

Final Evaluation Findings

Waquoit Bay National Estuarine Research Reserve

May 2007 to September 2014

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Executive Summary

The Coastal Zone Management Act requires the National Oceanic and Atmospheric Administration's Office for Coastal Management to conduct periodic evaluations of the performance of state programs participating in the National Estuarine Research Reserve System. This evaluation examined the operation and management of the Waquoit Bay National Estuarine Research Reserve (WBNERR) by the Massachusetts Department of Conservation and Recreation (DCR), the designated lead agency, for the period from May 2007 to September 2014. The evaluation focused on three target areas: resource protection, climate change and resilience, and 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 reserve. The evaluation came to these conclusions:

Accomplishment: Since the last evaluation period, WBNERR has successfully acquired lands, completing two acquisition projects (24.2 acres total), with another in progress (9 acres). These are strategic acquisitions in terms of salinity gradient and habitat restoration representation.

Accomplishment: The reserve has an excellent research infrastructure, as exemplified by the reserve's sentinel site and Salt Marsh Observatory. The Salt Marsh Observatory contains an innovative, one-thousand foot experimental boardwalk and associated platforms. The unique design is now being used by others (reserves and coastal programs) as a template and best practice for accessing sensitive areas without causing damage.).

Accomplishment: WBNERR is highly regarded as a climate leader on Cape Cod, exemplified by its designation as a sentinel site, its pivotal role in organizing the Cape Coastal Conference and a suite of other decision-maker and teacher trainings and community and school educational programs, the Bringing Wetlands to Market project, and its mitigation planning and community resilience efforts. Seamless integration of the sectors at WBNERR has led to explosive growth in this area, from, for example, zero climate change and resilience research projects in 2007 to seventeen in 2014, and the subsequent use of the data produced through those projects by other reserve sectors.

Accomplishment: WBNERR received and leveraged a \$1.3 million grant from the National Estuarine Research Reserve System (NERRS) Science Collaborative for the Bringing Wetlands to Market project. This project is a collaboration with a diverse contingent of researchers and end users (Woods Hole Oceanographic Institution, Marine Biological Laboratory, U.S. Geological Survey, University of Rhode Island, Florida International University, Restore America's Estuaries and the Manomet Center for Conservation Sciences) to generate science and management tools with the potential to bring coastal wetlands into international carbon markets and incentivize investment in tidal wetland restoration and preservation.

Accomplishment: The Mashpee National Wildlife Refuge, a flagship partner, together with its ongoing partnership with the Mashpee Wampanoag Tribe, provides a good example of tribal-state-federal cooperation. Together, the reserve works with the Mashpee Wampanoag Tribe, U.S. Department of Interior, U.S. Geological Survey, U.S. Fish and Wildlife Service, Commonwealth of Massachusetts, and Woods Hole Oceanographic Institution on stewardship issues and a cultural education program, resulting in expanded education and conservation footprints.

Necessary Action: DCR must take all steps necessary to ensure enforcement on the reserve properties—particularly those on Washburn Island—and ensure that lands are being managed consistent with the purposes for which the reserve was designated (16 U.S.C. §1461. Section 315 b(2)(B)(C)—such that the pieces that make up the NERR are protected for long-term research and education), and in accordance with both the missions of WBNERR and DCR. These steps should include (1) convening a meeting of applicable enforcement authorities at local, state, and federal levels, (2) establishing a plan with long-term protection provisions for Washburn Island, including a dock, and (3) utilizing lessons learned developed by other reserves in the system. These steps must be completed before the next evaluation.

Necessary Action: WBNERR must take all steps necessary to have outstanding System Wide Monitoring Program (SWMP) data submitted and moved quickly through the quality assurance/quality control (QA/QC) process. This action must be completed within one year of the issuance of these findings, with a progress report submitted at six months, in addition to the required annual reporting on evaluation recommendations in the cooperative agreement. Failure to do so could impact fiscal year 2016 operations funding.

Necessary Action: The NOAA Office for Coastal Management requires WBNERR and DCR to take all steps necessary to employ a permanent reserve manager by July 1, 2015, in order to ensure continuity of operations and continued growth in programs and partnerships. Failure to do so may affect future funding.

Recommendation: The NOAA Office for Coastal Management strongly encourages WBNERR to systematically examine all practical alternatives, including potential partnerships, that might allow the reserve to share use of an existing structure (dock). This was also a recommendation in the 2007 312 Evaluation for Waquoit Bay National Estuarine Research Reserve, and program recommendations that must be repeated in subsequent evaluations may be elevated to necessary actions.

Recommendation: The NOAA Office for Coastal Management encourages WBNERR to develop and implement an outreach plan that will engage physical, biological, and social scientists in addressing the reserve's priority research needs and synthesis of existing data to ensure that reserve research needs are being addressed and data produced by the reserve are being used to the maximum extent possible. Options for consideration include staff support from DCR and academic partnerships.

Recommendation: The NOAA Office for Coastal Management encourages WBNERR and DCR to continue assessing the full scope of construction and maintenance needs for the historic facility to ensure ongoing maintenance and the completion of renovations. This includes filling long-standing vacancies that support maintenance needs, such as the facility supervisor and full-time laborer positions.

Recommendation: The NOAA Office for Coastal Management encourages WBNERR and DCR to jointly explore and pursue mechanisms that will enable the reserve to expeditiously apply for external funds that can enhance and expand its programs, as well as evaluate the utility of the Conservation Trust Fund to meet this need.

This evaluation concludes that the Massachusetts Department of Conservation and Recreation is adhering to the programmatic requirements of the National Estuarine Research Reserve System in the operation of the Waquoit Bay National Estuarine Research Reserve.

Program Review Procedures

The NOAA Office for Coastal Management evaluated the Waquoit Bay National Estuarine Research Reserve in fiscal year 2014. The evaluation team consisted of Sacheen Tavares-Leighton, evaluation team lead; Carrie Hall, evaluator; Alison Krepp, site liaison; Rebecca Newhall, site liaison; Betsy Nicholson, Northeast lead; and Chris Peregrin, reserve manager, Tijuana River National Estuarine Research Reserve. The support of the reserve staff was crucial in conducting the evaluation, and this support is most gratefully acknowledged.

NOAA sent a notification of the scheduled evaluation to the commissioner of the Massachusetts Department of Conservation and Recreation and the director of MassParks, published a notice of “Intent to Evaluate” in the *Federal Register* on July 25, 2014, and notified members of Massachusetts’ congressional delegation. The reserve posted a notice of the public meeting and opportunity to comment in *The Enterprise* on August 4, 2014.

The evaluation process included a review of relevant documents, a survey of stakeholders, selection of three target areas, presentations by staff members about the target areas, and focus group discussions with stakeholders and program staff members about the target areas. In addition, a public meeting was held on Wednesday, September 10, 2014, at 4:00 p.m. at Waquoit Bay National Estuarine Research Reserve Visitor Center, 131 Waquoit Hwy (Rt. 28), Waquoit (E. Falmouth), MA 02536, to provide an opportunity for members of the public to express their opinions about the implementation of the reserve. Stakeholders and members of the public were given the opportunity to provide written comment via email or U.S. mail through Friday, September 12, 2014. The comments and the NOAA Office for Coastal Management’s responses are in Appendix A. The Office for Coastal Management then developed draft evaluation findings, which were provided to the reserve for review, and the reserve’s comments were considered in drafting the final evaluation findings.

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

Necessary Actions address programmatic requirements of implementing regulations of the Coastal Zone Management Act (CZMA). 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 CZMA §312(c).

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

Evaluation Findings

The Waquoit Bay National Estuarine Research Reserve (WBNERR) has strong relationships on Cape Cod within the scientific, education, and local communities, and is viewed as a leader in cutting-edge research, resource protection, and climate change and resilience issues. The reserve has shown extensive and ongoing program growth during the evaluation period, even with limited staffing. WBNERR's success at engaging stakeholders across the region can be attributed to the motivation and work ethic of staff members, who are also described as highly accessible, quick to respond, and able to provide appropriate assistance to stakeholders. WBNERR does a good job of managing resources, and is considered among the best at the state level for property management and managing resources. This expertise can and should be exported to other coastal parks within, and external to, the Commonwealth of Massachusetts. Given its institutional research and education and training capacity, the reserve is a center of excellence and center of knowledge for coastal management; however, it could strengthen its connections to other coastal properties (within the Commonwealth of Massachusetts). The reserve currently offers coastal interpretive training each spring and other trainings have been offered in the past for forest and park supervisors at DCR southeast parks. In addition to the trainings already provided, the reserve has opportunities to further share its expertise with land managers, providing WBNERR the opportunity to influence resource protection at a much higher level, and to gain much-needed attention and support from the higher levels of the Massachusetts Department of Conservation and Recreation (DCR).

Resource Protection

WBNERR is located on the south shore of Cape Cod, Massachusetts, in the towns of Falmouth and Mashpee, and encompasses almost 2,800 acres of land. Reserve properties represent a variety of habitats and include Washburn Island, South Cape Beach, Quashnet River, Abigails Brook, and Caleb Pond, among others. Long-term health of the reserve's natural resources is dependent on land use in the entire watershed. Therefore, WBNERR's stewardship, research and monitoring, coastal training, and education programs (sectors) work in concert to practice long-term resource protection in this representative area; sponsor applied research on the natural and human processes within the watershed; translate research results for policy makers to encourage informed decisions on coastal management issues; and promote stewardship and estuarine awareness through outreach activities designed to inform and involve the local citizenry.

The stewardship program leads long-term protection and management of the reserve's natural resources and oversees some aspects of research and monitoring. Since the last evaluation period, the reserve has strategically and successfully acquired lands, completing two acquisition projects that represent varying salinity gradients and habitat restorations. The reserve manages these (and other) lands in accordance with DCR's rules, regulations, and policies. The reserve also works well with partners in the region, coordinating management and enforcement actions

where appropriate; however, an enforcement challenge exists for WBNERR in the case of Washburn Island.

Washburn Island suffers from visitor management issues because it is a popular island with uncontrolled access. Additionally, the island managers—who are responsible for educating visitors to this heavily used area, and who live on the island during camping season (mid-May through mid-October)—do not have enforcement authority, a well-known fact to the many visitors who frequent the island. The reserve has repeatedly requested assistance from DCR on this issue; however, this has not been forthcoming. Reserve staff members mentioned a plan to gather law enforcement and other relevant personnel to discuss these issues and potential solutions. This is a good step and could be beneficial but is unlikely to resolve existing issues without sustained support and additional enforcement from state agency resources, for example.

The evaluation team urges WBNERR to continue to work with law enforcement on an ongoing basis. Most importantly, DCR must take all steps necessary to ensure enforcement on the reserve properties—particularly those on Washburn Island—and ensure that lands are being managed consistently with the purposes for which the reserve was designated. The NOAA Office for Coastal Management also encourages the reserve to plan and implement visitor impact research and monitoring, beginning with the pressing issues at Washburn Island. Based on the findings of these studies, options to address current issues may include enforcement personnel with a range of mechanisms at their disposal for enforcing regulations. WBNERR should consider working with the Office for Coastal Management on utilizing lessons learned by other reserves in the system working on similar issues—for example, the Team Ocean initiative by Rookery Bay NERR. The reserve should also consider hosting again and utilizing specific actions from the Office for Coastal Management’s Managing Visitor Use in Coastal and Marine Protected Areas (or similar) training.

The reserve has an excellent research infrastructure, as exemplified by the reserve’s sentinel site and Salt Marsh Observatory; however, there remains a long-term need for better water access, and the lack of a dock still remains an impediment to the reserve’s research and monitoring, education, stewardship, and enforcement activities. A recommendation encouraging the reserve to assess the feasibility of constructing a dock at reserve headquarters was included in the *Final Evaluation Findings, Waquoit Bay National Estuarine Research Reserve, September 2003 – June 2007*. The NOAA Office for Coastal Management strongly encourages WBNERR to continue to assess the feasibility of constructing a dock at reserve headquarters. As part of the assessment, WBNERR should systematically examine all practical alternatives, including potential partnerships that might allow the reserve to share use of an existing structure such as the nearby Waquoit Bay Yacht Club dock. Program recommendations that must be repeated in subsequent evaluations may be elevated to necessary actions.

The Salt Marsh Observatory contains an innovative, one-thousand foot experimental boardwalk and associated platforms. The unique design is now being explored by other reserves and coastal programs as a template and best practice for accessing sensitive areas without causing

damage. The Salt Marsh Observatory also contains the System Wide Monitoring Program (SWMP) salt marsh vegetation monitoring sites. WBNERR's state-of-the-art infrastructure, coupled with its proximity to premier research institutions, has enabled the reserve to host great numbers of independent research activities, placing WBNERR in the enviable position of producing highly sought after data on water quality and climate change. Research conducted at the Reserve has increased awareness about the value of coastal wetlands in storing carbon (blue carbon) and the important role these systems play in mitigating climate change (a function which has been under recognized). The study is also using the Herring Rover Restoration Project, Wellfleet, Massachusetts as an economic analysis case study to demonstrate how blue carbon can be used to support restoration projects.

These research efforts provide useful data, but their strategic application for the purposes of coastal management has yet to reach its full potential. To ensure benefit for the wider coastal management community and the reserve, the evaluation team encourages WBNERR to strategically seek out other research partners (individually or organizationally) who may be unfamiliar with the reserve. The NOAA Office for Coastal Management encourages WBNERR to communicate its research priorities to research institutions within New England, particularly Massachusetts, that are working on similar issues, ideally creating an opportunity to share and leverage opportunities and knowledge.

Additionally, although WBNERR is data rich, there is a lag in the analysis of these monitoring data, thereby reducing their utility. For this reason, the NOAA Office for Coastal Management encourages WBNERR to develop an outreach plan that will engage physical, biological, and social scientists in addressing the reserve's priority research needs and synthesis of existing data, to ensure that the monitoring data produced are being used to the maximum extent possible. Options for consideration include staff support from DCR and academic partnerships.

Of particular concern to the NOAA Office for Coastal Management are the compliance issues associated with WBNERR's SWMP data submissions over the past few years. WBNERR has not yet submitted 2009, 2010, 2011, or 2013 nutrient data. They also have not submitted 2013 water quality and meteorological data. These omissions have resulted in WBNERR being out of compliance with SWMP data submissions, in spite of repeated attempts from the Centralized Data Management Office, NOAA Office for Coastal Management, and NERRS SWMP Oversight Committee to develop a plan for remediation of the problem. Timely submission of SWMP data is a program requirement, and WBNERR's non-compliance impacts the national system as well as the reserve itself. Therefore, WBNERR must take all steps necessary to have outstanding SWMP data submitted and moved quickly through the QA/QC process.

Historically, WBNERR has focused on eutrophication studies, an area that has integrated all reserve sectors, engaged volunteers through myriad monitoring efforts and groups, and resulted in decisions at the local level, for example, a stakeholder from the Association to Preserve Cape Cod noted that the reserve's efforts have greatly contributed to the progress made in adapting fertilizer regulations across Cape Cod. There are currently six active eutrophication and estuarine nitrogen related projects at the Reserve. The Coastal Training

Program and education program integrate the information produced by WBNERR researchers into educational programs. The education staff works with school groups, taking them on field trips in their watersheds for water quality monitoring, and instructs students on equipment use, and how to analyze data collected. The education staff also trains teachers in using the SWMP graphing applications during workshops (Teachers on the Estuary and others) and at educator conferences. The Coastal Training Program includes research data and projects in local decision-maker trainings (e.g. on the Nitrex Reactive Barrier) to the extent possible.

Given the local context—increasing development pressure and populations, increasing nutrient (nitrogen) loading, decreasing estuary health and water quality, increasing costs for mitigation, and a need for support on building consensus about solutions and direction—the Coastal Training Program (CTP) focuses on ensuring that decision makers have access to relevant and needed information. CTP interventions include numerous water quality workshops and trainings on a range of topics addressing common community concerns. The CTP also hosted the First and Second Annual State of the Cape Coastal Conferences, which brought together over 200 local decision makers and ten partner organizations to share relevant science, local research, case studies, and best management practices related to coastal management efforts on Cape Cod.

It is evident that social issues are of paramount importance to the community, and the CTP is to be commended for convening the relevant parties and beginning to introduce those social issues in workshops. The local community has also been engaged through a variety of other activities, most notably the addition of Portuguese signage and brochures as well as Environmental Leadership Training for the burgeoning Brazilian community on the Cape. Also important is the reserve's engagement of the Mashpee Wampanoag Tribe. According to the tribe's assistant natural resources director, "WBNERR has had a real presence with the tribe. . . . From a trust perspective, (WBNERR is) holding the flag for NOAA—doing what is needed for the tribe to go forward." Stakeholders view the reserve as a great science and education resource through the provision of technical assistance to teachers who need help in applying the data, mentorship of students, and outreach to immigrant and tribal communities. Over the past three years, WBNERR and the tribe have worked together to educate youth about the connections between tribal knowledge and conventional science. A tribal member observed, "WBNERR has been instrumental in helping kids understand where they live and how to take care of the resource."

The CTP regularly assesses the outcomes of its trainings including longer-term follow-up surveys for select workshops. In 2011, the CTP conducted a Wastewater Impact Survey of past training participants who had participated in one or more of a series of wastewater workshops. The survey found 83% of survey respondents had shared workshop materials and content and 48% had applied the information learned to their job. As stated by CTP workshop participants, the workshop "Provided information directly relevant to my job" and "The information gained from these workshops has been very useful in developing new policies and evaluating current policies."

Decision makers have used the information from CTP waste water workshops to enhance their understanding of, and evaluate, different options available to communities including the associated regulatory requirements and processes, as their towns work to develop comprehensive wastewater management plans and implement watershed-based solutions. Given the stellar work in this area, and an acknowledgement that decisions to implement different wastewater treatment solutions have to be agreed upon and accepted at community town meetings, the evaluation team strongly encourages WBNERR to continue tracking the impacts of programming efforts and community progress towards implementing solutions as well as continuing to identify perceived and real barriers to application of knowledge and skills. Furthermore, the evaluation team urges the reserve to continue integrating social science information into community education program offerings and Coastal Training Program offerings, thus engendering more behavior change from local populations.

Accomplishment: Since the last evaluation period, WBNERR has successfully acquired lands, completing two acquisition projects (24.2 acres total), with another in progress (9 acres). These are strategic acquisitions in terms of salinity gradient and habitat restoration representation.

Accomplishment: The reserve has an excellent research infrastructure, as exemplified by the reserve's sentinel site and Salt Marsh Observatory. The Salt Marsh Observatory contains an innovative, one-thousand foot experimental boardwalk and associated platforms. The unique design is now being used by others (reserves and coastal programs) as a template and best practice for accessing sensitive areas without causing damage.

Necessary Action: DCR must take all steps necessary to ensure enforcement on the reserve properties—particularly those on Washburn Island—and ensure that lands are being managed consistently with the purposes for which the reserve was designated (16 U.S.C. §1461. Section 315 b(2)(B)(C), such that the pieces that make up the NERR are protected for long-term research and education) and in accordance with both the missions of WBNERR and DCR. These steps should include (1) convening a meeting of applicable enforcement authorities at local, state, and federal levels, (2) establishing a plan with long-term protection provisions for Washburn Island, including a dock, and (3) utilizing lessons learned by other reserves in the system. These steps must be completed before the next evaluation.

Necessary Action: WBNERR must take all steps necessary to have outstanding SWMP data submitted and moved quickly through the QA/QC process. This action must be completed within one year of the issuance of these findings, with a progress report submitted at six months, in addition to the required annual reporting on evaluation recommendations in the cooperative agreement. Failure to do so could impact FY16 operations funding.

Recommendation: The NOAA Office for Coastal Management strongly encourages WBNERR to systematically examine all practical alternatives, including potential partnerships, that might allow the reserve to share use of an existing structure (dock). This was also a recommendation in the 2007 312 Evaluation for Waquoit Bay National Estuarine Research Reserve, and program

recommendations that must be repeated in subsequent evaluations may be elevated to necessary actions.

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Climate Change and Resilience

During the evaluation period, WBNERR has shown increasing focus on and involvement in climate change and resilience issues. The reserve is highly regarded as a climate leader on Cape Cod, exemplified by its designation as a sentinel site, its pivotal role in organizing the Cape Coastal Conference, the Bringing Wetlands to Market project, and its mitigation planning and community resilience efforts. The Cape Coastal Conference is a multi-partner effort that brings scientists, practitioners, policy makers and relevant cape organizations, and is used as a forum for education and engagement on specific issues. Seamless integration of the sectors at WBNERR has led to explosive growth in this area, from, for example, zero climate change and resilience research projects in 2007 to seventeen in 2014, and the subsequent use of the data produced through those projects by other reserve sectors.

Crucial to the success of the reserve's efforts in climate change and resilience are the NERRS Science Collaborative grant and the Salt Marsh Observatory. WBNERR applied for and received a NERRS Science Collaborative (NSC) grant for \$1.3 million. This funding enabled the reserve to set up the Salt Marsh Observatory, which represents the reserve's investment in state-of-the-art, on-the-ground infrastructure, and has the added distinction of being a NOAA sentinel site. The Salt Marsh Observatory consists of a meteorological station and a one-thousand foot boardwalk, among other components, as well as over 150 plots for researchers to investigate the question of a changing climate on the coast. This infrastructure has attracted a prestigious list of principal investigators conducting research at the reserve on salt marsh evolution and greenhouse gas flux; warming effect on salt marsh biomass; and climate change-influenced range expansion on salt marsh crabs, among other projects.

With award of the NSC grant, WBNERR initiated the Bringing Wetlands to Market (BWM) project. BWM is focused on understanding the role that salt marshes play in climate change and the effect of nitrogen pollution. BWM seeks to do this through the generation of science and management tools, with the potential to bring coastal wetlands into international carbon markets and incentivize investment in tidal wetland restoration and preservation. The project is a collaboration of a diverse contingent of researchers (Woods Hole Oceanographic Institution, Marine Biological Laboratory, U.S. Geological Survey, University of Rhode Island, Florida International University, Restore America's Estuaries, and the Manomet Center for Conservation Sciences) and is currently led by WBNERR's CTP coordinator. Project collaborators

credit the reserve with award of the grant: “(There is) no question that the project would not have been funded if it weren’t for reserve staff. They had the network—knew who to, and how to contact.” The reserve’s role is valued by stakeholders, who overwhelmingly view the reserve as a convener. As one stakeholder aptly put it, “WBNERR plays more of a neutral role, bringing people together to have conversations that focus on planning and policy issues. (I) hope this continues, and keeps the line of communication open.” In addition to leading this very complex and innovative project, WBNERR is to be commended for leveraging the NSC funding to maximize the research’s potential. Transfer projects to other reserves and programs made possible through leveraged funds include the Salt Marsh Symposium, 2013 Teachers on the Estuary (TOTE) workshop, and the Blue Carbon Demonstration Pilot.

Bringing Wetlands to Market has increased the awareness of blue carbon at the local, regional, state, and national levels. It has deepened relationships among scientists, agencies, and decision makers, as well as provided learning opportunities for the next generation of coastal leaders through collaboration with the Training for the Integration of Decisions and Ecosystems Science (TIDES) program. Within this project, the Coastal Training Program educates communities about the local response to climate change and actions that people can take. Activities include “road show” meetings with state agencies that discuss management, policy, and regulatory issues related to blue carbon. The education program developed, “Bringing Wetlands to Market: A STEM Curriculum Linking Wetlands and Climate Change, which was piloted in the 2013 TOTE program. Many teachers laud the curriculum and the education program’s assistance, “TOTE was fantastic. As teachers, we needed what was fed to us. We had access to data but weren’t sure how to use it, and TOTE helped with that.”

Given the acceleration of climate change issues, reserve staff members are concerned about declining funding streams for monitoring and the loss of the graduate research fellowship. Also, given the current fiscal environment, the fact that sentinel sites are unfunded mandates within NOAA, and that the NSC grant is coming to a close, it may be challenging for WBNERR to sustain current levels of research activity and maintain the existing research infrastructure. The NOAA Office for Coastal Management recommends that WBNERR proactively explore mechanisms and develop a strategy for sustaining research efforts.

In addition to its involvement in Bringing Wetlands to Market, the CTP has also focused on enhancing community resilience through myriad efforts, such as climate change mitigation workshops that promoted energy efficiency and renewable energy programs and the Municipal Land-Based Wind Workshop Series, and several key regional workshops focused on understanding long term climate change impacts and potential adaptation responses. Through timely needs assessments, WBNERR’s Coastal Training Program has remained on the leading edge of issues and identified opportunities for working with local communities. For example, after initiating a series of climate change adaptation workshops, the reserve and a key partner, the Adaptation Network, approached the Cape Cod Commission about addressing climate change adaptation from the local level and linking best available climate science and adaptation information with local hazard mitigation planning efforts. Led by the Cape Cod Commission and supported by the reserve and the Adaptation Network, the regional Multi-Hazard Mitigation

Plan (2010) developed for Barnstable County was an early example of incorporating climate change information into a hazard mitigation plan.

Bolstered by continuing education provided through the Cape Coastal Conference and other CTP workshops conducted from 2007 to present, the reserve has addressed both climate mitigation and adaptation in its decision-maker trainings and worked with local communities to assist them in planning for climate change and coastal hazards. The reserve was instrumental in helping to shape the New England Climate Adaptation Project (NECAP), a research project led by the Massachusetts Institute of Technology that involving three other New England reserves and coastal communities. The research project was designed to evaluate the effectiveness of role-play simulations for educating the public about climate change risks and possible ways of managing them. Lessons learned from this research will help the Town of Barnstable and other Cape Cod communities better manage long-term vulnerability to climate change. Although the study focused on the Town of Barnstable, lessons learned, as well as resources produced by the project, are actively being reviewed by other municipalities that would like to adapt and use them.

In addition to NECAP, the award of a FEMA coastal community resilience grant to the Waquoit Bay Reserve Foundation – Friends of the Reserve, has enabled the reserve to initiate the “Collaborating for Cape Cod’s Coastal Resiliency” project and to tailor and pilot the Community Resilience Index (first developed in the Gulf of Mexico region) to the Cape Cod context. Through piloting this tool in the Town of Falmouth and conducting subsequent follow-up efforts the “Resilient Falmouth” project was developed under which WBNERR is working with the municipality and local businesses to enhance their readiness to address storm impacts.

Resilient Falmouth stakeholders speak very highly of the experience, stating, “The pilot highlighted that we really don’t know what we are doing, as well as our vulnerable infrastructure. It was very helpful to have candid discussions about what to do and how to do it. Really eye-opening having a lot of public discussions and talking about how to relocate infrastructure, pay for it, and incorporate resilience plans.” They also voiced their apprehension about future relations: “We (town) don’t want to be just another experiment. Funding will run out, but we need to sustain the relationship over time.” Reserve staff members are confident that this will not be the case, stating, “The FEMA grant is just a stepping stone to invest in the relationship, which will not end when the funding runs out.” The evaluation team encourages the reserve to ensure continuity of the relationship with Town of Falmouth (and others) that the reserve has supported with multi-hazard mitigation planning, since this provides an opportunity to inform local decisions.

As part of the Collaborating for Cape Cod’s Coastal Resiliency Project, WBNERR created a workgroup comprising staff from DCR, the Cape Cod Commission, Woods Hole Sea Grant, Massachusetts Coastal Zone Management Program (MA CZM), and Massachusetts Emergency Management Agency (MEMA), the Barnstable County Emergency Management Committee and several local towns. When asked about the use of StormSmart resources, reserve staff members acknowledged that there is a need to make all local officials on Cape Cod more aware

of the StormSmart coast resources which are not yet being used to the fullest degree. Reserve staff members also acknowledged that this is one of the project goals as suggested by the project working group and which the reserve will work with CZM and other workgroup members to fully develop. The reserve is cognizant that the Storm Reporter, for example, is useful for bringing community members together, and that linking to StormSmart Communities and serving as a conduit between programs would be beneficial to the project. Coupled with this is the Massachusetts Climate Adaptation Plan. Developed by the Commonwealth of Massachusetts, the climate framework encompasses much of the work that WBNERR is doing. The Education department used the StormSmart resources in their teacher professional development workshop entitled “preparing for Climate Change: Engaging Students in the Discussion” and presented about the contents of this workshop in virtual meeting of all the NERRS Education Coordinators. The NOAA Office for Coastal Management encourages the reserve to build on existing collaboration efforts with the CZM to maximize opportunities for cross pollination. Moreover, as a leader in this area, WBNERR should continue sharing climate and resilience lessons learned with other reserves within the national system, and with other state partners.

Accomplishment: WBNERR is highly regarded as a climate leader on Cape Cod, exemplified by its designation as a sentinel site, its pivotal role in organizing the Cape Coastal Conference, the Bringing Wetlands to Market project, its mitigation planning and community resilience efforts. Seamless integration of the sectors at WBNERR has led to explosive growth in this area, from, for example, zero climate change and resilience research projects in 2007 to seventeen in 2014, and the subsequent use of the data produced through those projects by other reserve sectors.

Accomplishment: WBNERR received and leveraged a \$1.3 million grant from the NERRS Science Collaborative for the Bringing Wetlands to Market project, to maximize the research’s potential. This project is a collaboration with a large contingent of researchers (Woods Hole Oceanographic Institution, Marine Biological Laboratory, U.S. Geological Survey, University of Rhode Island, Florida International University, Restore America’s Estuaries, and the Manomet Center for Conservation Sciences) to generate science and management tools with the potential to bring coastal wetlands into international carbon markets and incentivize investment in tidal wetland restoration and preservation.

Partnerships

WBNERR has shown significant growth and diversity in partnerships during the evaluation period, and is recognized among stakeholders as having the ability to “bring the right people to the table.”

Within the research and monitoring sector, program partners can be classified in five groups: (i) essential; (ii) researchers and institutions; (iii) federal; (iv) academic; and (v) nongovernmental organizations. Essential partners are the volunteer-driven programs, for example, Bay Watchers, Pond Watchers, Coast Watchers, and SWMP. The reserve is highly dependent on volunteers within these programs for assistance with data sampling, collection, and analysis.

WBNERR's prime location among other premier research institutions naturally results in collaborations, most notably with the Woods Hole Oceanographic Institution (WHOI) and Marine Biological Laboratory (MBL). The partnership between WHOI and the reserve is reciprocal, whereby WHOI routinely uses the reserve's facilities (such as storage, boat operations, moorings, infrastructure, instrumentation) and benefits from reserve assistance, and vice-versa. This is evident upon review of the many departments (geochemistry, marine geology and geophysics, biology, National Ocean Science Accelerator Mass Spectrometry Facility, and marine policy and social science) and research topics (which span from ocean acidification and carbon cycling to invasive species and radiocarbon-dating) that are in some way linked to the reserve. However, the reserve should capitalize on this relationship more and explore ways of making this relationship more beneficial to the reserve. Opportunity exists within the MBL partnership. Although the MBL library is a major marine science resource, WBNERR staff members note that the reserve does not currently have membership. The evaluation team encourages the reserve to explore a potential membership with the MBL library.

WBNERR's CTP and education programs recognize that partners are integral to programming. Accordingly, CTP's advisory group represents a wide cross-section of state agencies, academia, municipalities, and nongovernmental organizations. Relying heavily on strategic planning, the CTP aims for mutually beneficial partnerships, looks for issues of common interest, lays out partner expectations, and honors the agreement. This approach has resulted in many successful endeavors, for example, the Cape Coastal Conference and the New England Climate Adaptation Project, among others.

The education program partnered with the Wells and Narragansett Bay National Estuarine Research Reserves, which resulted in the award of a NOAA Bay Watershed Education and Training Program (B-WET) grant. The B-WET grant enabled the three reserves to launch the Teachers on the Estuary (TOTE) program, field-based professional development programs that focus on research and monitoring at the NERRS and introduce teachers to NOAA online data and activities. As a result of these efforts from 2009-2014, at Waquoit Bay Reserve alone, 87 teachers attended TOTE workshops and shared the resources with an additional 172 teachers, reaching almost 4,000 students, resulting in over sixty-seven stewardship projects back at the teacher's schools, many of which are still ongoing.

The stewardship program works very closely with federal, state, tribal, local, and nonprofit partners on all of the land management issues occurring in the watershed. The Mashpee National Wildlife Refuge is a flagship partnership, and together with its ongoing partnership with the Wampanoag tribe, provides a good example of tribal-state-federal cooperation. Together, the reserve works with the Mashpee Wampanoag Tribe, U.S. Department of Interior, U.S. Geological Survey, U.S. Fish and Wildlife Service, Commonwealth of Massachusetts, and Woods Hole Oceanographic Institution on stewardship issues and a cultural education program, resulting in expanded education, and conservation footprints. Additionally, the reserve's ongoing partnership with the Mashpee Wampanoag tribe has contributed to broader community awareness of cultural values, as evidenced by the involvement of tribal members in

reserve programming, and the inclusion of the Mashpee Wampanoag Tribe aspect in new outdoor exhibits, as well as the addition of a wetu (an authentic Wampanoag dwelling) to the Waquoit Bay campus during the evaluation period.

The reserve's volunteer program also has a strong partnership base. Established at the inception of the reserve, the volunteer program boasts 75 to 100 active volunteers at any given time. As a result of partnering with organizations and individuals, the volunteer program provides over 10,000 volunteer hours each year, with additional volunteers joining as needed for special events.

Overall, partners are very complimentary of the reserve and regard WBNERR as a very important partner within Cape Cod's science and education communities. Numerous partners (from different projects) stated that the reserve, "was an integral part of the effort," and expressed interest in sustaining and expanding relationships.

Administration

Program administrative partners include the Waquoit Bay Reserve Foundation and the Massachusetts Department of Conservation and Recreation (DCR). The Waquoit Bay Reserve Foundation was formed in 2012. This foundation is able to better address the reserve's future fundraising and grant-partnership needs, thus allowing the former group (Citizens for the Protection of Waquoit Bay) to focus on its primary mission of protecting Waquoit Bay. Actively working together, both entities engage in ongoing dialogue on how they can support each other.

Of particular interest to the evaluation team, is WBNERR's relationship with its parent agency, Massachusetts Department of Conservation and Recreation (DCR), and how it influences operations, staffing, and grants. Historically, the reserve has struggled for visibility (attention and support) within DCR, as noted in previous evaluations and more recently, on the stakeholder survey conducted as part of this evaluation. Progress has been made in this area during the evaluation period, due partly to the reorganization of DCR, and partly to the willingness of personnel on both sides to address this issue.

WBNERR is somewhat distinctive because, in addition to the natural resources, the campus contains four historic (1800s-1900s) buildings and presents numerous and costly maintenance challenges. During the evaluation period, the reserve completed construction of a maintenance facility, which then provided more space in the Carriage House for classrooms and labs. Unfortunately, the Carriage House is presently unusable, due to rotted window sills and an unstable foundation. Closure of the Carriage House impacts the reserve's ability to meet its mission, thus elevating it to the reserve's highest maintenance priority. The reserve and DCR have held ongoing discussions about this, and since the stakeholder meetings in September 2014, DCR has committed an additional \$200,000 to this project. DCR's commitment allows the reserve to use remaining funds from the NOAA Green Grant as originally intended. The evaluation team encourages the reserve to continue assessing the full scope of construction

and maintenance needs for the historic facility to ensure ongoing maintenance and completion of renovations.

Compounding this issue are long-standing maintenance staff vacancies. The reserve's maintenance staff has had substantial reductions to only one FTE, when previously there were three FTEs. To mitigate for the vacancies, WBNERR has relied on seasonal staff, correctional facility crews, and volunteers to off-set the impacts of these reductions – however, this is not ideal. Other noted staff vacancies include enforcement staff, seasonal and roving interpreters, and research positions. Stakeholders also voiced the need for a communications specialist on more than one occasion. Since the stakeholder meetings, the Facility Supervisor position has been advertised and closed, with the intention of having the position filled during Fall 2014. This is a step in the right direction, and the evaluation team urges the reserve to add another maintenance position, given that this is one of the reserve's most pressing needs. Additionally, WBNERR should consider expanding staff and explore other potential options for meeting emerging demands for seasonal and roving interpreters, as well as a communications specialist.

The evaluation team is concerned with the continuity of leadership at the reserve. Since 2007, there has been high turnover in leadership, evidenced by four reserve managers. Most recently the reserve manager resigned in April 2014, and the position is being temporarily filled by the stewardship coordinator. Stakeholders also voiced concern about the high turnover rate and "DCR's investment in finding a new director (reserve manager)," stating, "If things are going to move forward, (they) need a strong director to make things happen. Leadership needs to be solidified." The reserve manager is a program requirement, and for this reason, the NOAA Office for Coastal Management requires WBNERR and DCR to take all steps necessary to employ a permanent reserve manager by July 1, 2015, (the start of WBNERR's next cooperative agreement), as this may affect future funding.

Grant efficiencies are an area of concern for WBNERR staff members, who state that current reserve funding limits the reserve's ability to fulfill its mission. Currently, WBNERR supplements its staff funding and program shortfalls with other grants. However, the reserve has not been able to maximize the opportunities from external grants because of the 30 to 40 day DCR processing time frame. While this does not apply to federal grants, it severely limits WBNERR's ability to apply for, support, or receive non-federal grants. On occasion, the reserve has used the Waquoit Bay Reserve Foundation as a conduit for small grants (under \$25,000); however, as a newly formed group with volunteer staff, the foundation cannot support larger grants. The Conservation Trust Fund is a state vehicle for receiving non-federal funds, but the turnaround time can be challenging. However, this mechanism may help to broaden the grant opportunities that WBNERR can apply for through the state, and the reserve should investigate those possibilities.

The NOAA Office for Coastal Management encourages WBNERR and DCR to jointly explore and pursue mechanisms that will enable the reserve to expeditiously apply for external funds that can enhance and expand its programs. Additionally, the reserve should research how other state agencies with federal dollars and other reserves are applying for and administering

research grants within short time frames, and use that information to build capacity within, and work with the Friends group on how best to align roles.

Accomplishment: The Mashpee National Wildlife Refuge, a flagship partner, together with its ongoing partnership with the Mashpee Wampanoag Tribe, provides a good example of tribal-state-federal cooperation. Together, the reserve works with the Mashpee Wampanoag Tribe, U.S. Department of Interior, U.S. Geological Survey, U.S. Fish and Wildlife Service, Commonwealth of Massachusetts, and Woods Hole Oceanographic Institution on stewardship issues and a cultural education program, resulting in expanded education and conservation footprints.

Necessary Action: The NOAA Office for Coastal Management requires WBNERR and DCR to take all steps necessary to employ a permanent reserve manager by July 1, 2015, to ensure continuity of operations and continued growth in programs and partnerships. Failure to do so may affect future funding.

Recommendation: The NOAA Office for Coastal Management encourages WBNERR and DCR to continue assessing the full scope of construction and maintenance needs for the historic facility to ensure ongoing maintenance and the completion of renovations. This includes filling long-standing vacancies that support maintenance needs, such as the facility supervisor and full-time laborer positions.

Recommendation: The NOAA Office for Coastal Management encourages WBNERR and DCR to jointly explore and pursue mechanisms that will enable the reserve to expeditiously apply for external funds that can enhance and expand its programs, as well as evaluate the utility of the Conservation Trust Fund to meet this need.

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.

The goals and objectives are from the Waquoit Bay National Estuarine Research Reserve 2006-2011 Management Plan.

METRIC 1.

Goal: Improve the operations, infrastructure, and stature of the reserve. (Goal 5)

Objective: Each year, an increasing number of community members are aware of WBNERR's research, education, stewardship, or monitoring programs. (Objective 5.18)

Performance Measure: The number of new people per year that come to programs or volunteer at the reserve as a result of an off-site talk given by a reserve staff member.

Target: Thirty new people per year come to programs or volunteer at the reserve as a result of an off-site talk given by a reserve staff member.

Six-Month Progress: These data are proving difficult to gather. It is not always practical to ask the question of where people heard about the reserve, especially in a big group outside. There are definitely new people coming to the reserve as a result of outside programs, but the reserve is re-evaluating how best to capture this information.

Discussion: The reserve should re-evaluate and propose a new measure to NOAA office for Coastal Management.

METRIC 2.

Goal: Improve the understanding of coastal ecosystems and the human influences on them. (Goal 1)

Objective: Researchers and others will be able to access comprehensive information about the natural and societal environment of Waquoit Bay, its surrounding watershed and communities, both current and past. (Objective 1.5)

Performance Measure: Number of data sets made accessible through reserve website during the five-year period.

Target: Five data sets will be made accessible through the reserve website during the five-year period.

Six-Month Progress: The reserve went live with its new website in June. This was an enormous step forward as the new site has the capacity to host data sets, and can control how and when they appear. The new site also does a far more comprehensive job of showing all of the ongoing projects at the reserve. So far the new site has been populated with a list of all the current projects (monitoring and research), as well as a Featured Projects page. Links to databases will be added over the coming year.

Discussion: It is likely that the reserve will achieve the five-year target for providing access to five data sets.

METRIC 3.

Goal: Improve the operations, infrastructure, and stature of the reserve (Goal 5)

Objective: Volunteers will support implementation of reserve programs. (Objective 5.8)

Performance Measure: Percentage of volunteers who are “Satisfied” or “Very satisfied” with their volunteer experience.

Target: By 2017, 90% of volunteers are “Satisfied” or “Very satisfied” with their volunteer experience at WBNERR.

Six-Month Progress: In November, the volunteer coordinator conducted a baseline survey of volunteers to assess satisfaction: 85% of volunteers said they were “Extremely Satisfied,” overall, and 15% were “Moderately Satisfied.”

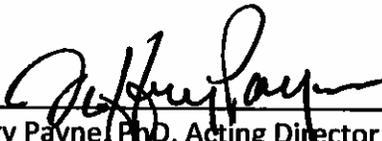
Discussion: It is unclear whether the reserve is on track to meet, or has met, the target because of the discrepancy in scales. The reserve should align the survey with the metric or vice-versa.

Conclusion

For the reasons stated herein, I find that the Commonwealth of Massachusetts is adhering to the programmatic requirements of the Coastal Zone Management Act and its implementing regulations in the operation of its approved Waquoit Bay National Estuarine Research Reserve.

These evaluation findings contain three necessary actions and four recommendations that must be considered before the next regularly scheduled program evaluation. Program recommendations that must be repeated in subsequent evaluations may be elevated to necessary actions.

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



Jeffery Payne, PhD, Acting Director
Office for Coastal Management

2/16/2015
Date

Appendix A: NOAA Office for Coastal Management’s Response to Written Comments

**Maureen Farley
Triton High School
Byfield, Massachusetts**

Comment: I would just like to say that I attended a workshop several summers ago at WBNERR entitled TOTE – Teachers on the Estuary – and enjoyed it very much. I have been teaching Marine Biology to juniors and seniors in high school for the past 15 years or so. We are lucky to have a campus which is bordered by a salt marsh, so I was already well aware of the fantastic teaching opportunities that abound in an estuarine environment. The workshop proved to be informative and also provided many potential lessons for the classroom and for field studies. It is always beneficial to get together with other teachers and share curriculum ideas – this was a great opportunity for doing that.

NOAA Office for Coastal Management’s Response: The NOAA Office for Coastal Management thanks Ms. Farley for providing input on the implementation of the program.

**Therese Goulet
Paxton Center School
Paxton, Massachusetts**

Comment: I was fortunate to be selected as a classroom teacher to join a group of teachers at Waquoit Bay this summer. From the beginning, my experience with the staff was highlighted by obvious preparedness. Joan and her staff were prepared with well-planned resources, experiences, and expert support lecturers designed with the goal in mind: that is, to help teachers both near and far from estuaries develop plans to help students understand their importance, and find ways to protect them, despite being 100 miles away. I look forward to launching my 6th grade students into this investigation! I also want to commend the staff for their kindness and ability to meet my needs for housing. I had planned on camping on Washburn Island, but the weather had other plans. Joan helped me stay in the cottage with the interns and fellow teachers. Overall, this has been one of the best PD courses I’ve taken, as it involved hands on learning, adventures, deep thinking, technology updates, and collegial interactions not often found. Hope I can attend again! Waquoit Bay and TOTE really was a truly rewarding educational experience that I hope to replicate with my three classes of 6th graders. This age group wants to adopt animals to protect their habitats, loves hiking around finding bugs to identify, wants to go out and pick up trash on 9/11. Want to find ways to harness their energy, and move it toward STEM careers eventually.

Any other resources geared at younger middle school learners would be most appreciated, as they are scientifically naive but extremely interested in all things science, having recently been released from almost complete focus on language arts and math instruction in grades K-5. My students are working at a 2nd or 3rd grade scientific literacy level, as teachers work to help kids pass ELA and Math state standards at the expense of science and social studies literacy. Hope the NGSS and Common Core will change these practices. Thank you for listening.

NOAA Office for Coastal Management's Response: The NOAA Office for Coastal Management thanks Ms. Goulet for providing input on the implementation of the program.

Ruth Zwirner

Comment: Waquoit bay reserve has been of value to our family for many years. Programs have been offered that interest elders and children which we have participated in. Programs have been educational and/or fun.

NOAA Office for Coastal Management's Response: The NOAA Office for Coastal Management thanks Ms. Zwirner for providing input on the implementation of the program.

Jayne B. Abbott

Comment: WBNERR has been a very special part of my life as a member of Citizens for the Protection of Waquoit Bay, the first Friends group. My husband's family history dates back to just prior to 1900 and Tom summered in Waquoit from 1930 till we moved here permanently in 1972. We welcomed the ACEC designation in 1979 and took part in the various steps leading to the creation of WBNERR in 1988. Tom served on the advisory committee which planned the Reserve and also served as Falmouth's representative on the South Cape Beach advisory committee. WBNERR's contributions in the areas of research and education continue to grow and the staff is dedicated to their various tasks. They are currently working with the Town of Falmouth and the Chamber of Commerce as well as planners and coastal emergency managers Cape-wide to develop a resilience tool should a severe coastal storm affect Cape Cod. This would be valuable to businesses and home owners alike. We appreciate NOAA's choosing Waquoit as one of the NERR sites.

NOAA Office for Coastal Management's Response: The NOAA Office for Coastal Management thanks Ms. Abbott for providing input on the implementation of the program.

Barry Balan
Member, Falmouth Water Stewards
East Falmouth, Massachusetts

Comment: WBNERR has been an asset to the Upper Cape Cod, because it stretches out its educational arm to communities in the Falmouth area. I have attended many seminars and events at WBNERR and have become more involved in environmental preservation especially those items that have to do with water conservation pertaining to salt water ponds and estuaries. And it's because of the educational programs at WBNERR that I have gotten involved.

NOAA Office for Coastal Management's Response: The NOAA Office for Coastal Management thanks Mr. Balan for providing input on the implementation of the program.

Mary Hubbard
Board Member, Falmouth Water Stewards
North Falmouth, Massachusetts

Comment: I think the operation and implementation plan for the Waquoit Bay National Estuarine Research Reserve, pursuant to the Coastal Zone Management Act of 1972, is both appropriate and necessary, and I am therefore in favor of its approval. Thank you for soliciting public input.

NOAA Office for Coastal Management's Response: The NOAA Office for Coastal Management thanks Ms. Hubbard for providing input on the implementation of the program.

Doug Brown
Brown Building Company
Teaticket, Massachusetts

Comment: I am a Falmouth Town Meeting Member. I also serve currently on the Falmouth Planning Board. It has been my pleasure to attend many events and learning experiences at WBNERR. As a former member of Falmouth's first Comprehensive Wastewater Management Plan Review Committee I have enjoyed attending events that directly helped me understand the hydrology and unique nature of our local watersheds to better prepare me in shaping our wastewater plan. In addition to this I was also involved in installing a ground mounted solar array as part of a solar thermal class by Cape and Island Self Reliance. The staff at WBNERR is constantly engaged with local groups and organizations in an effort to bring timely education on important issues and I find their work most effective. As the current Vice President of Falmouth Water Stewards I am most appreciative of the support and guidance we have received in establishing a local pond watch group to illustrate in our local newspaper the need to restore our estuaries to healthy condition. We are pleased to be participating in an upcoming event on September 1 at WBNERR, National Estuaries Day. The staff at WBNERR is very

professional and an invaluable resource to our county and town. Please keep them funded so they may continue their important work here.

NOAA Office for Coastal Management's Response: The NOAA Office for Coastal Management thanks Mr. Brown for providing input on the implementation of the program.

Sue Mack
Nashua Catholic Regional Junior High

Comment: I have attended TOTE 1 and TOTE 11 – these are some of the best workshops that I have ever attended. From taking these courses I have developed knowledge and skills needed to incorporate “lessons from the oceans” in both my life science and physical science classes. I would encourage development of more of these types of courses as from what I can see the science curriculum in a lot of schools is very weak when covering estuaries and/or oceans. Students need to develop an understanding of both to know how choices they personally make can have either a positive or negative impact regardless of how far or close they are to the oceans. The 2 courses have made a great impact on how I teach. I look forward to the opportunity to participate in additional workshops to further develop my understanding and teaching to have an even greater impact upon my students.

NOAA Office for Coastal Management's Response: The NOAA Office for Coastal Management thanks Ms. Mack for providing input on the implementation of the program.

Pete Sampou
Sturgis Charter Public School
Hyannis, Massachusetts

Comment: Please let me express my total support and thanks for the existence, community outreach, teacher training and educational resources that have been made available and only exist because of the breadth of both scientific and educational programs that exist at WBNERR. I have personally attended TOTE, Climate Change teacher training, and evening community engagements that have focused on pressing local watershed and water quality conditions throughout the Cape. Additionally, Sturgis has received a NOAA grant to run a 400 student per year instructional engagement with facilities and water quality data directly associated with WBNERR. Our program finished the first year (of its 3 years) with high success. This level of success was without doubt helped along by the hard work and enthusiastic involvement of WBNERR's facilities and staff. Our students and staff here at Sturgis Charter School could not have such a world class experience/educational exposure were it not for what WBNERR offers to the surrounding communities. I have been in the field of coastal ecology (biogeochemistry) for the past 34 years as a student of science, a research scientist/college professor and now as a secondary education environmental science teacher and can say, without reservation, that the

program at WBNERR is the finest program (in its total involvement with all the many facets, with the interested parties of Cape Cod) that I have encountered.

NOAA Office for Coastal Management's Response: The NOAA Office for Coastal Management thanks Dr. Sampou for providing input on the implementation of the program.

Megan Amsler
Cape & Islands Self-Reliance Corp.
Cataumet, Massachusetts

Comment: We at Self-Reliance and though CIRENEW activities have found the work and collaboration with WBNERR over the years has been great! We would love to know how we can do more moving forward. We loved doing the teacher education projects, the weatherization workshops, the wind workshops as well as doing the energy-related work with the municipalities. I was thrilled to hear Falmouth's planning office speak about the work you did getting the various departments to talk candidly about climate change vulnerabilities. I hope that is being done in many other towns. I would love to know if it is not or if it can be expanded, if we can help with that. Especially, as the energy committee has been trying to get things moving onto decision-makers radar screens to make them take the climate action stuff seriously. I was really glad to hear that those conversations are happening. Again, if there is a way to expand this to other areas of the Cape & Islands, we are interested in collaborating on that. We have enjoyed and learned a great deal from the workshops that we have attended that you guys have put on. Water Words is my favorite, but I know that Lindsey and Sarah have attended others and have come back with great ideas and feedback. You guys are easy to work with and full of inspiration. You get great speakers who address the issues and share great examples and I have always found WBNERR folks are true collaborators, which is rare!

NOAA Office for Coastal Management's Response: The NOAA Office for Coastal Management thanks Ms. Amsler for providing input on the implementation of the program.

Carri Hulet
The Consensus Building Institute

Comment: The most significant benefit to our partnership has been our NERR partners' connections and reputations in the communities in which we have worked. We have absolutely relied on our NERR CTP partners to help us identify and then get in touch with the right people. Their knowledge of local issues and understanding of the local culture and expectations has also been invaluable. It's hard to imagine how we could have done this project as collaboration with our partner towns without the NERR relationship. The only challenge I would identify is that all of our NERR partners seemed at times to be overwhelmed by too many responsibilities. Frankly, this never had a big impact on our project because (I think) they always did an excellent job of prioritizing the work we were doing together, but I'm afraid that some of their other

work may have suffered for it along the way. Also, I often felt/feel nervous to ask for more because I know they are so busy. So, if I were to give some advice or make a request, it would be to see the NERR sites as high-impact, place-based entities that are probably under-resourced and that naturally limits their reach and/or has the potential of burning out the staff.

NOAA Office for Coastal Management's Response: The NOAA Office for Coastal Management thanks Ms. Hulet for providing input on the implementation of the program, and acknowledges that budget constraints can influence a program's impact.

Richard Delaney
Center for Coastal Studies
Provincetown, Massachusetts

Comment: The Center for Coastal Studies collaborates with staff from the Waquoit Bay NERR on a number of projects ranging from water quality studies and monitoring to public information and training sessions on topics critical to Cape Cod. Without exception, every one of our interactions and partnerships has been productive and positive. Every one of our staff reports that it is a pleasure to work with such a professional, talented, thoughtful and cooperative group. Just to highlight two aspects of WBNERR's many contributions to our Cape Cod community: the Coastal Training Program continually brings attention to and solid information to about the most critical issues facing our coastal environment with each session being well-organized, advertised and the results and papers made available to all as part of excellent follow-up; and secondly, the research activities truly implement the idea of collaboration as they continually invite and involve numerous outside partners to utilize the resources of Waquoit Bay to further our knowledge of this special ecosystem. As someone who had a hand in the establishment of WBNERR, I could not be more proud of its contributions to the community. It deserves the high marks for its performance and NOAA would be wise to invest more financial resources in productive NERRS site like Waquoit Bay.

NOAA Office for Coastal Management's Response: The NOAA Office for Coastal Management thanks Mr. Delaney for providing input on the implementation of the program.

Joan L. Geggatt-Tobey
Mashpee, Massachusetts

Comment: The programs offered at the Waquoit Bay National Estuarine Research Reserve provide tremendous opportunities for children and families to become reacquainted and educate themselves about our natural resources. Our ten year old son Hunter has participated in the Waquoit Bay Summer Science School Programs for three summers. As each summer approached, his interest and heart was in attending the Summer Science programs offered at the Waquoit Bay Reserve. We truly believe his attendance in the program has created a solid foundation for years of learning. In addition, he participates in the Seine netting offered on

Saturdays exploring the bay. He takes great pleasure in spending time exploring and learning about Waquoit Bay and discovering the wildlife and their natural habitats. He is interested in learning about our environment and protecting our natural resources and conservation areas. As a tribal member of the Mashpee Wampanoag tribe, Hunter attended a Preserving Our Homelands Program. He was so thrilled to spend the day at the Reserve Headquarters and share his traditions with other campers. We have made created lasting friendships with the Directors, Interpreters and Staff at the Waquoit Bay National Estuarine Research Reserve Headquarters. Hunter is looking forward to participating in the Celebrating Estuaries and Wampanoag Coastal Traditions On Sunday, September 21st.

NOAA Office for Coastal Management's Response: The NOAA Office for Coastal Management thanks Ms. Geggatt-Tobey for providing input on the implementation of the program.

Ken Pearson

**Montachusett Regional Vocational Technical High School
Fitchburg, Massachusetts**

Comment: I am pleased to provide feedback on my experience with the Waquoit Bay National Estuarine Reserve over the past 5 years. In short, my experiences at Waquoit Bay NERR have changed my life personally and professionally! I enjoy teaching Biology, Aquatic Ecology, and Environmental topics. As part of my professional development, I attended several excellent classes as well as a Coastal Conference hosted by the reserve, but the most impactful were the Teachers on the Estuary (TOTE1 and TOTE2) classes at Waquoit and Wells, Maine. Based in central Massachusetts, it is not easy to get hands on educational experiences related to coastal environments. These classes were well designed, very informative and inspiring. We had the benefit of talented speakers from around the region to provide us with scientific information and practical hands on experiences that we could tie to the curriculum and tailor for our classes. These resources were invaluable! We also had opportunities to meet and learn from other instructors with diverse backgrounds. Many of these connections and relationships are still alive today through social media. In the summer of 2009, I was fortunate to attend the first TOTE class at Waquoit. In the fall of that year we met again to discuss our homework assignment which was to design a stewardship program for an estuary or watershed. Inspired to do this, I decided to use some local watershed resources (ponds / rivers) to create outdoor classrooms for our watershed /aquatic studies. It required getting permission from a Paper Mill based in New Jersey and the selectmen/conservation commission of local town. To make the story short, it was a success and the program has expanded every year since. The 1-semester Aquatic Ecology course has expanded into a full year environmental course. It is project oriented and we do at least 6 different field trips per year. It is so popular that we have 5 sections with about 130 students and several teachers each year. We make connections to student shops, academics (math, history, English), the community and potential jobs. In 2013, our activities received the attention of the Massachusetts Audubon and I was awarded the Massachusetts Audubon Teacher of the Year (grades 9-12). Last year, Niki Tsongas, congresswoman from Massachusetts recognized our school for our contributions to the

environment in her annual River Day. I have made several presentations highlighting our achievements...to our school committee, congressional representatives, local Rotary Club, press and others. Each time, I mention that this program started with the inspiration and education that I received from TOTE. You have a great program! Thank you! There is so much more I could say.

NOAA Office for Coastal Management's Response: The NOAA Office for Coastal Management thanks Mr. Pearson for providing input on the implementation of the program.

Stephanie A. Scherr
Fitzwilliam, New Hampshire

Comment: I have nothing but praise for NERR education coordinators Joan Muller, at Waquoit Bay, MA, and Ms. Suzanne Kahn, Wells, ME. My experience with Teachers On The Estuary (TOTE) began in 2009 at the Waquoit Bay NERR. The first education coordinator I worked with was Pat Harcourt. She was highly educated, efficient, organized and timely. At that time, Joan Muller, the current education coordinator at Waquoit Bay, was also working with the TOTE teachers. She has since become a master education coordinator who has been an asset to the Waquoit Bay community and teachers in the TOTE program. She often invites local experts to participate in programs, thereby increasing the diversity of programs with a variety of experiences and viewpoints. We always participate in interesting and innovative hands-on activities at Waquoit Bay. At that first TOTE I was introduced to Cape Cod ecology, the Estuaries 101 curriculum, SWMP data, and the stewardship project. I also met a wonderful group of dedicated teachers. My first stewardship project included composting as well as using the Hobo data loggers we were given at the workshop! In time I purchased more data loggers and used them in my classroom to collect climate data on the school campus. During that first TOTE workshop I also met Atziri Ibanez, NOAA/NERR National Education Coordinator. She participated in our TOTE and joined us at our final dinner. One of the teachers that I met at that 2009 workshop, Sue Ellen Lyons from New Orleans, Louisiana, sat with Ms. Ibanez and I. Ms. Ibanez answered our many questions about education and her job at NOAA. I was incredibly impressed. She frequently updates us on NOAA programs and shares with our NOAA Teachers on the Estuary Facebook group! Meeting Sue Ellen Lyons at the Waquoit Bay TOTE changed my life. She and I were fast friends. In 2010, when the BP oil spill in the Gulf occurred, I was very distressed and felt quite helpless. I wanted to help. I had received oiled bird training in VT and thought I could be of assistance, but I was frustrated at not being contacted to assist. I wanted to be there, experience what was taking place first hand, and share with my students. I know that first-hand experience is important to giving credibility to my work with students. A well-respected, experienced educator in her field, Sue Ellen was able to put me in touch with educators at programs on the Gulf of Mexico. I not only witnessed the oiled Gulf shores first hand, and the clean-up efforts, but I made lasting connections in the region and have continued to take workshops on the Gulf coast. In 2012, former TOTE teachers were invited to apply for TOTE II at Wells NERR, a follow up TOTE program. I enthusiastically applied and so did several of the TOTE teachers from my original group in 2009. We were all thrilled to greet each other and

meet TOTE teachers from Waquoit, Wells and Narragansett NERR programs. This was my first opportunity to meet Suzanne Kahn. Suzanne is also an expert educator. I have very much enjoyed her reflective process drawing upon writing, sharing, collaborative and interactive activities. During TOTE II we received updated training on using SWMP data (it had really improved!), had guest speakers who worked with us on estuaries curriculum and climate change, as well as reflection activities. We also have the opportunity to kayak through the estuary identifying species, impacts and improvements to the wetlands – what a joy! It was particularly nice to work with other teachers who had been dedicated to continuing education, keeping their skills and classes fresh and updated. We have all bonded and continued to collaborate with each other! At the TOTE II follow up we were treated to a behind-the-scenes tour at the Woods Hole Oceanographic Institute. We felt so honored and fortunate to be there. It was a wonderful day for us all! The image above is of our group with the original Alvin deep sea submersible. At least once a year I attend a workshop with Robert Allia, Ken Pearson, Debbi Coury and Suzanne Elliot from the TOTE II group. We all keep in touch with each other and the rest of the TOTE II group online, frequently sharing curriculum, resources and additional professional development activities. We particularly enjoy attending workshops at Waquoit Bay and Wells NERRs as we are warmly welcomed and know we will always receive quality training from the excellent staff and others they bring in to work with teachers. It's well worth our time and the long drive! I cannot say enough about how I have benefitted from them. Last year I brought my friend Necie Moore, from Key Largo, FL, to a TOTE workshop at Wells ME. She is a teacher that I met at Gulf workshop the year before. She is also a marine educator whom I collaborate with. She has now had the benefit of visiting the Gulf of Maine and comparing it to the Gulf of Mexico. You see, that is how it works – dedicated teachers working together, sharing their experiences in their own regions, and going home with a deeper understanding of our estuaries and oceans. First-hand experience on location makes all the difference! It is vitally important that teachers continue to have these experiences, which enhance our passion and dedication to conservation, so that we may pass on that love of the natural world to our students.

NOAA Office for Coastal Management's Response: The NOAA Office for Coastal Management thanks Ms. Scherr for providing input on the implementation of the program.