habitat in the region. The "framework" is intended to foster conservation partnerships and conservation action in the context of local home rule. Partners include: the Hudson River Valley Greenway, United States Geological Survey, Cornell University, Department of Natural Resources and the New York State Office of Parks, Recreation and Historic Preservation.

***Town of Wappinger: Recommended Model Development Principles for Conservation of Natural Resources in the Hudson River Estuary Watershed, Consensus of the Local Site Planning Roundtable***, June 2006. The 51-page report presents specific recommendations on how to foster more environmentally sensitive local site design within the town of Wappinger.

***Town of Clinton: Recommended Model Development Principles for Protection of Natural Resources in the Hudson River Estuary Watershed, Consensus of the Local Site Planning Roundtable***, June 2006. The 44-page report presents specific recommendations on how to foster more environmentally sensitive local site design within the town of Clinton, Dutchess County.

***Ecological Profile of the Hudson River National Estuarine Research Reserve***: This document, produced by Dr. David Yozzo of Barry Vittor and Associates working with Hudson River Reserve staff, provides a synthesis of more than 20 years of Hudson River environmental research and monitoring that has been undertaken at the reserve. It also includes an environmental overview of the Hudson River Estuary and recommendations for future research and monitoring for the reserve. Copies may be obtained by contacting reserve headquarters at 845-758-7010. Electronic copy also is available.

**The Hudson River Estuary website:**

The *Hudson River Almanac*, (<http://www.dec.ny.gov/lands/5082.html>) continues to provide an important link for the public to access information about the river and the Estuary Program. It includes background information on the Hudson River Estuary Program (<http://www.dec.ny.gov/lands/4920>), the *Estuary Action Agenda* (<http://www.dec.ny.gov/lands/5104.html>) and other related documents. Public use of the site has grown steadily.

Web pages are updated monthly and contain links to information regarding estuary basics, the Estuary Grants Program (<http://www.dec.ny.gov/lands/5091.html>) and a calendar of Hudson River Estuary Program-sponsored events. Estuary Program web pages also contain links to other DEC pages and to state, federal and non-profit organizations related to the Estuary Program. (See Goal 8 for more details.)

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**Planned and/or anticipated regulatory policy changes** which may affect the Hudson River estuarine district can be found online at: ( <http://www.dec.ny.gov/regulations/36816.html> ).

**Appendix A**  
**Hudson River Estuary Advisory Committee - Members and Ex-officios**

**March 2007**

Dennis Suszkowski, Committee Chair  
Hudson River Foundation

Alex Mattheissen  
Riverkeeper, Inc.

Judy Anderson  
Community Consultants

John Mylod  
MT Net Company

Allan Beers  
Coordinator Environmental Resources  
Rockland County

Jon Powell  
Columbia Greene Community College

Andy Bicking  
Scenic Hudson

Gregg Swanzey  
Hudson River Sloop Clearwater

Jeff Clock  
Central Hudson Gas and Electric Corp.

David VanLuven  
The Nature Conservancy Eastern N.Y. Chapter

Bill Connors  
Sportsman Advocate

Rene VanSchaack  
Greene County Soil and Water District

Bob Creeden  
Hudson River Waterfowl Protective Association

John Young  
ASA Analysis and Communication, Inc.

Gina D'Agrosa  
Westchester County

**HREMAC Ex-officios:**  
Tom Baudanza  
New York City Dept. of Environmental Protection

Bob Elliott  
New York State Planning Federation

George Stafford  
New York State Department of State  
Representatives:  
- Steve Ridler  
- Bonnie Devine

Bill Emslie  
Coastal Conservation

Stuart Findlay  
Institute of Ecosystem Studies

Mario Del Vicario  
U.S. EPA Region II  
Marine and Wetlands Protection Branch

Bob Gabrielson  
N.Y.S. Commercial Fisherman's Association

Noreen Doyle  
Hudson River Park Conservancy

Sara Griffen  
OLANA Partnership

Nordica Holochuck  
New York State Sea Grant

Shannon LaFrance, Esq.  
Rapport, Myers, et.al.

Len Houston  
Army Corps of Engineers  
Environmental Analysis Branch

Tom Lake  
Commercial Fisherman/Educator

Chris Letts  
Hudson River Foundation Educator

Mary Mangione  
Hudson River Valley Greenway Council  
Representatives:  
- Scott Keller

Eric Lind  
Constitution Marsh Sanctuary

Boris Rucovets  
Interstate Environmental Commission

Copies of this publication are available by contacting:

Hudson River Estuary Program  
New York State Department of Environmental Conservation  
21 South Putt Corners Road  
New Paltz, NY 12561

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FAX: 845-255-3649

e-mail: [HREP@gw.dec.state.ny.us](mailto:HREP@gw.dec.state.ny.us)

Visit the DEC Website at: <http://www.dec.ny.gov>

(click on Oceans and Estuaries, then Hudson River Estuary Program)

The *2006-2007 Annual Report* was prepared by Frances F. Dunwell, Hudson River Estuary Coordinator, and Nancy Beard, Citizen Participation Specialist.