

Evaluation Findings

Hudson River National Estuarine Research Reserve

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Summary of Key Findings

The Coastal Zone Management Act requires the National Oceanic and Atmospheric Administration (NOAA) to conduct periodic evaluations of the performance of state and territorial programs participating in the National Estuarine Research Reserve System. This evaluation conducted by the NOAA Office for Coastal Management examined the operation and management of the Hudson River National Estuarine Research Reserve for the period from December 2008 to May 2018. The evaluation focused on three target areas: resource stewardship; outreach and science communication; and partnerships. The four sectors addressed by all of the National Estuarine Research Reserves are research, training, education, and stewardship.

The findings in this evaluation document will be considered by the NOAA Office for Coastal Management in making future financial award decisions concerning the Hudson River Research Reserve. The evaluation came to these conclusions:

Accomplishment: The Hudson River Research Reserve has been a leader in developing partnerships to undertake research on habitat adaptation to climate change and sharing the information throughout the coastal zone management community.

Accomplishment: The Hudson River Research Reserve completed the Gay's Point side channel restoration in the Stockport Flats component, a major step forward in restoring habitat to the upper Hudson River estuary.

Accomplishment: : The Hudson River Research Reserve staff was successful in defusing a contentious public process in the Village of Piermont while developing the management plan for the Piermont Marsh component of the reserve.

Accomplishment: The Hudson River Research Reserve has developed a unique long-term education project that has not only influenced children's lives in a disadvantaged community but has grown to include participants from throughout the Hudson River valley while providing useful information for resource management at the regional level.

Accomplishment: The Hudson River Research Reserve has become a respected partner in the Hudson Valley and has influenced state policy affecting not only the Hudson River estuary, but also shorelines throughout the state of New York.

Recommendation: The Hudson River Research Reserve should promote research and monitoring of the Gay's Point restoration site with university partners to further restoration science throughout the region.

Recommendation: The Hudson River Research Reserve should consider sharing the knowledge gained from restoring the habitat at Iona Island to allay community fears related to potential impacts from the restoration of the Piermont Marsh.

Recommendation: Because of the significant challenges facing habitats along the estuary and within the Hudson River Research Reserve, the Department of Environmental Conservation should consider creating a full-time stewardship coordinator position for the reserve.

Recommendation: If the Annandale Dam is removed, the Hudson River Research Reserve should make certain that the System-Wide Monitoring Program station on the Saw Kill remains in place to document changes to the estuarine environment. After observing the changes from the dam removal, the reserve may want to consider whether maintaining this monitoring site is the best option for the long term.

Recommendation: The Hudson River Research Reserve should consider using innovative methods to enhance constituent support by proactively sharing information about what the reserve is accomplishing in their communities along the river.

Recommendation: The New York Department of Environmental Conservation should continue to recognize the role of the reserve as a part of a national system in supporting out-of-state travel to ensure that reserve staff members are gaining as much knowledge as possible from system partners.

Recommendation: The Hudson River Research Reserve should consider developing overnight lodging accommodations for researchers. This might be accomplished by working in conjunction with the Office of Parks, Recreation, and Historic Preservation to adapt existing facilities.

Recommendation: The Hudson River Research Reserve should work with the Office of Parks, Recreation, and Historic Preservation to develop a more resilient parking lot at the Norrie Point offices.

Conclusion: This evaluation finds that the State of New York Department of Environmental Conservation is adhering to the requirements of section 312(a) of the Coastal Zone Management Act, 16 U.S.C. § 1458(a), in the operation of the Hudson River National Estuarine Research Reserve.

Program Review Procedures

The NOAA Office for Coastal Management evaluated the Hudson River National Estuarine Research Reserve in fiscal year 2018. The evaluation team consisted of Ralph Cantral, evaluation team lead, and Nina Garfield, site liaison, both from the NOAA Office for Coastal Management. The support of the Hudson River Research Reserve staff members was crucial in conducting the evaluation, and their support is most gratefully acknowledged.

NOAA sent a notification of the scheduled evaluation to the Honorable Basil Seggos, Commissioner of the New York State Department of Environmental Conservation, on January 23, 2018, and published a notice of intent to evaluate the Hudson River Research Reserve in the *Federal Register* on February 26, 2018. The Hudson River Research Reserve posted a notice of the public meeting and opportunity to comment in the *Poughkeepsie Journal* and *The Journal News* on April 13, 2018.

The evaluation process included a review of relevant documents and a survey of stakeholders, which helped identify three target areas for the evaluation: resource stewardship, education and science communication, and partnerships. A site visit was conducted from May 8 through 10, 2018, where the evaluation team held group discussions with stakeholders and program staff members. The evaluation team also discussed the target areas with reserve staff members, who helped identify issues and workable solutions to maintain and improve the implementation of the reserve's programs. In addition, a public meeting was held on Wednesday, May 9, 2018, at 4:00 p.m. at Norrie Point Environmental Center, 256 Norrie Point Way, Staatsburg, NY 12580 to provide an opportunity for members of the public to express their opinions about the implementation of the reserve programs.

Stakeholders and members of the public were also given the opportunity to provide written comments via email or U.S. mail through Friday, May 18, 2018. No written comments were received from the public or interested parties.

Final evaluation findings for each national estuarine research reserve highlight the reserve's accomplishments in the target areas and include recommendations that are of two types:

Necessary Actions address programmatic requirements of the implementing regulations of the Coastal Zone Management Act and of the reserve's management plan approved by NOAA. These must be carried out by the dates specified. Failure to address necessary actions may result in a future finding of non-adherence and the invoking of interim sanctions, as specified in the Coastal Zone Management Act §312(c). This evaluation contains no necessary actions.

Recommendations are actions that the office believes would improve the program, but which are not mandatory. The reserve is expected to have considered the recommendations by the time of the next evaluation or by the dates specified. This evaluation contains seven recommendations.

Evaluation Findings

Target Area 1: Resource Stewardship

The Hudson River Research Reserve has taken a difficult geographic location—four relatively small sites extending for more than 100 miles along the river—and shown how to implement a cohesive approach to research, education, and training that yields significant impacts at a regional level. To achieve this accomplishment, the reserve has helped to create and lead a number of partnerships and projects to advance reserve goals related to habitat identification, protection, and restoration.

Key Findings Related to Target Area 1

The reserve staff led efforts with a number of partners, including state and federal agencies and nongovernmental organizations, to complete the mapping of wetlands and deep and shallow water habitats for the length of the tidal estuary from New York City to the Federal Dam at Troy. In addition to assuring data quality and compatibility for projects, the reserve coordinated efforts of a number of funders and partners. The reserve staff also has ensured wide access to the information that it has collected.

The reserve has also been active in using the results of research to support resource protection. A primary partner in protecting the estuary is the Hudson River Estuary Program. Reserve staff members play essential roles with the estuary program by leading efforts specifically related to habitat protection and enhancement. The estuary program has assigned responsibility for tracking progress to several “goal keepers.” The Hudson River Research Reserve manager serves as the goalkeeper for river habitats, and the reserve education coordinator is the goalkeeper for education. This partnership has enabled the reserve to provide the best available information directly to implementation efforts.

Also during this evaluation period, the Hudson River Research Reserve has been providing an increased focus on resource adaptation related to climate change and sea level rise. A multi-year undertaking called the Hudson River Sustainable Shorelines Project, funded through the National Estuarine Research Reserve System Science Collaborative, was central to this effort. The New York Coastal Management Program in the Department of State has also been a key player in this effort by promoting the use of sustainable shorelines through funding for design and construction and in their work with communities.

The Hudson River Sustainable Shorelines Project has engaged a diverse community of shoreline stakeholders over the last decade. These efforts have focused on ecological, engineering, and social science research and developing a community of practice among private design professionals, including ecologists, engineers, and landscape architects. To encourage nature-based shoreline protection by waterfront landowners and the public, the reserve produced an outreach document entitled *Managing Shore Zones for Ecological Benefits*. This guide provides a number of steps that landowners can take to protect their shoreline while protecting and enhancing the natural resources of the Hudson River. In 2015, the reserve received the

Environmental Protection Agency's (EPA) Environmental Quality Award for the Hudson River Sustainable Shorelines Project.

In an effort to continue and expand the work of the Sustainable Shorelines Project, the reserve has convened and supported a Shoreline and Habitat Adaptation Dialogue. This ad hoc group, composed of a variety of governmental, educational, and nongovernmental entities, provides input into the reserve's research, monitoring, and stewardship agendas, identifies restoration projects for collaboration, and serves as a conduit for communicating research results to decision-makers.

Another resource stewardship initiative was initiated by recent state legislation that required the Department of Environmental Conservation to develop guidance on natural resilience measures. The reserve staff helped to lead the teams drafting measures to meet the requirements of the New York Community Risk and Resiliency Act of 2014. The measures were based largely on the reserve's previous efforts, including the Hudson River Sustainable Shorelines Project. The results of these efforts were also shared with states and reserves throughout the region, and, in cooperation with NOAA, to the rest of the country.

Accomplishment: The Hudson River Research Reserve has been a leader in developing partnerships to undertake research on habitat adaptation to climate change and sharing the information throughout the coastal zone management community.

The Hudson River Research Reserve has also been active in supporting habitat restoration on the reserve sites as well as throughout the Hudson River valley. Construction of a new side channel at Gay's Point in the Stockport Flats component of the reserve was completed in the fall of 2017. This project, the first of its kind on the Hudson River, is intended to restore valuable habitat lost during historical dredge and fill activities associated with the construction of the federal navigation channel. Side channels historically occurred in the northern third of the Hudson River estuary as part of a braided river-channel dominated by vegetated shallows and wetlands. Construction of the new channel and reintroduction of river flow through the area behind Gay's Point is expected to result in relatively immediate hydrological changes to flows in that area and create new shoreline, intertidal, and vegetated shallow water habitats.

Accomplishment: The Hudson River Research Reserve completed the Gay's Point side channel restoration in the Stockport Flats component, a major step forward in restoring habitat to the upper Hudson River estuary.

Recommendation: The Hudson River Research Reserve should promote research and monitoring of the Gay's Point restoration site with university partners to further restoration science throughout the region.

Invasive species management has been another key focus area for the reserve. During this evaluation period, the reserve began treating a rapidly spreading foreign strain of *Phragmites australis* at the Stockport Flats component. Because the areas of infestation were small, the site

was determined to be a good opportunity to preserve the existing native marsh plant communities and related biodiversity by applying herbicide in contained patches. Native marsh plants have been recovering, and annual monitoring allows the reserve to identify new invasions for treatment before they become established.

By 2008, the Iona Island component, which is slightly brackish, had become dominated by *Phragmites* with few native communities remaining. Treatments at Iona Island have been focused on small areas and phased so that treated areas have time to recover. Each phase has resulted in vigorous recovery of native plant communities including threatened and endangered species.

A plan to control *Phragmites* at the more brackish Piermont Marsh component is focused on a 10-acre pilot project at the marsh center, and is part of a broader management plan for the site that was completed in 2017. The plan involved extensive input from the leaders and residents of the adjoining communities, county officials, environmental organizations, researchers, educators, and marsh managers. The plan will guide management of the Piermont Marsh component, including marsh management, habitat restoration, resource stewardship, public access, education programs, and research.

The proposed low-level herbicide treatment of the Piermont Marsh is controversial with some individuals in the adjacent Village of Piermont. To address community concerns, the reserve staff convened numerous public meetings and worked to address many of the resident's concerns. The plan includes intense monitoring of the area to be treated as well as surrounding areas to ensure that the work will meet all conservation objectives while allaying the fears of community members.

Accomplishment: The Hudson River Research Reserve staff was successful in defusing a contentious public process in the Village of Piermont while developing the management plan for the Piermont Marsh component of the reserve.

Recommendation: The Hudson River Research Reserve should consider sharing the knowledge gained from restoring the habitat at Iona Island to allay community fears related to potential impacts from the restoration of the Piermont Marsh.

The stewardship coordinator position for the Hudson River Research Reserve is funded using outside funds from the Tappan Zee Bridge replacement. Although the primary purpose of the funds was to provide oversight, review, and support for all compensatory habitat mitigation projects related to bridge construction and removal, the incumbent has also identified and resolved habitat issues throughout the reserve. When the funding from the New York State Thruway Authority ends, funding may not be available to support this crucial position.

Recommendation: Because of the significant challenges facing habitats along the estuary and within the Hudson River Research Reserve, the Department of Environmental Conservation should consider creating a full-time stewardship coordinator position for the reserve.

A March 2018 report on alleviating flooding in the Saw Kill watershed by the Hudson River Estuary Program and the New England Water Pollution Control Commission has recommended the removal of the Annandale Dam near the Tivoli Bays component of the reserve.

Recommendation: If the Annandale Dam is removed, the Hudson River Research Reserve should make certain that the System-Wide Monitoring Program station on the Saw Kill remains in place to document changes to the estuarine environment. After observing the changes from the dam removal, the reserve may want to consider whether maintaining this monitoring site is the best option for the long term.

Target Area 2: Education and Science Communication

The reserve is active on a number of fronts related to education and science communication, especially in influencing landowner decision-making and involving Hudson Valley residents of all ages in citizen science.

Key Findings Related to Target Area 2

The Hudson River Research Reserve created the Hudson River Eel Project in 2008 to help accomplish a number of reserve goals: it is a research project to learn more about juvenile glass eel migration; it is an opportunity to enlist volunteers in citizen science; and it provides science, technology, engineering, and math-focused case studies for students in local schools. In 2017, approximately 750 volunteers were engaged in the effort at 13 sites, and approximately 2,000 additional people learned about the effort through presentations and online resources. The project has garnered recognition from the EPA, National Audubon Society, Scenic Hudson, and Hudson River Environmental Society. Another highly significant benefit of the project has been encouraging long-term interest in science education by students from disadvantaged schools. Several of these students have gone on to pursue science careers. In addition, data from the project are now being used to guide natural resource conservation efforts along the river.

Accomplishment: The Hudson River Research Reserve has developed a unique long-term education project that has not only influenced children's lives in a disadvantaged community, but has grown to include participants from throughout the Hudson River valley while providing useful information for resource management at the regional level.

One problem that the reserve has had to overcome in providing information on estuaries to local schools is that estuarine science is not specifically included in the state curriculum. The reserve staff has worked closely with teachers to develop programs that align with the state standards. Staff members are also working to see that estuary- and watershed-specific language is included in future state standards.

An example of meeting estuary needs while aligning with state standards is the SAV in the Classroom program. This is a program to grow submerged aquatic vegetation in classrooms, and currently seven classes in five different schools are participating. The plants grown in the

classrooms are transplanted each spring to sites that previously had healthy beds of seagrass. The project meets a local resource management need, as well as an educational one, because it was created in response to the impacts of Hurricane Irene, when researchers noted a decline in submerged vegetation caused by a surge of sediments that smothered existing beds.

The reserve also places an emphasis on educating local citizens about how their actions affect the Hudson River estuary. As mentioned previously under the resource stewardship discussion above, the reserve produced and distributed a handbook entitled *Managing Shore Zones for Ecological Benefit*. This well-received guide communicates best management practices for ensuring a more natural approach to shoreline management directly to landowners. It is an excellent example of how to share information that is based on strong research in a manner that can be readily understood by non-scientists.

The Hudson River Research Reserve also provides real-time data from the newly installed Turkey Point tide station to the public. Before its establishment, there was no reliable tide data available north of the Battery station in Manhattan. This lack of data created problems not only for resource management at the reserve, but also for mariners navigating the Hudson. The reserve has been recognized by the Hudson River Pilots Association for its work in making this real-time information available to improve navigation and public safety.

The communities adjacent to the Hudson River Research Reserve often do not understand what the reserve is and what it can provide to them. The works of the reserve are certainly valued, but the townspeople often do not recognize that the reserve is responsible for these improvements. Making the public more aware of the reserve's works could lead to the development of new partnerships with riverfront communities.

Recommendation: The Hudson River Research Reserve should consider using innovative methods to enhance constituent support by proactively sharing information about what the reserve is accomplishing in their communities along the river.

Target Area 3: Partnerships

The Hudson River Research Reserve has formed a number of longstanding strategic partnerships with other state agencies, nongovernmental organizations, and other reserves in the National Estuarine Research Reserve System.

Examples of Key Efforts Related to Target Area 3

The Hudson River Research Reserve has developed an impressive network with the other state agencies and demonstrates value added to its partners. The reserve has identified a clear niche that complements the goals of the other partners. Three excellent examples of this are 1) serving as the major research arm for the Hudson River Estuary Program; 2) designing the Hudson River Sustainable Shorelines Project, securing funding for it, and enlisting the appropriate partners to make it a success; and 3) leading the development of guidance for the research and education components required under new resilience legislation.

The reserve routinely consults and collaborates with the Department of State Office of Planning and Development, the lead agency for the state coastal management program. Members of the reserve staff have served on working groups at the Department of State, most significantly on working waterfront and community resilience efforts. Members of the Department of State have participated on all advisory committees for the four phases of the Hudson River Sustainable Shorelines Project. The Department of State staff has also been able to support on-the-ground development of sustainable shoreline projects by funding design and construction activities as part of the state's waterfront revitalization program.

The Department of State has also collaborated with the reserve staff to update significant coastal fish and wildlife habitat designations on the Hudson River estuary. Reserve staff members updated narratives, boundaries, and scoring, drawing on a wide variety of reserve-generated and other scientific information about Hudson River tidal wetlands and other habitats, fish and wildlife, public use patterns, and impact analyses. Using the new information, the Department of State designated new habitats, resulting in 40 new or updated designations.

The multi-phase Hudson River Sustainable Shorelines Project was enhanced by a partnership that was based on the needs of the partners, including regulators and engineers. Many of these same partners came together to participate in the Shoreline and Habitat Adaptation Dialogue. This partnership now has evolved into an ongoing community of practice on climate adaptation. Through these partnerships, the Hudson River Research Reserve has become a trusted voice in the Hudson Valley on river habitat topics. Staff are consulted on restoration priorities, valued in collaborative research partnerships, and consulted on river and shoreline habitat management.

Accomplishment: The Hudson River Research Reserve has become a respected partner in the Hudson Valley and has influenced state policy affecting not only the Hudson River estuary, but also shorelines throughout the state of New York.

Because the Hudson River Research Reserve's sentinel site in Tivoli Bays was located more than 100 miles away from the closest National Water Level Observing Network station, local tidal datums needed to be extrapolated from the Battery station in New York City to conduct data analysis. In 2014, the Turkey Point tide station, located on the western shore of the Hudson River approximately one mile from the sentinel site, was constructed through a partnership with the New York State Department of Environmental Conservation's Hudson River Estuary Program and the NOAA Center for Operational Oceanographic Products and Services. As was mentioned in the education and science communication section, this station, the first of its kind in the national reserve system, has been lauded for providing real-time tidal information to the maritime industry.

The reserve staff has been very active providing information about program successes to the other reserves within the National Estuarine Research Reserve System. The Hudson River Research Reserve has also conducted a number of workshops with regional partners and has provided direct technical assistance to other reserves.

Recommendation: The New York Department of Environmental Conservation should continue to recognize the role of the reserve as a part of a national system in supporting out-of-state travel to ensure that reserve staff members are gaining as much knowledge as possible from system partners.

Implementation of General Requirements

Although this evaluation has focused primarily on the three target areas identified before the site visit, the Hudson River Research Reserve has also achieved other objectives.

- The 2018-2022 draft management plan for Hudson River National Estuarine Research Reserve was submitted to the Office for Coastal Management on June 12, 2018.
- The Hamersley Barn has been in an advanced state of disrepair for many years and has been a concern for safe public access to the Tivoli Bays component of the reserve. As of the fiscal year 2018 New York state budget, the reserve has received funding for demolishing the barn, and it will be removed.

As mentioned previously, stakeholders were contacted in a number of different ways. One concern expressed by researchers was the difficulty in obtaining overnight lodging near the reserve to enable them to pursue continuing research within the reserve.

Recommendation: The Hudson River Research Reserve should consider developing overnight lodging accommodations for researchers. This might be accomplished by working in conjunction with the Office of Parks, Recreation, and Historic Preservation to adapt existing facilities.

Another concern was related to the facilities at the reserve. The 2008 restoration of the reserve's facilities at Norrie Point has created an excellent home for the reserve's programs, yet several physical needs were identified during the site visit.

- Phone and internet connections are badly in need of an upgrade.
- The parking lot is quite difficult for both employees and visiting groups to maneuver.
- The partnership with the Sloop Clearwater, a floating education facility, could be enhanced if docking facilities were available at Norrie Point.
- As mentioned above, dormitory facilities are needed for visiting researchers.

These facilities and others like them are eligible for planning, design, and construction funding using NOAA Procurement, Acquisition and Construction (PAC) funds. The reserve may want to be more active in seeking PAC funds to address facilities issues.

Recommendation: The Hudson River Research Reserve should work with the Office of Parks, Recreation, and Historic Preservation to develop a more resilient parking lot at the Norrie Point offices.

Evaluation Metrics

Beginning in 2012, national estuarine research reserves began assessing their success by tracking three evaluation metrics specific to their programs. The evaluation metrics include a five-year target and provide a quantitative reference for each program about how well it is meeting the goals and objectives it has identified as important to the program.

Goals and Objectives are from the *Hudson River National Estuarine Research Reserve Revised Management Plan 2009-2014*.

METRIC 1

Goal: Increase informed decision-making to protect and enhance estuarine habitats.

Objective: By 2017, decision-makers have an increased awareness of climate change impacts and increasingly plan for adaptation.

Strategy: The Hudson River Sustainable Shorelines Project, led by the reserve manager with active participation of reserve training program, habitat restoration, and research staff and a large team of partners, will develop and promote recommendations for managing coastal shorelines along the tidal Hudson in a way that enhances ecological function and promotes resilience to projected sea level rise and changing storm and flooding patterns. The Sustainable Shorelines Project team prepared the guide *Managing Shore Zones for Ecological Benefits*, and further guidance will be available in 2014. (Further discussion of this strategy appears in our management plan on pages 39, 43, 46-48, 61, 62.)

Performance Measures: Over the five-year period, a combination of shoreline projects that adopt at least three recommendations from the guidance on best management practices, and shoreline demonstration projects completed.

Targets: Over the five-year period, a combination of five shoreline projects that adopt at least three recommendations from the guidance on best management practices, and shoreline demonstration projects completed.

First Year Results: **0**

Second Year Results: **1**

Third Year Results: **0**

Fourth Year Results: **2**

Fifth Year Results: **3**

Cumulative Results: 6 (exceeded target)

Discussion: The Hudson River Research Reserve has been actively seeking to implement the results of the Sustainable Shorelines Project, and has exceeded the target for this five-year period.

METRIC 2

Goal: Increase informed decision-making to protect and enhance Hudson River habitats.

Objective: By 2017, decision-makers have an increased knowledge and capacity to protect upland and aquatic biodiversity, plan for climate adaptation, and use science-based information.

Strategy: The reserve's Estuary Training Program will offer workshops, forums, and conferences to priority audiences (land and natural resource managers, watershed coordinators, citizen scientists, planners, engineers, municipal officials, and advocates) in scientific topics important to resource management and climate adaptation, management processes and tools, and technical skills development. (Further discussion of this strategy appears in our 2010-2014 Final Management Plan in Chapter VI.) The Coastal Training Program also tries to reach out to new audiences and develops training programs to meet their needs. At times, such innovative programming may not initially score as high in "training participants reporting intent to apply knowledge or skills," but trainings are then revised to improve their effectiveness and scores.

Performance Measure: Percent of training participants reporting intent to apply knowledge or skills.

Target: Between 2012 and 2017, 85 percent of training participants report intent to apply knowledge or skills.

First Year Results: **72%**

Second Year Results: **69%**

Third Year Results: **79%**

Fourth Year Results: **88% (exceeded target)**

Fifth Year Results: **75%**

Cumulative Results: **N/A (raw numbers unavailable)**

Discussion: The Hudson River Research Reserve has continued to reach out to new audiences, and has been successful in exceeding the target in one of the past five years. As described above, new audiences may not immediately be able to use the information gained; however they may use their new knowledge in future situations.

METRIC 3

Goal: Increase estuarine and climate literacy to promote active stewardship and environmentally sustainable behaviors and decisions.

Objective: By 2017, middle, high school and college educators and students have an increased understanding of the Hudson River estuary, and make connections between their actions and the health of the estuary and its inhabitants.

Strategy: Reserve educators, working in partnership with the Hudson River Estuary Program, will offer programs at the Norrie Point Environmental Center to middle, high school, and college students, and will offer opportunities for student scientific explorations, for instance through the “Day in the Life of the Hudson River Estuary” event and the Citizen-Science Eel Project. (Further discussion of this strategy appears in our 2010-2014 Final Management Plan on pages 53-54.)

Performance Measure: Number of grade 5-12 and college students, per year, who engage in a hands-on scientific experience along the Hudson River estuary.

Target: 3,000 5th to 12th grade and college students per year engage in a hands-on scientific experience along the Hudson River estuary.

First Year Results: **7,432**

Second Year Results: **8,219**

Third Year Results: **9,558**

Fourth Year Results: **8,445**

Fifth Year Results: **12,287**

Cumulative Results: **45,941 (exceeded target)**

Discussion: The Hudson River Research Reserve has continued to develop both classroom and field opportunities for students in the 5th through 12th grades that attract a growing number of students.

Conclusion

For the reasons stated herein, I find that the New York State Department of Environmental Conservation is adhering to the programmatic requirements of the Coastal Zone Management Act and its implementing regulations in the operation of the Hudson River National Estuarine Research Reserve.

These evaluation findings contain no necessary actions and eight recommendations. The recommendations must be considered before the next regularly scheduled program evaluation, but they are not mandatory at this time. Program recommendations that must be repeated in subsequent evaluations may be elevated to necessary actions.

This is a programmatic evaluation of the Hudson River National Estuarine Research Reserve that may have implications regarding the reserve's financial assistance awards. However, it does not make any judgment about or replace any financial audits.

signed Keelin S. Kuipers
Keelin S. Kuipers
Deputy Director
NOAA Office for Coastal Management

dated December 19, 2018
Date

Appendix A: Response to Written Comments

No written comments were received.