# Final Evaluation Findings

## Jacques Cousteau
## National Estuarine Research Reserve

September 2007 to August 2016

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Office for Coastal Management
National Ocean Service
National Oceanic and Atmospheric Administration
United States Department of Commerce

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# Summary of Key Findings

The Coastal Zone Management Act requires the National Oceanic and Atmospheric Administration to conduct periodic evaluations of the performance of states and territories with federally approved coastal management programs. This evaluation conducted by the Office for Coastal Management examined the operation and management of the Jacques Cousteau National Estuarine Research Reserve for the period from September 2007 to August 2016. The evaluation focused on three target areas: coastal resilience, sector integration, and organizational partnerships.

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

**Accomplishment**: The work of the Jacques Cousteau Reserve has led to the reduction of vulnerability of life and property in Tuckerton and other communities along the New Jersey Coast through the many trainings and hours of direct technical assistance. The effects of this work can be seen through the number of communities that have increased their scores and participation in the National Flood Insurance Program's Community Rating System.

**Accomplishment:** The Jacques Cousteau Reserve has been instrumental in identifying and promoting information about resilience to a variety of audiences. As a result of these efforts, they have received significant recognition and awards for their accomplishments.

**Accomplishment:** The Jacques Cousteau Reserve has developed numerous projects that integrate the research, education, stewardship, and coastal training program sectors based on a science to management model.

**Accomplishment:** The Jacques Cousteau Reserve's coastal training program has become a model for the rest of the National Estuarine Research Reserve System and for training and technical assistance in general. The reserve conducted more than 70 trainings with more than 20,000 contact hours for educators and nearly 2700 hours of technical assistance based on research conducted at the reserve.

**Accomplishment**: Increasing numbers of citizens are engaged in citizen science efforts at the Jacques Cousteau Reserve supporting research efforts to monitor ichthyoplankton; participate on research projects; and support exhibit interpretation, community education, marine debris removal, and the Shore Bowl.

**Accomplishment:** The Jacques Cousteau Reserve has leveraged National Estuarine Research Reserve System appropriations to provide significant levels of funding to support the efforts of the reserve.

**Accomplishment:** The Jacques Cousteau Reserve has successfully worked with the Tuckerton Seaport to recover from the impacts of Hurricane Sandy to reopen an improved public interpretive exhibit.

**Recommendation:** The Jacques Cousteau Reserve should take advantage of any opportunities to solidify their status as leaders in coastal resilience by establishing themselves as a Coastal Resilience Institute that promotes research, training, education, and resource management technical assistance.

**Recommendation:** The Jacques Cousteau Reserve should include an examination of flooding on Great Bay Blvd. in its update of the reserve's management plan, including an analysis of options such as enhancing research capabilities at the NERR education center to supplement facilities at the lab, which may be inaccessible during storm events.

**Recommendation:** The Jacques Cousteau Reserve should continue to improve public access opportunities between the Tuckerton Seaport Museum and the reserve education center to encourage use of the recently completed nature trails.

**Recommendation:** The Jacques Cousteau Reserve is encouraged to seek new partnerships and enhance existing ones that will allow broader application of their resilience efforts with other coastal states and reserve's throughout the National Estuarine Research Reserve System.

**Recommendation:** The Jacques Cousteau Reserve should seek to broaden the interaction with the host New Jersey Agriculture Experiment Station and take advantage of this relationship to strengthen existing partnerships and establish new ones with the other programs of the Experiment Station.

**Necessary Action:** The Jacques Cousteau Reserve must work with the NOAA Office for Coastal Management to develop within 90 days of the receipt of the final evaluation report an agreed-upon timeline for the adoption of the final management plan. [1]

This evaluation finds that Rutgers University 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 Jacques Cousteau National Estuarine Research Reserve.

[1] The reserve submitted a draft management plan in April 2017.

# Program Review Procedures

The NOAA Office for Coastal Management evaluated the Jacques Cousteau National Estuarine Research Reserve in fiscal year 2016. The evaluation team consisted of Ralph Cantral, evaluation team lead, Nina Garfield, site liaison, and Randall Schneider, Mid-Atlantic region lead, all from the NOAA Office for Coastal Management; and Aitza Pabón-Valentin, manager of the Jobos Bay National Estuarine Research Reserve in Aguirre, Puerto Rico. The support of the Jacques Cousteau NERR staff was crucial in conducting the evaluation, and their support is most gratefully acknowledged.

NOAA sent a notification of the scheduled evaluation to Dr. Bradley Hillman, Director of Research at the New Jersey Agricultural Extension Station, Rutgers University, on March 7, 2016, and published a notice of "Intent to Evaluate" in the *Federal Register* on June 22, 2016. The Jacques Cousteau Reserve posted a notice of the public meeting and opportunity to comment in the Asbury Park Press.

The evaluation process included a review of relevant documents and a survey of stakeholders, which helped identify three target areas for the evaluation: coastal resilience, sector integration, and organizational partnerships. A site visit was conducted and 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 improve the implementation of the reserve's programs. In addition, a public meeting was held on Tuesday, July 19, 2016, at 6:00 p.m. at 130 Great Bay Boulevard, Tuckerton, New Jersey 08087, to provide an opportunity for members of the public to express their opinions about the implementation of the coastal program.

Stakeholders and members of the public were also given the opportunity to provide written comments via email or U.S. mail through Friday, August 26, 2016. No written comments were received from the public or interested parties.

Final evaluation findings for all national estuarine research reserves 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).

**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.

# Evaluation Findings

## Coastal Resilience

### *Examples of Key Efforts*

Hurricane Sandy provided an excellent opportunity for the Jacques Cousteau National Estuarine Research Reserve to demonstrate a wide range of skills and abilities. The reserve's ability to understand the impacts of the storm and to penetrate the social fabric of adjacent coastal communities helped to achieve a significant change in efforts to rebuild heavily impacted coastal communities.

The reserve undertook a number of efforts to reach out to the local community as well as other coastal communities in the coastal area. The *Getting to Resilience* website provided tools such as the NJ Floodmapper to allow individuals and communities to examine exposure to coastal storms, nuisance flooding, and other threats. This website, combined with hands on technical assistance helped communities to better understand the vulnerabilities of both built communities and the ecosystems on which they depend.

Through this work, the reserve recognized that decision makers, whether local officials or homeowners needed to receive messages in such a way that it would bring about action. To further their efforts, the reserve initiated social science research to better understand how people receive information and what messages resonate in a way that will bring about positive change in how coastal communities build and rebuild after disasters.

In partnership with the New Jersey Department of Environmental Protection's coastal management program, the resilience messages have been exported to other coastal communities around the state. This partnership resulted in the creation of new staff positions, funded by the coastal program, to enable the reserve to provide training and technical assistance to more communities. The reserve also took advantage of existing meetings where they could share their expertise related to resilience. The annual New Jersey Planning Conference, a forum for planning and development practitioners was one such opportunity, and reserve staff also conducted trainings for the New Jersey real estate and appraisal communities, as well as the New Jersey Emergency Preparedness conference.

A major achievement of the reserve's resilience work was that New Jersey was chosen as one of only eight states to receive an award under the National Disaster Resilience Competition sponsored by the U.S. Department of Housing and Urban Development and the Rockefeller Foundation. The State of New Jersey will receive $15,000,000 in funding to support the creation of a Regional Resiliency Planning Grant Program that will help regions and communities that experience significant flooding to undergo a comprehensive planning process to identify and address vulnerabilities due to increased flooding risk, and for work with university partners to develop a toolkit of best practices for communities to assess their flooding risks and develop resilience building codes and plans. The partnership between the reserve and the New Jersey

Department of Environmental Protection was the prototype for this project. Similarly, the partnership with the Department of Environmental Protection helped the state secure more than $450,000 in NOAA Regional Coastal Resilience funding for resilience planning in the Two Rivers region, an effort in which the reserve will also collaborate.

The reserve has also worked to export their resilience models to other states and reserves in a number of ways. They have provided risk and vulnerability communication training at the National Estuarine Research Reserve System annual meeting; developed articles for publications; and obtained additional funding to export resilience work through dialogues with the Wells (ME) and Waquoit Bay (MA) communities. In addition, the reserve has conducted briefings on resilience for legislative staff in Washington, DC.

Unfortunately, one area that is vulnerable to rising waters has direct impacts on the reserve. During storm events, the Reserve's joint lab facilities with Rutgers University are cut off from the Reserve headquarters and education center during storms and very high tides. Although the flooding of Great Bay Boulevard is a known and accepted risk to the reserve, there have been no serious impacts to reserve properties or employees to date. The flooding of Great Bay Boulevard remains a topic that should be addressed as the reserve updates its management plan.

***Findings for Coastal Resilience***

**Accomplishment**: The work of the Jacques Cousteau Reserve has led to the reduction of vulnerability of life and property in Tuckerton and other communities along the New Jersey Coast through the many trainings and hours of direct technical assistance. The effects of this work can be seen through the number of communities that have increased their scores and participation in the National Flood Insurance Program's Community Rating System.

**Accomplishment:** The Jacques Cousteau Reserve has been instrumental in identifying and promoting information about resilience to a variety of audiences. As a result of these efforts, they have received significant recognition and awards for their accomplishments.

**Recommendation:** NOAA's Office for Coastal Management recommends that the Jacques Cousteau Reserve take advantage of any opportunities to solidify their status as leaders in coastal resilience by establishing themselves as a Center of Excellence that promotes research, training, education, and resource management.

**Recommendation:** NOAA's Office for Coastal Management recommends that the Jacques Cousteau Reserve include an examination of flooding on Great Bay Boulevard in its update of the reserve's management plan, including an analysis of options such as enhancing research capabilities at the NERR education center to supplement facilities at the lab, which may be inaccessible during storm events.

## Sector Integration

### *Examples of Key Efforts*

A hallmark of the National Estuarine Research Reserve System is a commitment to provide science for resource management. The Jacques Cousteau Reserve exhibits this commitment in several ways.

The reserve has shown a willingness to collect and make available long-term data sets. The partnership with researchers from Rutgers University continues to provide not only current state of the art science, but also access to researchers who have been studying the Mulucca River/Great Bay area for decades. These long-term data sets have also proven useful to many projects along the New Jersey coast, and beyond, as some of the area-wide projects such as the establishment of regional monitoring protocols for shoreline change in partnership with the National Park Service and the U.S. Fish and Wildlife Service. This on-going project focuses on the changing geomorphology of the Atlantic coast from Massachusetts to Virginia.

The reserve has also been quick to adopt innovative and integrative technologies and their research has proven useful to resource managers in many ways. The reserve was one of the first to use autonomous underwater vehicles to track fish movement in the wild. The *Striper Tracker* is a project to study fish migration along the coast using acoustic tagging and listening. This project has provided information not only about fish movement, but also about essential habitat for the species. Data from the project has also been used to provide crucial information for dredging project permitting.

Efforts to share research across the other sectors are exemplified by the Data in the Classroom and Estuaries 101 programs. These programs illustrate the successful integration of the research and education sectors, as does the continuing effort to bring researchers to reserve and community training programs to share their findings. In addition, the number of local residents participating in citizen science activities continues to increase. The reserve may want to consider developing an internal performance metric that evaluates how well the research published by the reserve supports management and education. In this way, the sectors would become even more integrated.

An example of cooperation between the research and stewardship sectors of the reserve conduct wetland assessments that are examining thin layer deposition strategies for restoring wetlands. This information will help resource managers throughout the region to better understand and adapt to sea level rise.

In its role as a sentinel site, the reserve has implemented a number of SETs, vegetation transects and a temporary tide station. The trajectory of the Tuckerton Peninsula will be studied to provide information for the coastal training program to help nearby communities develop adaptation strategies for shoreline change.

***Findings for Sector Integration***

**Accomplishment:** The Jacques Cousteau Reserve has developed numerous projects that integrate the research, education, stewardship, and coastal training program sectors based on a science to management model.

**Accomplishment:** The Jacques Cousteau Reserve's coastal training program has become a model for the rest of the National Estuarine Research Reserve System and for training and technical assistance in general. The reserve conducted more than 70 trainings with more than 20,000 contact hours for educators and nearly 2,700 hours of technical assistance based on research conducted at the reserve.

**Accomplishment**: Increasing numbers of citizens are engaged in citizen science efforts at the Jacques Cousteau Reserve supporting research efforts to monitor ichthyoplankton; participate on research projects; and support exhibit interpretation, community education, marine debris removal, and the Shore Bowl.

## Organizational Partnerships

***Examples of Key Efforts***

One indicator of the success of the reserve's partnerships has been the ability to bring in outside funding to conduct research and education and training programs. The reserve has received 75 grants worth more than $10 million since 2007 to supplement the NERR system funding.

The Barnegat Bay Partnership is a National Estuary Program located adjacent to the reserve. The reserve has a close relationship to the Partnership, as the reserve manager and Partnership director serve on each other's advisory boards. This partnership has allowed the reserve to expand the range of available data to include Barnegat Bay in addition to Great Bay and the Mullica River, providing a range that can compare the impacts of more developed shorelines with the relatively undisturbed areas of Great Bay and Mullica River. It also has placed the reserve in a key position to be aware of new developments and projects related to stormwater pollution abatement within their watershed.

The reserve has taken a leadership position on identifying shoreline change along the Atlantic coast. The reserve's stewardship coordinator has been working closely with both the National Park Service and the U.S. Fish and Wildlife Service to collect and analyze beach geomorphology information. The project has proven useful in helping to locate National Park Service facilities in areas that are less vulnerable to shoreline change.

A partnership with Stockton University has brought a diverse set of undergraduate students to the reserve. They have provided assistance with collecting SWMP data and performing analysis that has taken advantage of the college's close proximity to the reserve. This collaboration has

yielded benefits not only to the reserve, but also to the college, as they find that the ability to undertake field research as undergraduates is an excellent way to market their programs as opportunities.

The reserve's primary interface with the public is the *Life on the Edge* exhibit. This interactive display is located at the Tuckerton Seaport and Baymen's Museum, a reconstructed maritime village located on Highway 9, approximately one-quarter mile from the reserve's education center. The reserve's partnership with the Seaport provides the reserve with a very accessible location for interaction with the public. The exhibit was closed for several years due to damages from Hurricane Sandy, but has been renovated and reopened in the fall of 2016. The reserve recently completed a new interpretive trail at the education center. This trail will provide an outdoor space for education programs and may provide and interpretive opportunity to the public as well.

### *Findings for Organizational Partnerships*

**Accomplishment:** The Jacques Cousteau Reserve has leveraged National Estuarine Research Reserve System appropriations to provide significant levels of funding to support the efforts of the reserve.

**Accomplishment:** The Jacques Cousteau Reserve has successfully worked with the Tuckerton Seaport to recover from the impacts of Hurricane Sandy to reopen an improved public interpretive exhibit.

**Recommendation:** NOAA's Office for Coastal Management recommends that the Jacques Cousteau Reserve continue to seek new partnerships and enhance existing ones that will allow broader application of their resilience efforts with other coastal states and reserve's throughout the National Estuarine Research Reserve System.

**Recommendation:** NOAA's Office for Coastal Management recommends that the Jacques Cousteau Reserve examine ways to establish better public access opportunities between the Tuckerton Seaport Museum and the reserve education center to encourage use of the recently completed nature trails.

**Recommendation:** NOAA's Office for Coastal Management recommends that the Jacques Cousteau Reserve seek to broaden the interaction with the host New Jersey Agriculture Experiment Station and take advantage of this relationship to strengthen existing partnerships and establish new ones with the other programs of the Experiment Station.

## Implementation of General Requirements

The reserve has not completed an update of its Management Plan adopted in September 2010. NOAA regulations require an updated Management Plan once every five years. [2]

With all of the strengths related to the focus areas of this evaluation, it is hard to believe that the reserve is operating from an out of date management plan. It is a testament to the abilities of the reserve manager and staff members are managing to stay on course as a well-integrated machine with the flexibility to immediately shift focus and bring its capability to bear on events such as Hurricane Sandy. The development of a new management plan provides an opportunity for the reserve to manage its growth and changes over the next 5-10 years.

The unplanned delay in the management plan revision has had at least one positive consequence, however. By preparing the plan at this time, it has enabled the reserve to align its priorities with the Barnegat Bay Partnership. The two entities are currently working together to ensure the maximum alignment between their strategic plans.

**Necessary Action:** The Jacques Cousteau Reserve must work with the NOAA Office for Coastal Management to develop within 90 days of the receipt of the final evaluation report an agreed-upon timeline for the adoption of the final management plan. [3]

[2] 15 CFR 921.33(c)

[3] The reserve submitted a draft management plan on April XX, 2017.

## Evaluation Metrics

Beginning in 2012, National Estuarine Research Reserves began tracking their success in addressing 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.

**Metric 1: Community Education**

**Goal:** The K-12 community and the general public possess increased awareness and understanding of estuaries and coastal watersheds, and the effects of human behavior and natural change on them.

**Objective:** Improve the capacity and skills of coastal decision makers to use and apply science-based information in decisions that affect estuaries and coastal watersheds.

**Strategy:** The Reserve will offer programs on estuarine and climate literacy focused on behavioral change and science-based decision making to promote resource conservation. Community education programs will be delivered to watershed residents. Community education participants will complete workshop evaluations and follow-up evaluations to assess application of stewardship activities.

Further details on program strategies and information regarding the community education programs can be found on pages 95-105 of the Management Plan and placed into context from notes of the 2011 Education Sector Annual Meeting located on the NERRS Intranet and current voluntary Education Performance measures.

**Performance Measure:** The percentage of community education participants who acknowledge that their decisions play a role in the stewardship of estuaries and coastal wetlands.

**Target:** Between 2012 and 2017, 75 percent of community education participants would acknowledge their role in protecting estuaries and coastal wetlands.

**Fiscal Year (FY) 2012 Annual Data:** 100% of coastal education participants
**FY 2013 Annual Data:** 100% of coastal education participants
**FY 2014 Annual Data:** 100% of coastal education participants
**FY 2015 Annual Data:** 100% of coastal education participants

**Cumulative Data:** 100% of coastal education participants

**Discussion:** The reserve has exceeded its target for this category. At the end of training and participation events, 100 percent of participants have acknowledged their role in protecting estuaries and coastal wetlands.

**Metric 2: Peer reviewed research**

**Goal:** Key management information needs, especially with respect to eutrophication, habitat loss and alteration, effects of climate change and sea level rise on coastal communities and resources, and resource conservation are supported with advanced coastal and estuarine research and observing capabilities at relevant time and space scales.

**Objective:** Promote the reserve as a long-term study site for use by federal, state, local, and private academic organizations.

**Strategy:** The Reserve will design and implement comprehensive research and monitoring projects that target nutrient inputs to coastal waters, human alteration of habitat and water quality, and effects of climate change on coastal and estuarine systems.

**Performance Measure:** Number of peer-reviewed research projects published and monitoring projects conducted by staff and partners.

**Target:** Between 2012 and 2017, five articles based on research done within the reserve will be published in peer-reviewed journals.

> **FY 2012 Annual Data:** Eleven articles were published in peer-reviewed journals.
> **FY 2013 Annual Data:** Zero articles were published in peer-reviewed journals.
> **FY 2014 Annual Data:** Seven articles were published in peer-reviewed journals.
> **FY 2015 Annual Data:** Thirteen articles were published in peer-reviewed journals.
>
> **Cumulative Data:** Thirty-one articles based on research done within the reserve have been published in peer-reviewed journals.

**Discussion:** The reserve has exceeded the target for this category. One must recognize that completing research and subsequently publishing findings in journals is difficult to predict on an annual basis, the cumulative data may more accurately reflect the level of achievement. The cumulative data supports the findings of this evaluation that the research conducted at the reserve is very high quality, is extensively published, and is focused on application to resource stewardship throughout the region.

**Metric 3: Coastal Training**

**Goal:** Coastal decision-makers use science-based information to manage New Jersey's natural resources.

**Objective**: Coastal decision makers will use decision support tools and reserve products to address local and regional management needs and coastal decision makers will recognize the reserve's coastal training program as a resource for scientific information relevant to resource management issues.

**Strategy:** The best available information, tools, and technology will be disseminated to help partners and coastal communities adapt to and prepare for the effects of sea level rise. This information will be provided to CTP participants through workshops, training opportunities, hands on technical assistance and an online mapping website. CTP participants will complete workshop evaluations and follow-up evaluations 6 -12 months after workshops to assess application of the tools and information provided. For purposes of the evaluation measure and target associated with this evaluation metric, "information" includes information, tools, and technology.

**Performance Measure:** The percentage of coastal decision makers indicating that sea level rise and coastal flooding information provided by the reserve will be used for decision-making and land acquisition.

**Target:** Between 2012 and 2017, 30 percent of coastal decision makers attending workshops or receiving technical assistance from the reserve's coastal training program will use the tools in their daily lives.

**FY 2012 Annual Data:** 78.9 percent of coastal decision makers
**FY 2013 Annual Data:** 81.6 percent of coastal decision makers
**FY 2014 Annual Data:** 91.7 percent of coastal decision makers
**FY 2015 Annual Data:** 86.5 percent of coastal decision makers

**Cumulative data:** Not available due to due lack of total number of participants.

**Discussion:** The reserve has far exceeded the target for this category. As discussed in this evaluation, the reserve's coastal training program has become a model for the rest of the national estuarine research reserve system and for training and technical assistance in general.

# Conclusion

For the reasons stated herein, I find that Rutgers University is adhering to the programmatic requirements of the Coastal Zone Management Act and its implementing regulations in the operation of the Jacques Cousteau National Estuarine Research Reserve.

These evaluation findings contain one necessary action and five 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 Jacques Cousteau 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 by Dr. Jeffrey Payne
Jeffrey L. Payne, Ph.D.
Director
NOAA Office for Coastal Management

June 29, 2017
Date

# Appendix A: Response to Written Comments

No written comments were received.