

Evaluation Findings

Waquoit Bay National Estuarine Research Reserve

September 2014 to June 2022

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Summary of Key Findings

Section 315(f) of the Coastal Zone Management Act (16 U.S.C. § 1451 *et seq.*) requires the National Oceanic and Atmospheric Administration (NOAA) to conduct periodic evaluations of the performance of states and territories with federally approved national estuarine research reserves. This evaluation conducted by the Office for Coastal Management examined the operation and management of the Waquoit Bay National Estuarine Research Reserve for the period from September 2014 to June 2022. The evaluation focused on three target areas: collaborative research and partnerships; education, engagement, and outreach; and staffing and program administration. The five sectors addressed by all of the national estuarine research reserves are management, research, training, education, and stewardship.

Over the course of this evaluation period, the reserve weathered significant challenges including a pandemic and several staff vacancies. Restricted access to the reserve during the pandemic impacted essential programs and activities, and the prolonged vacancy of core staff, including a Coastal Training Program coordinator and more recently the stewardship coordinator, as well as facilities and research staff, made it difficult to meet data requirements, facilities and maintenance needs, and training program targets. Despite these challenges, the reserve has conducted and hosted innovative research in the region, led several meaningful diversity, equity, and inclusion (DEI) initiatives, and collaborated with local educators and citizen groups to advance coastal management on the Cape.

The findings in this evaluation document will be considered by the NOAA Office for Coastal Management in making future financial award decisions concerning the research reserve and will be shared with the Waquoit Bay Research Reserve and the Massachusetts Department of Conservation and Recreation (henceforth referred to as DCR). The evaluation came to these conclusions:

Accomplishment: The Waquoit Bay Research Reserve has established a research advisory committee which has helped to identify and prioritize research needs as well as applications for research reserve monitoring data.

Accomplishment: The Waquoit Bay Research Reserve has sought and received external funding to participate in collaborative research projects that provide information to address coastal problems that impact both the research reserve and lands and waters throughout the region. The resulting information from many of these collaborative efforts has been applied by local and state decision-makers.

Accomplishment: Monitoring data produced by the Waquoit Bay Research Reserve is a valued resource for research reserve partners and coastal management practitioners in the Cape Cod region and beyond and is routinely incorporated into training, education, and community outreach programs and has been used to stimulate further research and demonstrate the value of the reserve and Massachusetts DCR within the commonwealth.

Accomplishment: The Waquoit Bay Research Reserve has reduced access barriers for deaf and hard of hearing people to participate in coastal and estuarine science and management, developed inclusive programming specific to this often marginalized and underserved community, and shared lessons learned across the region and throughout the National Estuarine Research Reserve System.

Accomplishment: The Waquoit Bay Research Reserve has shown a continuing commitment to diversity, equity, and inclusion throughout its programming and administration. The reserve has worked with tribal, state, federal, and local partners to better reach underserved audiences and continues to be a leader in this area.

Accomplishment: During this evaluation period the Waquoit Bay Research Reserve has convened numerous events that have brought stakeholders and technical experts together to learn more about resource protection, provide science-based information, and address the needs of coastal decision makers.

Accomplishment: The reserve was selected by the state's Department of Energy Resources to receive a Leading by Example (LBE) award to celebrate and highlight the reserve's work over many years to reduce greenhouse gas emissions by maximizing energy efficiency and using renewable energy options, implementing sustainable practices on campus, as well as being a regional leader in climate change research and education.

Accomplishment: The Waquoit Bay Research Reserve has completed actions related to land protection, including the hiring of a seasonal ranger to support stewardship activities on Washburn Island and help enforce Massachusetts DCR regulations. In addition, DCR has developed plans to make improvements on Washburn Island to meet public health and safety standards.

Necessary Action: The Waquoit Bay Research Reserve must provide full-time staffing for the role of the Coastal Training Program coordinator and meet the requirements of the Coastal Training Program Coordination task in its fiscal year 2023 annual federal assistance award (award period: July 1, 2023 to December 31, 2024) in order to maintain federal funding for this position in fiscal year 2024. The reserve must report on this necessary action until requirements are met.

Necessary Action: The Waquoit Bay Research Reserve must submit all mandatory reporting, including performance measure requirements, information requests, and 312 necessary action and recommendation reporting, in a timely manner through the appropriate databases and/or personnel per NOAA guidance and timelines.

Necessary Action: The Waquoit Bay Research Reserve must work with the NOAA Office for Coastal Management to develop detailed steps to update the final reserve management plan.

This action will be included as a task within the current grant award (July 2023 to December 2024) and must be reported on within their progress reports. A complete draft plan is due by April 1, 2024.

Recommendation: The NOAA Office for Coastal Management recommends that the DCR place a high priority on collecting data and maintaining the continuous record of monitoring in Waquoit Bay, including filling and retaining the research associate position at the Waquoit Bay Research Reserve.

Recommendation: The NOAA Office for Coastal Management recommends that the DCR fill vacant positions in an expedient manner in order to meet program requirements, limit gaps in research reserve programming, and ensure continued participation and contribution to the national system.

Recommendation: The NOAA Office for Coastal Management recommends that the DCR consider realigning the Waquoit Bay Research Reserve to provide a chain of command that would be more in line with the programmatic purposes of the reserve, including research, education, training, and land stewardship, yet still allow for effective management of reserve facilities and operations staff.

Recommendation: The NOAA Office for Coastal Management recommends that the Department of Conservation and Recreation hire a full-time Forest and Park Supervisor (rather than seasonal hires) for the Waquoit Bay Research Reserve and to develop an oversight approach that ensures that the reserve manager is able to integrate the day-to-day operations work with research reserve programming.

Recommendation: The NOAA Office for Coastal Management encourages the reserve and Massachusetts DCR to continue assessing the full scope of construction and maintenance needs for the historic buildings and take the opportunity to apply and provide state matching funds for Procurement, Acquisition, and Construction (PAC) grant opportunities provided annually to ensure efficient operation and innovation within the facility.

Recommendation: The NOAA Office for Coastal Management recommends that the Massachusetts DCR identify methods to improve purchasing and contracting protocols for the reserve, including the ability to develop and submit external grant applications and execute any grants received in an expedited manner, to ensure that the research reserve can meet all of the requirements for full participation in the National Estuarine Research Reserve System.

Recommendation: The NOAA Office for Coastal Management recommends that the DCR recognize the role of the reserve as a part of the national system by communicating and expediting the travel approval process. Out-of-state travel is a condition of the annual cooperative agreement and ensures that research reserve staff members are gaining as much knowledge as possible from system partners.

Conclusion: This evaluation finds that the Massachusetts Department of Conservation and Recreation is generally 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 2022. The evaluation team consisted of Ralph Cantral, Evaluation and Compliance program manager, Betsy Nicholson, north region director, Michael Migliori, evaluation team lead, and Rebecca Love, site liaison, all from the NOAA Office for Coastal Management; and Caitlin Chaffee, manager, Narragansett Bay Research Reserve in Rhode Island. The support of the Waquoit Bay Research Reserve staff members was crucial in conducting the evaluation, and their support is most gratefully acknowledged.

NOAA sent a notification of the scheduled evaluation to James Montgomery, commissioner, Massachusetts Department of Conservation and Recreation, on October 20, 2021, and published a notice of intent to evaluate the Waquoit Bay Research Reserve in the *Federal Register* on May 10, 2022. The Waquoit Bay Research Reserve posted a notice of the public meeting and opportunity to comment on June 2, 2022.

The evaluation process included a review of relevant documents and a survey of stakeholders, which helped identify three target areas for the evaluation: collaborative research and partnerships; education, engagement, and outreach; and staffing and program administration. A site visit was conducted from June 22 through 24, 2022, where the evaluation team held group discussions with stakeholders and program staff members. The evaluation team also discussed the target areas with research reserve staff members who helped identify issues and workable solutions to maintain and improve the implementation of the research reserve's programs. In addition, a public meeting was held on Thursday, June 23, at 6:00 p.m. (EDT) to provide an opportunity for members of the public to express their opinions about the implementation of the research reserve programs.

Stakeholders and members of the public were also given the opportunity to provide written comments via email through Friday, July 1, 2022. Written comments were received from the public or interested parties. Final evaluation findings for all national estuarine research reserves highlight the research 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 (15 C.F.R. Part 921) and of the research 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) and §315(f). This evaluation contains three necessary actions.

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

Evaluation Findings

The Waquoit Bay National Estuarine Research Reserve is located in the Towns of Falmouth and Mashpee, in Barnstable County, Massachusetts, on the south shore of Cape Cod. The research reserve encompasses 2,800 acres and contains open waters, salt and fresh marshes, barrier beaches, sand dunes, rivers, mixed pine and oak forests, and sandplain grasslands. The research reserve is administered by the Massachusetts Department of Conservation and Recreation for long-term research, water quality monitoring, education, and coastal stewardship.

Target Area 1: Collaborative Research and Partnerships

Over the years, the Waquoit Bay Research Reserve has fostered partnerships with a variety of organizations at the local, regional, and national levels to conduct collaborative research projects that involved all of the research reserve's sectors in efforts to inform decision-making.

Key Findings related to Target Area 1:

The most recent evaluation of the Waquoit Bay Research Reserve in 2015 recommended that the research reserve engage physical, biological, and social scientists to address the research reserve's priority research needs and synthesis of existing data to ensure that both the research needs were being met and that the data and information produced by the research reserve were being used by the outside community. In 2018, the Waquoit Bay Research Reserve created a science advisory committee to perform this function. The Waquoit Bay Reserve Science Advisory Committee, initiated in 2018, takes input from the community on research needs and provides recommendations.

Accomplishment: The Waquoit Bay Research Reserve has established a research advisory committee which has helped to identify and prioritize research needs as well as applications for research reserve monitoring data.

The Waquoit Bay Research Reserve has been proactive in seeking outside funding for collaborative research. During this evaluation period, the research reserve has been a recipient of six National Estuarine Research Reserve System Science Collaborative Grants as well as three science transfer grants. Two of these initiatives, the Bringing Wetlands to Market projects (Phases 1 and 2), have been especially effective in integrating all of the sectors of the research reserve. The research reserve has demonstrated an integrated approach to working on collaborative research projects, which has engaged a large range of scientific disciplines, and the effort has been supported by participation from each of the research reserve program sectors.

The research reserve has also focused research on the need to directly inform and address solutions to coastal management problems and meet information needs of local decision-makers and resource managers. Much of this work has been funded through the National Estuarine Research Reserve System Science Collaborative with additional funding from NOAA and EPA. Examples of projects addressing local resource management issues include:

Evaluating Whether Oyster Aquaculture Can Help Restore Water Quality was a project to inform coastal communities that were exploring the use of shellfish aquaculture to remediate water quality. The research team included science investigators and end users from the Town of Falmouth, Stonehill College, Science Wares, Inc., the Woods Hole Oceanographic Institution, and the Waquoit Bay Research Reserve. Project web site:

<https://nerrsciencecollaborative.org/project/Rogers17>

Evaluating the Impact of Hydrologic Alterations on Salt Marsh Sustainability in a Changing Climate was conducted with local, national, and university partners to develop decision-support tools that promote sustainability in the face of rising sea levels. The end users of the information developed under the project are the Waquoit Bay Research Reserve, the Cape Cod Mosquito Control Project, and the federal land managers, including the US Fish and Wildlife Service and the National Park Service. Project web site:

<https://nerrsciencecollaborative.org/project/Spivak17>

Accomplishment: The Waquoit Bay Research Reserve has sought and received external funding to participate in collaborative research projects that provide information to address coastal problems that impact both the research reserve and lands and waters throughout the region. The resulting information from many of these collaborative efforts have been applied by local and state decision-makers.

The Waquoit Bay Research Reserve has continued to build upon the Bringing Wetlands to Market project, which was included as an accomplishment in the 2007-2014 evaluation findings. During this evaluation period, the research reserve has worked with an expanded set of partners in New England to test the applicability of a previously developed model to accurately predict greenhouse gas fluxes across a wide range of coastal wetlands. The methods for greenhouse gas accounting developed by the research reserve are being adopted by the state. The research reserve has also worked with the Mission-Aransas and the Kachemak Bay National Estuarine Research Reserves through Science Collaborative transfer projects to apply the lessons learned at the research reserve to Gulf of Mexico and Alaskan wetlands. The Waquoit Bay Research Reserve continues to be recognized regionally, nationally, and internationally as a leader in blue carbon research and application.

The Waquoit Bay Research Reserve's data and information is used in a variety of ways by the reserve's partners, students, researchers, and decision-makers. The reserve's water quality data was a major contributor to regional projects, including a grant the Cape Cod Commission

received to compile water quality data from each Cape Cod town to target potential areas of concern for management and resource protection. State and local fisheries agencies as well as local aquaculture businesses also use the reserve's research and water quality data to inform shellfish harvest and closure decisions.

The reserve is admired in the region as a convener, data provider, connector, educator, leader in diversity, equity, and inclusion (DEI), science translator, and innovator. The evaluation team found that it may be helpful to expand outreach to other state entities, including other parts of Massachusetts DCR, by sharing information and lessons learned from their collaborative research projects. Vehicles for such information transfer could include existing regional coastal wetland working groups in Massachusetts and Rhode Island, and direct transfer between the Waquoit Bay Research Reserve and other research reserves via annual or regional meeting sessions or targeted outreach.

In an effort to ensure that research reserve water quality monitoring data is a valued resource for partners and practitioners in the New England region and the nation, the Waquoit Bay Research Reserve completed a Quality Assurance Project Plan under Environmental Protection Agency guidelines. This plan allows the research reserve's monitoring data, including both the research reserve's staff-maintained data from the research reserve's System-Wide Monitoring Program (SWMP) and the data collected by the Waquoit Bay Watchers, to be more available to research reserve partners. The data is also more publicly accessible through the Cape Cod Commission's online database. Both the database and the Quality Assurance Project Plan were developed as part of a Southeast New England Project (SNEP)-funded regional water quality project spearheaded by the Cape Cod Commission and in which the research reserve was a contributing partner.

Accomplishment: Monitoring data produced by the Waquoit Bay Research Reserve is a valued resource for research reserve partners and coastal management practitioners in the Cape Cod region and beyond and is routinely incorporated into training, education, and community outreach programs and has been used to stimulate further research and demonstrate the value of the reserve and Massachusetts DCR within the commonwealth.

In the 2015 evaluation, the Waquoit Bay Research Reserve received a necessary action related to operation of the System-Wide Monitoring Program:

2015 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.

While this requirement was met in 2016, the ability of the research reserve to continue to provide the data in a timely manner was an issue that arose during the site visit for this evaluation. Persistent staff shortages (see Target Area 3 below) jeopardized the short-term ability to maintain this data. While the reserve's research coordinator is responsible for ensuring that SWMP is implemented sufficiently, it is unsustainable for one person to cover both SWMP tasks and RC duties. The RC should understand the protocols and needs for this program and guide the SWMP technician to perform them and answer any questions they have to perform their job adequately.

The SWMP data is important not only to partner communities and organizations, but as an essential element of the reserve system. As mentioned above, the research reserve is seen throughout the region as a primary source for information about the status and long-term trends in water quality at Waquoit Bay.

Recommendation: The NOAA Office for Coastal Management recommends that the Massachusetts Department of Conservation and Recreation place a high priority on collecting data and maintaining the continuous record of monitoring in Waquoit Bay, including placing a high priority on filling and retaining the research associate position at the Waquoit Bay Research Reserve.

The Department of Conservation and Recreation manages 39 sites within the South Coast district where the research reserve is located, as well as more than 100 additional sites throughout the balance of the state. The department has begun a pilot program to examine methods for reducing the carbon footprint of the agency's operations. This effort could build on and benefit greatly from the knowledge obtained from the research reserve's research and education efforts. The Waquoit Bay Research Reserve has recently been selected as one of four sites in Massachusetts to be part of a statewide decarbonization effort.

Target Area 2: Education, Engagement, and Outreach

Key Findings Related to Target Area 2:

The COVID-19 pandemic created an entirely new environment for providing education and outreach programs to the Waquoit Bay Research Reserve community. Research reserve staff responded to this challenge by introducing new methods for conducting existing programs as well as developing new programs designed for remote learning. The research reserve was able to maintain connections with the general public by establishing temporary interpretive stations at nearby beaches when the research reserve was closed to the public. Unfortunately, it also meant that some critical events such as the Cape Cod Conference would be put in abeyance for a number of years.

During this evaluation period, the Waquoit Bay Research Reserve undertook an initiative to reach out to the Deaf community, which is under-represented in science and technical professions, including coastal science and resource management. Working with Deaf science professionals, including the Boston University Deaf Education graduate program and the Learning Center for the Deaf, the research reserve created Watershed Stewardship in Action: Deaf Students on the Estuary. This new initiative brought K-12 teachers together with educators from national estuarine research reserves in the New England region to develop a curriculum that would teach key concepts of estuarine and watershed science to the Deaf community. The curriculum included a series of customized workshops and field experience for pre-service and in-service teachers, interpreters, and deaf students. The final products also included a number of new words to be added to the American Sign Language vocabulary and a series of videos that allowed deaf scientists to share their academic and professional achievements with students interested in pursuing estuarine science in higher education.

Accomplishment: The Waquoit Bay Research Reserve has reduced access barriers for deaf and hard of hearing people to participate in coastal and estuarine science and management, developed inclusive programming specific to this often marginalized and underserved community, and shared lessons learned across the region and throughout the National Estuarine Research Reserve System.

The Waquoit Bay Research Reserve has fostered a strong partnership with the Wampanoag Tribe through a number of efforts during this evaluation period. The research reserve has conducted after-school and vacation week programming at the research reserve for elementary school student tribal members. This successful partnership also led to the creation of a four-week summer program co-led annually by research reserve staff and Wampanoag tribal elders. This programming meshes the environmental and natural science elements of the Teachers on the Estuary (TOTE) workshops with the cultural and historical elements of the Wampanoag Circle of Life program.

This commitment to serving underserved communities is further demonstrated in the staffing and internship opportunities for minority students, programming and product development for minorities and underserved communities, and meaningful engagement and collaboration with tribes. During the evaluation site visit, a partner referred to these research reserve activities as “empowering” and “life-changing.”

The reserve continued the Increasing Minority Student Participation in STEM Initiative and hosted a festival of short films produced by local high school students featuring the careers of African American and Caribbean scientists as part of a Juneteenth celebration. In collaboration with the Wampanoag Tribe, education staff developed a curriculum for teachers focused on incorporating Traditional Ecological Knowledge into their teaching.

Accomplishment: The Waquoit Bay Research Reserve has shown a continuing commitment to diversity, equity, and inclusion throughout its programming and administration. The reserve has worked with tribal, state, federal, and local partners to better reach underserved audiences and continues to be a leader in this area.

The Waquoit Bay Research Reserve has played a key role in bringing together researchers, educators, and nongovernmental organizations across the Cape Cod region. One of the key efforts of the research reserve during this evaluation period was convening the Cape Coastal Conference from 2013 to 2020. This conference was seen by stakeholders across the region as an invaluable opportunity for networking and information transfer. Unfortunately, during the COVID-19 pandemic, the conference has not been able to be held. The evaluation team also learned that the lack of staff in key positions such as the coastal training coordinator has also contributed to the inability to continue the conference. Yet a number of stakeholders expressed their opinion that restarting this annual conference should be one of the highest priorities for the research reserve moving forward.

Accomplishment: During this evaluation period the Waquoit Bay Research Reserve has convened numerous events that have brought stakeholders and technical experts together to learn more about resource protection, provide science-based information, and address the needs of coastal decision makers.

Accomplishment: The reserve was selected by the state's Department of Energy Resources to receive a Leading by Example (LBE) award to celebrate and highlight the reserve's work over many years to reduce greenhouse gas emissions by maximizing energy efficiency and using renewable energy options, implementing sustainable practices on campus, as well as being a regional leader in climate change research and education.

Target Area 3: Staffing and Program Administration

Key Findings Related to Target Area 3:

Prior evaluations of the Waquoit Bay Research Reserve going back to 2004 have described problems related to filling vacant positions at the reserve. In 2014, the evaluation findings included a requirement that the DCR fill the position of research reserve manager.

Necessary Action 2014: The NOAA Office for Coastal Management requires WBNERR and DCR to take all steps necessary to employ a permanent research 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.

Despite meeting that requirement, the research reserve has continued to suffer from a lack of staff in key positions. At the time of the site visit for this evaluation, the research reserve had vacancies in five key staff positions, including the Coastal Training Program and stewardship coordinators, both of which had been vacant for a significant period of time. Maintaining consistent staffing levels is critical, and avoiding lengthy vacancies in key positions is paramount to the continued success of the research reserve.

In this regard, the evaluation team also learned that the lack of staffing and delays in filling existing vacancies have negatively affected the morale of the existing personnel. Staff members expressed concern about being overwhelmed both by responsibilities beyond their job descriptions and by ineffective communication among reserve staff members. Promoting strong communication protocols between and among staff and leadership at the reserve will prepare the reserve to operate efficiently and identify opportunities and challenges in a timely manner.

Necessary Action: The Waquoit Bay Research Reserve must provide full-time staffing for the role of the Coastal Training Program coordinator and meet the requirements of the Coastal Training Program Coordination task in its fiscal year 2023 annual federal assistance award (award period: July 1, 2023 to December 31, 2024) in order to maintain federal funding for this position in fiscal year 2024. The reserve must report on this necessary action until requirements are met.

Recommendation: The NOAA Office for Coastal Management recommends that the Department fill vacant positions in an expedient manner in order to meet program requirements, limit gaps in research reserve programming, and ensure continued participation and contribution to the national system.

Necessary Action: The Waquoit Bay Research Reserve must provide full-time staffing for the role of the Coastal Training Program coordinator and meet the requirements of the Coastal Training Program Coordination task in its fiscal year 2023 annual federal assistance award (award period: July 1, 2023 to December 31, 2024) in order to maintain federal funding for this position in fiscal year 2024. The reserve must report on this necessary action until requirements are met.

Waquoit Bay Research Reserve staff members have risen above the staff shortages to meet many of the research reserve's obligations as a part of the cooperative agreements. However, due to staff shortages, IT barriers, and challenges around the information submittal process, the evaluation team had to conduct the site visit without the information requested. Provision of this information in a timely manner would have reduced the need to ask many basic questions about the research reserve programs during the site visit and would have enabled a better understanding of the evaluation's target areas. Reporting of performance measure data should be submitted through the appropriate performance measure database and progress on

312 necessary actions and recommendations should be submitted annually with the second progress report.

Necessary Action: The Waquoit Bay Research Reserve must submit all mandatory reporting, including performance measure requirements, information requests, and 312 necessary action and recommendation reporting, in a timely manner through the appropriate databases and/or personnel per NOAA guidance and timelines.

To successfully continue to meet the needs of the research reserve and fill positions in a timely manner, the Department of Conservation and Recreation and the Waquoit Bay Research Reserve may want to consider additional changes to hiring practices. Some options to address this concern might include increasing the allowable number of full-time staff equivalents dedicated to the research reserve or ensuring that the existing positions can be filled without needing to be reallocated. Another option could be the hiring of contract personnel through a cooperative agreement with a partner organization.

Part of the problem related to the continuing inability of the department to maintain adequate staffing at the research reserve may be related to the reserve's placement in the agency's organizational chart. The evaluation team learned that agency leadership has discussed relocating the research reserve from the Operations and Recreation Division to the Conservation and Resource Stewardship Division of the department. This move could better align the research reserve's research, education, and training programs with similar efforts in the department, but, as described to the evaluation team, could cause communication and responsiveness issues if the research reserve operations and maintenance, as proposed, were to remain within the Operations and Recreation Division.

Recommendation: The NOAA Office for Coastal Management recommends that the DCR consider realigning the Waquoit Bay Research Reserve to provide a chain of command that would be more in line with the programmatic purposes of the reserve, including research, education, training, and land stewardship, yet still allow for effective management of reserve facilities and operations staff.

The staff member responsible for the overall maintenance of the facilities at Waquoit Bay Research Reserve has in recent years been classified as a Forest and Parks Supervisor and has been retained as a seasonal employee. This status limits the length of time the incumbent can serve, and also limits other benefits, and requires a significant outlay of time by the research reserve's permanent staff to orient seasonal staff. And this knowledge and expertise is lost when the seasonal position ends. While this may be standard practice for other facilities operated by the department, the facilities at the research reserve have several attributes that set them apart from other department facilities. These characteristics include the upkeep of the historic properties and maintenance of laboratory facilities that are central to the mission

of the reserve. In addition, the reserve manager does not directly oversee the day-to-day work of this staff member, so there can be misalignment between the maintenance and operations staff and the programmatic needs. Creating a permanent position would help in the long term for addressing planning and upkeep of the historic properties, and close coordination between the research reserve manager and the supervisor of the operations and maintenance staff is essential.

Recommendation: The NOAA Office for Coastal Management recommends that the Department of Conservation and Recreation hire a full-time Forest and Park Supervisor (rather than seasonal hires) for the Waquoit Bay Research Reserve and to develop an oversight approach that ensures that the reserve manager is able to integrate the day-to-day operations work with research reserve programming.

Recommendation: The NOAA Office for Coastal Management encourages the Waquoit Bay Research Reserve and Massachusetts DCR to continue assessing the full scope of construction and maintenance needs for the historic buildings and take the opportunity to apply and provide state matching funds for Procurement, Acquisition, and Construction (PAC) grant opportunities provided annually to ensure efficient operation and innovation within the facility.

In addition to the problems caused by position vacancies, the Waquoit Bay Research Reserve staff's frustration has been exacerbated by delays in the procurement of goods and services. Some of these delays seem to be the result of the centralized nature of the department's procurement processes and lack of clear guidance and dedicated personnel support for purchasing, information technology, and human resource-related issues. Additional training for staff on necessary administrative systems should be given a high priority.

Purchasing related to computers, technical and specialized equipment related to research and monitoring, and software has also been a laborious process for research reserve staff. A research and education facility such as the Waquoit Bay Research Reserve must rely on sophisticated technology that may not be common for other units in the Department of Conservation and Recreation, and that may be available from only a single vendor. Moreover, this equipment is essential and often needed in short order to maintain continuous data sets that provide invaluable information to the national system.

One of the hallmarks of the National Estuarine Research Reserve System and the Waquoit Bay Research Reserve is to serve as a location to conduct research. In many instances this research is supported by external funding. The evaluation team learned that approval of funding from outside sources has often been unnecessarily difficult due to agency procedures. The research reserve would benefit greatly from a streamlined approach to both seeking external funding and executing contracts and agreements when funding is received.

Recommendation: The NOAA Office for Coastal Management recommends that the Massachusetts Department of Conservation and Recreation identify methods to improve

purchasing and contracting protocols for the Waquoit Bay Research Reserve, including the ability to develop and submit external grant applications and execute any grants received in an expedited manner, to ensure that the research reserve can meet all of the requirements for full participation in the National Estuarine Research Reserve System.

Although perhaps not directly related to the problems dealing with centralized agency systems, the evaluation team also learned that Waquoit Bay Research Reserve staff have had difficulties gaining approval for travel to national and regional meetings where participation is expected from all of the national estuarine research reserves. Being a constituent part of a national system requires the research reserve manager and sector coordinators to participate in meetings that may not be common for other units within the Department of Conservation and Recreation.

Recommendation: The NOAA Office for Coastal Management recommends that the DCR recognize the role of the reserve as a part of the national system by communicating and expediting the travel approval process. Out-of-state travel is a condition of the annual cooperative agreement, and ensures that research reserve staff members are gaining as much knowledge as possible from system partners.

The Waquoit Bay Research Reserve has continued to work with the Massachusetts Office of Coastal Zone Management in the Executive Office of Energy and Environmental Affairs on a variety of issues, including a blue carbon working group and serving as members of the Salt Marsh Working Group of both programs. The research reserve is encouraged to continue strengthening collaborative relationships with the coastal zone office to state and local governments to address emerging issues related to coastal development and resource protection.

Implementation of General Requirements

The 2014-2019 management plan for Waquoit Bay National Estuarine Research Reserve became out of date three years ago. The regulations for the National Estuarine Research Reserve System (15 CFR 921.33) require that management plans be revised at least every five years. The research reserve is currently updating its management plan and has been coordinating with the NOAA Office for Coastal Management.

Necessary Action: The Waquoit Bay Research Reserve must work with the NOAA Office for Coastal Management to develop detailed steps to update the final reserve management plan. This action will be included as a task within the current grant award (July 2023 to December 2024) and must be reported on within their progress reports. A complete draft plan is due by April 1, 2024.

The prior evaluation of the Waquoit Bay Research Reserve included a necessary action related to protection of research reserve resources.

Necessary Action 2014: must take all steps necessary to ensure enforcement on the research reserve properties—particularly those on Washburn Island—and ensure that lands are being managed consistent with the purposes for which the research 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.

Accomplishment: The Waquoit Bay Research Reserve has completed actions related to land protection, including the hiring of a seasonal ranger to support stewardship activities on Washburn Island and help enforce Massachusetts DCR regulations. In addition, DCR has developed plans to make improvements on Washburn Island to meet public health and safety standards.

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.

Goals and objectives for the period 2012-2017 are from the Waquoit Bay Research Reserve Evaluation Metrics approved March 8, 2012.

2012-2017 METRIC 1: Restoration

Goal: Restoration projects within the Waquoit Bay watershed.

Objective: To restore stream flows and habitat functions to improve water quality.

Strategy: Work with partners to implement the Waquoit Bay Stream Restoration Master Plan.

Performance Measure: Number of restoration projects completed within the Waquoit Bay watershed.

Target: Three upland or in-stream restoration projects will be complete by 2017. The research reserve will use the Waquoit Bay Stream Restoration Master Plan and restoration planning document developed with its partners to prioritize these projects. (Replacement Measure)

First Year Results: NA

Second Year Results: NA

Third Year Results: 2

Fourth Year Results: 2

Fifth Year Results: 0

Cumulative Results: 4

Discussion: The Waquoit Bay Research Reserve, working with a variety of partners, met its target for this restoration measure.

2012-2017 METRIC 2: Data Access

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

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

Strategy: Providing online access to research and environmental data about Waquoit Bay and environs on or through our website has been a high priority for the research reserve – in Management Plans and annual operations grants – for several years, yet we have struggled to achieve it. We want to set it as a metric as an added incentive. As part of our website upgrade (in process), we plan to include descriptions of all of our primary monitoring programs. Embedded in these descriptions will be links for two different audiences: to raw data for researchers who want to use them for their own purposes, and to sample analyses that tell “stories” for the public. Staff from all sectors are working together to decide which dataset(s) to analyze to respond to public interest and educational priorities. This performance metric will focus on the raw datasets such as: water quality, nutrients, coastwatcher, nekton, wells, etc.

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

Target: Five datasets will be made accessible through the research reserve website during the 5-year period. [Instead of original idea to make available for download.]

First Year Results: 0

Second Year Results: 0

Third Year Results: 0

Fourth Year Results: 0

Fifth Year Results: 0

Cumulative Results: 0

Discussion: The Waquoit Bay Research Reserve was unable to make progress toward this objective due to a number of complications related to lack of staff, loss of key partner participation, and the inability of the existing website to allow downloads of datasets.

2012-2017 METRIC 3: Volunteer Support

Goal: Improve the operations, infrastructure, and stature of the research reserve.

Objective: Volunteers will support implementation of research reserve programs.

Strategy: Enhance volunteer recruitment, retention, and recognition by conducting an annual volunteer satisfaction survey (to be initiated in 2012). The Coastal Training Program (CTP) Performance Measure

Manual will be used to design the survey to measure satisfaction. Survey results will be used to make changes or improvements where needed in the volunteer program.

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 the Waquoit Bay Reserve.

First Year Results: 100%

Second Year Results: No data

Third Year Results: 94%

Fourth Year Results: 96%

Fifth Year Results: Not enough data to calculate.

Cumulative Results: 95% for years with available data.

Discussion: The Waquoit Bay Research Reserve exceeded its target for this measure for the years it had data available. The lack of data for three of the five years points to either a problem with data collection or not placing a high level of importance on this measure.

2017-2022 METRIC 1: Access to Information

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

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

Strategy: Providing online access to research and environmental monitoring information or key results about Waquoit Bay and environs. This will include descriptions of our primary monitoring programs and available research datasets or key results for external projects to which the reserve has access. This performance metric will focus on datasets such as: water quality, submerged aquatic vegetation, surface elevation tables, nekton, wells, etc.

Performance Measure: Number of datasets or summaries with key results made accessible through reserve website during the five-year period.

Target: Five summaries of research or monitoring data will be made accessible through the reserve website during the 5-year period.

First Year Results: 2

Second Year Results: 0

Third Year Results: 3

Fourth Year Results: 0

Fifth Year Results: No data available.

Cumulative Results: 95% for years with available data.

Discussion: The Waquoit Bay Research Reserve met the target of five new datasets made available during the five-year period.

2017-2022 METRIC 2: Education, Training, and Outreach

Goal: Improve environmental literacy in our communities to enable environmentally sustainable decision-making.

Objectives: (this is an inter-sector performance measure, with multiple objectives):

- 1: Increased student understanding of estuarine ecology
- 2: Teachers increase their knowledge and teaching of estuarine ecology
- 3: Increased understanding of environmental issues by visitors and community members
- 4: Increase access of CTP target audiences to science-based information that connects to them work

Strategy: The reserve will work to increase the number of education and CTP programs in which research and monitoring projects and results (for example SWMP, National Estuarine Research Reserve System Science Collaborative-funded, and other internal and external projects) are shared with students, teachers, community members, and coastal decision makers to increase environmental literacy and application of science-based information by coastal decision makers.

Performance Measure:

Number of education and CTP programs sharing research and monitoring projects and results (for example, SWMP, Science Collaborative, and external projects) with students, teachers, community members, and coastal decision makers.

Target: A minimum of five education and coastal training programs sharing research and monitoring projects and results each year.

First Year Results: 10

Second Year Results: 22

Third Year Results: 20

Fourth Year Results: 15

Fifth Year Results: 1

Cumulative Results: Average of 13.6 coastal training programs per year.

Discussion: The Waquoit Bay Research Reserve exceeded the target of five education and coastal training programs sharing research and monitoring projects and results each year.

2017-2022 METRIC 3: Monitoring

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

Objective: The reserve's environment is monitored as context for research and determining current status and trends.

Strategy: Reserve staff are interested in working on a multiple sector monitoring effort to involve new volunteers and in new and compelling citizen science projects. We are currently working on developing a soundscapes project that would monitor natural and manmade sounds in several key habitats. These audio recordings would serve to establish baseline data, but could also help to assess change due to stressors or our own restoration efforts. A second project would seek to establish a series of picture posts that could be used by volunteers and the public to gather photographs of our changing habitats and project sites.

Performance Measures: Total number of monitoring projects being carried out within the reserve.

Target: Two new monitoring programs will be initiated.

First Year Results: 0

Second Year Results: 2

Third Year Results: 0

Fourth Year Results: 0

Fifth Year Results: No data available

Cumulative Results: The target was met for this metric, as new monitoring programs related to environmental change and soundscape monitoring in the Upper Childs River watershed to establish a baseline for the future restoration project were initiated.

Conclusion

For the reasons stated herein, I find that the Massachusetts Department of Conservation and Recreation's operation and management of the Waquoit Bay National Estuarine Research Reserve, including education, research, and interpretative activities, is generally adhering to the programmatic requirements of the Coastal Zone Management Act and its implementing regulations.

These evaluation findings contain three necessary actions and seven recommendations that must be considered before the next regularly scheduled program evaluation but that are not mandatory at this time. 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, which may have implications regarding future financial assistance awards. However, it does not make any judgment about or replace any financial audits.

Jeffrey L. Payne, Ph.D.
Director
NOAA Office for Coastal Management

Date

Appendix A: Response to Written Comments

Two written comments were received during the public comment period.

Dr. David Dow, a retired marine scientist from East Falmouth, Massachusetts, shared some historical perspective about the area and the work of the reserve and expressed his appreciation for the work of the Waquoit Bay Research Reserve staff.

The evaluation team thanks Dr. Dow for his insights and comments.

Ms. MaryKay Fox, treasurer and board member of the Friends of the Mashpee National Wildlife Refuge (NWR), shared some historical perspective of the relationship between the wildlife refuge and the research reserve and also described several collaborations between the Friends of the Mashpee NWR and the Waquoit Bay Research Reserve. Ms. Fox also expressed her concerns about the inadequate staffing at the reserve.

The evaluation team very much appreciates Ms. Fox's comments and has addressed her concerns in these findings.