



Connecticut National Estuarine Research Reserve

Management Plan 2022-2027

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Proposed Connecticut National Estuarine Research Reserve Final Management Plan 2022-2027

Prepared for:

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Front Cover Photo Credit: Connecticut Department of Environmental Protection. Coastal 2003 Oblique Photography, <http://www.lisrc.uconn.edu/lisrc/catalogimages.asp>. *last accessed*: 15 May 2021.

Photos: (top) Pine Island with Bluff Point complex in the distance; (mid, left) Lord Cove, (mid, middle) UConn Avery Point campus, Lowell P. Weicker Jr. Building, wet labs, and docks; (mid, right) Haley Farm State Park; (bottom) DEEP Marine District Headquarters (near bridge) and Roger Tory Person Natural Area Preserve.

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Executive Summary

Plan Purpose and Scope

This plan's purpose is to provide an overriding direction for the proposed Connecticut National Estuarine Research reserve (CT NERR) during the first five years after its designation to identify and focus on audiences and needs not currently met by existing organizations with a particular focus on underserved communities. This will empower the proposed CT NERR as a place-based entity that can not only provide services and access to several special coastal locations, but also link local communities to the services provided by these existing organizations.

The development of a comprehensive management plan for the proposed CT NERR will provide a pathway for establishing a strong and adaptable foundation built to address the challenges of protecting and managing a reserve for long-term sustainability and success. As the first of such plans, it is intended to serve as a strategic pathway and guide future staff and partners who will tackle the numerous details of operation and implementation. As such, balancing clear direction with room for interpretation and innovation is an underlying theme.

The proposed CT NERR is entering a local landscape in southeastern Connecticut with groups already working in the fields of environmental education, research and monitoring, coastal training, and stewardship of natural habitats through ecosystem-based management (EBM) approaches. During the strategic planning process, a key theme that emerged was the need to find a niche that complements other existing programs without directly competing for the same audience or service need.

An area of emphasis that resulted from stakeholder meetings (See *Appendix C*) was to ensure that the proposed CT NERR works to address and improve issues surrounding Diversity, Equity, Inclusion, and Justice through staffing, projects, and programs. The plan attempts to include these themes holistically throughout.

A thoughtful and responsible course of action is to proceed with the implementation of the proposed CT NERR Management Plan with a focus on coordinated research and monitoring, education, stewardship, resource management, and financial prudence rather than initiating redundant and unaligned programs. Further, the proposed CT NERR management plan is rooted in the concept of using adaptive management as a practical tool, meaning that as information becomes available, the management plan can be reassessed and adjusted accordingly.

Reserve Context

Nomination: Connecticut has a long history of interest in securing a NERR, originating in the offices of Connecticut's Coastal Zone Management Program (CZMP) within the Connecticut Department of Energy and Environmental Protection (DEEP).

In the early 1980s to 1990s, the CT CZMP attempted to nominate a NERR in the region of the Connecticut River from Long Island Sound north to the limit of tidal action. While the initial request was favorably received, NOAA was unable to accept the proposal due to funding limitations and a focus on areas of the country that were under-represented in the National Estuarine Research Reserve System (hereinafter, Reserve System).

From the early 2000s to 2014, Connecticut and the National Oceanic and Atmospheric Administration (NOAA) renewed their efforts, although at varying times both the state and NOAA had to pause, generally due to limits involving organizational capacity.

In 2014, NOAA and DEEP reached a point where sustained efforts resumed. A State Steering Committee, with staff from DEEP, UConn, Connecticut Sea Grant, and eventually the Connecticut Audubon Society developed a site selection process strategy and evaluation criteria. By 2016, and continuing through 2019, a Site Selection Team made up of resource and subject matter experts from a variety of state agencies, academic institutions, and non-governmental organizations reviewed potential locations to evaluate their abilities to support the research, education, stewardship, and manageability needs of a NERR. An assemblage of several state-owned properties and public-trust water was presented for review and approval by the Designation Steering Committee; this was subsequently nominated to NOAA in December 2019 through the office of Governor Dannel P. Malloy. A campaign of public engagement resulted in several hundred letters of support sent to NOAA encouraging the acceptance of the nomination and illustrating the local level of interest.

Following a review period in 2019, NOAA accepted the site nomination in 2020 and Connecticut and NOAA began the next phases of the designation process by developing draft and final versions of the required Environmental Impact Statement and Reserve Management Plan.

Reserve Location: The proposed CT NERR, totaling approximately 52,160 acres, includes several landward properties as well as a substantial area of public-trust riverine and deeper-water subtidal areas, all of which are in the southeastern part of the state.

The landward components (approximately 1,955 acres) include the following properties:

- Bluff Point complex in Groton: including Bluff Point State Park, Bluff Point Coastal Reserve (CR), and Bluff Point Natural Area Preserve (NAP)
- Haley Farm State Park in Groton
- Roger Tory Peterson NAP in Old Lyme; formerly Great Island Wildlife Management Area
- Lord Cove NAP in Lyme and Old Lyme; formerly Lord Cove Wildlife Management Area
- Pine Island in Groton, a State Archaeological Preserve
- DEEP Marine District Headquarters in Old Lyme
- UConn Avery Point Campus in Groton

The subtidal area (approximately 50,205 acres) is generally described by:

- a) Eastern Long Island Sound from approximately Crane Reef and Long Sand Shoal west of the mouth of the Connecticut River, east to Mason's Island in western Fishers Island Sound, and southward to just north of the Connecticut-New York state boundary line in The Sounds.
- b) The lower Thames River from approximately the Gold Star Bridge south to the area described in (a).
- c) The lower Connecticut River from approximately Lord Cove south to the area described in (a); which also includes the Lieutenant River, Black Hall River, and Back River to CT Route 156.
- d) The embayments of Baker Cove / Birch Creek / Birch Plain Creek, Poquonnock River, Mumford Cove, and Palmer Cove.

With the following exclusions:

- Two areas proximal to the General Dynamics Electric Boat facility in the Thames River (65 acres) and the Dominion Millstone Power Station in Waterford (45 acres) that are designated as subtidal security zones pursuant to 33 C.F.R. § 165.154.
- The entire area of the designated Eastern Long Island Sound Open Water Disposal Area and the inactive disposal site immediately adjacent and to the east, plus a surrounding gap of approximately 0.3 miles between the proposed CT NERR (approximately 1,940 acres).

Lead State Agency: The University of Connecticut (UConn) is the designated lead state agency responsible for the overall management and direction of the proposed CT NERR programs and goals. Given that DEEP is the property owner of several land-based components, DEEP is also included in the Memorandum of Understanding between UConn and NOAA (*Appendix B*) as a formal operational party of the proposed CT NERR. The MOU and components of this plan emphasize the need and articulate pathways for the close collaboration and partnership to achieve the proposed CT NERR's mission and vision.

Priority Coastal Management Issues

Many coastal management issues for the proposed CT NERR were identified during public meetings, in presentations, and in written comments. These were synthesized into a refined suite of priorities and aligned with theme areas of Applying Science, Protecting Places, and Educating Communities taken from the Reserve System's 2017-2022 strategic plan (NOAA OCM 2017).

Applying Science - Issues associated with climate related impacts focus largely on sea level rise and increasing storm frequency and intensity in the context of resilient human communities and natural habitats. Communities need to address coastal erosion and protection of critical infrastructure, but traditional shoreline hardening puts marshes, habitat integrity, and habitat connectivity at risk. Innovative solutions grounded in ecosystem-based management approaches will be important.

Continued attention to impacts on water quality (e.g., climate variability exacerbating existing eutrophication and human influenced point and nonpoint source pollution) are necessary to support habitat integrity.

Protecting Places - Maintaining habitat connectivity, diversity, and integrity support success of native species, from plants and seaweed to birds, fish, and invertebrates. Stewardship of important terrestrial and aquatic habitats and supporting decisions that consider the carrying capacity of the ecosystem will help provide a road map to long-term sustainability.

Developing solutions and making decisions that integrate the needs of humans with supporting and protecting the natural environment requires an understanding of both the compatible and competing uses of the coastal zone. Understanding the interconnectedness of our local environment and the most important areas for our natural diversity and the ecosystem services they provide requires expanded monitoring and assessment.

Educating Communities - Community engagement allows for coordination among the many organizations currently stewarding our local environment. Balancing the multiple uses of the coastal environment requires coordination and understanding among the varied user groups of the coastal zone. Education, training, and outreach can be an effective tool in connecting communities to the estuary, increasing equitable and responsible access to coastal resources, and increasing the capacity for informed decision making.

Reserve Vision, Mission, Niche, and Goals

Vision and Mission: Estuaries are biologically rich, economically valuable, and highly vulnerable ecosystems. The vision and mission of the proposed CT NERR (as well as the entire Reserve System) reflects the importance of these areas within our communities:

The proposed CT NERR vision statement is the overarching description of what the reserve would like to achieve or accomplish and encapsulates how it should be distinguished.

Proposed CT NERR Vision:

*A resilient, healthy Long Island Sound estuary and watershed
where human and natural communities thrive.*

The reserve mission statement describes the reserve's core purpose and focus and describes its unique contributions.

Proposed CT NERR Mission:

To collaboratively integrate science with conservation, learning, recreation, and economic viability using ecologically diverse sites in southeastern Connecticut.

Niche: A reserve's niche is the unique suite of functions it provides to meet audience needs that are not well met. Based on feedback from the stakeholder meeting series and observations on the range of interests, activities, and capacities within the region, the proposed CT NERR niche will include:

- Increasing environmental data and monitoring capacity across terrestrial, intertidal, and underwater ecosystems.
- Synthesizing existing and new environmental information and delivering it to stakeholders.
- Using diverse habitats to increase the access to place-based estuarine research, training, and education experiences.
- Contributing to the Reserve System network that improves our ability to understand regional implications and warning signs of climate change and translating that information into effective management and funding.

Coordination with ongoing research and monitoring efforts will amplify this work and extend the capabilities of the reserve to deliver sound science for use in management, education, and stewardship.

Pathways for connecting managers and already-active stakeholders exist and will be utilized to translate information on water quality, habitat quality, and climate change impacts to these groups while providing opportunities to engage in collaborative grant writing.

The proposed CT NERR can also develop new pathways between reserve activities and other research and stewardship activities and target audiences that are currently less engaged with environmental issues. Education, outreach, and training opportunities are critical mechanisms for fostering peoples' connection to their local natural environments.

Goals: The proposed CT NERR’s goals reflect priorities during our first five years and speak to the long-term future of the proposed CT NERR. Based on feedback from stakeholder meetings and observations on the range of interests, activities, and capacities within the region, three proposed CT NERR goals were identified:

Goal 1: Increase our understanding of the effects of human activities and natural events through collaborative research and monitoring to improve informed decision making and support adaptive management of coastal ecosystems.

Goal 2: Strengthen stewardship, protection, and management of estuaries and their watersheds through place-based approaches to training and education in order to maintain and enhance natural environments.

Goal 3: Advance environmental appreciation and scientific literacy utilizing a place-based approach, to enhance people’s ability to make science-based decisions that positively affect estuaries, watersheds, and coastal communities.

Reserve Program Overview

In developing the CT NERR management plan, the State accepted the responsibility of developing a plan that was: (1) based on stakeholder engagement, (2) identifies a sustainable approach to research, education, training and stewardship, and (3) proposes reasonable management approaches. Throughout the engagement process, it was apparent that stakeholders have a keen interest in stewarding their lands, managing their resources, and collecting information, but these activities could be strengthened with additional communication and collaboration with other stakeholders. The CT NERR provides an opportunity to support a collective effort to share information, maximize, limited resources, and manage the estuarine lands and waters in a sustainable way.

Research and Monitoring: The proposed CT NERR couples research with monitoring efforts to inform changes and to advise adaptive management strategies amidst climate and human development stressors. It has the benefit of providing excellent opportunities based on a mosaic of upland, transitional and subtidal habitats situated proximal to a variety of coastal uses involving varying degrees of developed waterfronts. It can also leverage existing capacities and capabilities of UConn, DEEP, and many other organizations. The proposed CT NERR research and monitoring program has four fundamental objectives:

- Objective 1: Improve opportunities to support and conduct basic and applied research within the reserve.

- Objective 2: Contribute to status and trends assessments and forecasting of environmental quality by tracking short-term variability and long-term changes in abiotic and biological parameters within the reserve through establishment of the System Wide Monitoring Program (SWMP).
- Objective 3: Encourage and assist in a multi-agency approach to research, monitoring, and science leveraging ecosystem-based management.
- Objective 4: Provide coastal resource managers, the scientific community, and general education practitioners with appropriate scientific and technical information to foster informed decision-making.

Education: The region surrounding the proposed CT NERR is home to an economically and culturally diverse mix of people; many are involved with environmentally themed education programs, and participated in various public engagement efforts. Nonetheless, there are significant needs such as improving access to outdoor learning, enhancing the current efforts of environmental organizations, and ensuring educational programming has access to current scientific research and monitoring data. The proposed CT NERR identified two objectives to focus on:

- Objective 1: Develop and support the next generation of environmental stewards and environmentally literate citizens by providing hands-on, experiential, place-based learning opportunities in the NERR to students and educators, particularly those from underserved and Environmental Justice Communities.¹
- Objective 2: Promote environmental stewardship, environmental literacy, and science-based management and decision-making across a wide variety of sectors, including businesses, municipalities, and the public.

Coastal Training: The Coastal Training Program (CTP) is designed to foster better-informed decision-making by local and regional decision-makers thereby improving coastal stewardship. It will accomplish this mission by serving as a link between research, policy, community support, and education. The CTP objectives are:

- Objective 1: Establish the proposed CT NERR’s CTP as a reliable and relevant source for training and support on coastal management issues.
- Objective 2: Deliver science-based knowledge and skills appropriate to the needs of coastal decision-makers in Connecticut, taking advantage of relationships with other NERRS staff to support program content.

¹ The term “environmental justice community” is assigned to all communities included on the Connecticut Department of Economic and Community Development annual list of Distressed Municipalities. These represent the state’s 25 most fiscally and economically distressed municipalities and are used by state agencies to target funds for needs such as housing, insurance, open space, brownfield remediation, and economic development programs, among others. For more information, see <https://portal.ct.gov/DEEP/Environmental-Justice/Environmental-Justice-Communities>

- Objective 3: Increase access of CTP target audiences to science-based information that connects to their work to increase networking and information sharing.

Administration & Facilities: The administrative plan describes the context of the state and federal agencies under which the reserve is managed, as well as the state agency administrative and management structure for the proposed CT NERR. The administrative plan also describes the roles and responsibilities of the proposed CT NERR's core and additional staff, identifies strategic partnerships, describes an advisory committee, and introduces a supportive Friends Group and volunteer program.

A reserve's facilities provide functional space for reserve work and programming, as well as serve as a place for public interaction. The proposed CT NERR facilities plan is designed to rely on existing facilities during the term of this first 5-year management plan, using both the space made available to the proposed CT NERR by UConn (Avery Point campus) as well as the space available through potential collaborations with strategic partners. Both facilities are close to or adjacent to natural uplands and submerged areas included in the proposed CT NERR area. The proposed CT NERR staff, advisory committees, and the Friends Group will also identify future facility needs through a planning process which may consider: a small welcome center, office space, laboratories, classrooms, and equipment storage, necessary for the continued successful operation and future growth of the reserve.

Public Access: Adequate land and water access are critical to facilitating and conducting research and monitoring in the proposed CT NERR. But more broadly, public access is an important part of achieving the proposed CT NERR's vision of a resilient, healthy Long Island Sound estuary and watershed where human and natural communities thrive. Public access allows for recreational and educational opportunities that promote the proposed CT NERR and increase visitor appreciation and understanding of natural resources. Public use of the proposed CT NERR can provide opportunities to develop new relationships and strengthen existing connections with local communities and to promote awareness and stewardship of coastal resources. The need to ensure and improve appropriate access to these important land and water areas for communities and groups that historically may not as readily have visited or enjoyed them was a critical point underscored during much of the stakeholder engagement process and is part of this plan.

Resource Manipulation: The NERR term "resource manipulation" describes certain human activities that significantly modify the natural condition. It is important to note that not all human activities are considered resource manipulation, and in some cases manipulative activities may also provide important ecosystem services to the natural systems. When occurring within proposed CT NERR boundaries, these manipulation activities should be compatible with the reserve's overall vision and mission and coexist with reserve goals and objectives. The proposed CT NERR resource manipulation plan first identifies longstanding, pre-existing manipulations consistent with 15 C.F.R. § 921.1(d) which include:

- Dredging
- Activities involving installation and maintenance of typical shoreline coastal structures such as docks, jetties, groins, breakwaters

- Submerged cable or pipeline infrastructure
- Concentrated areas of water-dependent uses such as marinas, boatyards, or marine transportation facilities, etc.

The resource manipulation plan then justifies the need for continuation of these activities, and addresses what the proposed CT NERR will do to manage or address impacts. (Note: Areas of shellfish or seaweed aquaculture do not constitute manipulation within the proposed CT NERR. Rather, they are described within allowable uses under the Resource Protection Plan.)

Resource Restoration: Habitat restoration at the proposed CT NERR seeks to improve the ecological integrity and biogeographical representative character of the reserve, provide habitat for a diverse range of species, and improve the knowledge base of the science and practice of habitat restoration. The current areas of the proposed CT NERR have a long history of successful and innovative active management and restoration activities. As a result, they do not require extensive restoration efforts to ensure a functioning, healthy ecosystem that can immediately support anticipated reserve needs surrounding research, education, and training. To be clear, this is not to say these areas are devoid of restoration needs now or in the future—particularly in the face of threats that rising sea levels may have on coastal marshes and the spread of invasive species. In this vein the proposed CT NERR, through its research and stewardship efforts will work with partners to investigate and help mitigate and prevent the impacts of invasive species and seek opportunities to advance the understanding and application of various living shoreline techniques, thin layer placement to elevate marsh surfaces, changes to historic strategies of routine marsh ditch cleaning, and shellfish restoration.

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Acronyms and Abbreviations

\$	– U.S. dollars
%	– percent
<	– less than
>	– greater than
°F	– degrees Fahrenheit
AIS	– Automated Information System
CAD	– Confined Aquatic Disposal
CAM	– Coastal Area Management, DEP
CAS	– Connecticut Audubon Society
CAS-RTPEC	– Connecticut Audubon Society’s Roger Tory Peterson Estuary Center
CESE	– Center for Environmental Sciences and Engineering, a UConn Center
C.F.R.	– Code of Federal Regulations
C.G.S.	– Connecticut General Statute
CIRCA	– Connecticut Institute for Resilience & Climate Adaptation, a UConn Center
CLEAR	– Center for Land Use Education and Research, a UConn Center
CR	– Coastal Reserve
CSC	– Connecticut Siting Council
CSP	– Connecticut State Police
CT	– Connecticut
CT NERR	– Connecticut National Estuarine Research Reserve
CT-WAP	– Connecticut Wildlife Action Plan
CTP	– Coastal Training Program
CTSG	– Connecticut Sea Grant, a UConn Center and NOAA program
CTWQS	– Connecticut Water Quality Standards
CZMP	– Connecticut’s Coastal Zone Management Program, DEEP
DA/BA	– Connecticut Department of Agriculture Bureau of Aquaculture
DEP	– Connecticut Department of Environmental Protection
DEEP	– Connecticut Department of Energy and Environmental Protection
DESPP	– Department of Emergency Services and Public Protection
DMS	– Department of Marine Sciences, UConn
e.g.	– for example
ELDS	– Eastern Long Island Disposal Site
ELT	– Essex Land Trust
EnCon	– Environmental Conservation, typically used in the context of EnCon Police
et al.	– and others
<i>et seq.</i>	– and what follows, in reference to legal code
etc.	– and others; and so forth; and so on
ETD	– Estuary Transit District
FEMA	– Federal Emergency Management Agency
GC3	– Governor’s Council on Climate Change
K-12	– Kindergarten through twelfth grade
KEEP	– K-12 Estuary Education Program

LISICOS	– Long Island Sound Integrated Coastal Observing System
LISS	– Long Island Sound Study, a USEPA National Estuary Program
LWRD	– Land and Water Resources Division, DEEP
MPRSA	– Marine Protection, Research, and Sanctuaries Act
MOA	– Memorandum of Agreement
MOU	– Memorandum of Understanding
NAP	– Natural Area Preserve
NEPA	– National Environmental Policy Act
NERACOOS	– Northeastern Regional Association of Coastal Ocean Observing Systems
NERR	– National Estuarine Research Reserve, NOAA program
NERRA	– National Estuarine Research Reserve Association
NERRS	– National Estuarine Research Reserve System, NOAA
NESS	– New England Science and Sailing
NOAA	– National Oceanic and Atmospheric Administration
NOS	– National Ocean Service, NOAA
NRCS	– Natural Resources Conservation Service, USDA
NY	– New York
OCM	– Office for Coastal Management, NOAA
OPM	– Connecticut Office of Policy and Management
OLISP	– Office of Long Island Sound Programs, DEEP
OVPR	– Office of the Vice President for Research, UConn
ppt	– parts per thousand
RAC	– Reserve Advisory Committee of the proposed CT NERR
R.C.S.A.	– Regulations of Connecticut State Agencies
Reserve System	– National Estuarine Research Reserve System, a NOAA Program
REU	– Research for Undergraduate Students, a National Science Foundation program
RI	– Rhode Island
ROD	– Record of Decision
RSRs	– Connecticut Remediation Standard Regulations
SAV	– submerged aquatic vegetation, may refer to freshwater or estuarine species
SCORP	– Statewide Comprehensive Outdoor Recreation Plan
SLAMM	– Sea-level Affecting Marshes Model
SEAT	– Southeast Area Transit District
SHPO	– State Historic Preservation Office, CT Department of Economic and Community Development
SWMP	– System-Wide Monitoring Program
The Sounds	– eastern Long Island Sound and western Fishers Island Sound
TNC	– The Nature Conservancy
TOTE	– Teachers on the Estuary
UConn	– University of Connecticut
U.S.	– United States of America
USACE	– United States Army Corps of Engineers
U.S.C.	– United States Code
USCG	– United States Coast Guard
USDA	– United States Department of Agriculture

USEPA – United States Environmental Protection Agency
USFWS – United States Fish and Wildlife Service
USGS – United States Geological Survey
UWS – Unified Water Study, a program of Save the Sound
WMA – Wildlife Management Area

1 Introduction

The proposed Connecticut National Estuarine Research Reserve (proposed CT NERR) *Final Management Plan* is based on the foundation of adaptive management; that is, we develop a direction and purpose based on what is known or assumed now, and amend and adapt the plan as new information and data become available. This new information is typically—though not exclusively—the result of annual reviews as well as a standard cycle of 5-year planning horizons. As such, the management plan concept is intended to be a living resource that evolves over time. As this plan represents the first of such plans, it will present the foundational beginnings of a National Estuarine Research Reserve (NERR). The contents devoted to the elements of a reserve as described in the subsequent sections of this document are intended to reflect the input from a variety of stakeholders originating from a series of ten public meetings in early 2021. This plan is designed to communicate a level of detail that provides a clear sense of direction and goals for an initial 5-year horizon, with a level of flexibility for staff and partners to design and implement the specific conditions for success. As the reserve matures, these plans will mature as well, with focus and details changing to advance areas of experience and to address future needs.

1.1 Introduction to the National Estuarine Research Reserve System

The National Estuarine Research Reserve System is a network of 29 protected estuarine areas that represent different biogeographic regions and estuarine types within the United States (Figure 1-1). Reserves are protected for long-term research, monitoring, education, and coastal stewardship. The Reserve System, created by the Coastal Zone Management Act of 1972, as amended (16 U.S.C. §§ 1451 et seq.) currently protects over one million acres of estuarine lands and waters. The system is managed in accordance with federal regulations at 15 C.F.R. Part 921.

Each reserve has a unique boundary based on the nature of its ecosystem. The boundaries include the land and water areas needed to protect an intact ecological unit. Reserves classify their land and water areas as either “core” or “buffer,” which determines the level of protection for and the types of activities allowed within each area. Each reserve develops the programming most appropriate for its location while also delivering required system-wide programs focused on research and monitoring, education, training, and stewardship.

The Reserve System is a partnership program between the National Oceanic and Atmospheric Administration (NOAA) and the coastal states. NOAA provides funding, national guidance, and technical assistance for reserve operations and system-wide programs, facilities construction and land acquisition, graduate fellowships, and collaborative science projects. The state partner manages the reserve on a daily basis and works collaboratively with local and regional partners. NOAA also leads projects that integrate data or support decision-making at the national level.



LIST OF RESERVES

Great Lakes

- 1. Lake Superior, Wisconsin
- 2. Old Woman Creek, Ohio

Northeast

- 3. Wells, Maine
- 4. Great Bay, New Hampshire
- 5. Waquoit Bay, Massachusetts
- 6. Narragansett Bay, Rhode Island

Mid-Atlantic

- 7. Hudson River, New York
- 8. Jacques Cousteau, New Jersey
- 9. Delaware
- 10. Chesapeake Bay, Maryland
- 11. Chesapeake Bay, Virginia

Southeast

- 12. North Carolina
- 13. North Inlet-Winyah Bay, South Carolina
- 14. ACE Basin, South Carolina
- 15. Sapelo Island, Georgia
- 16. Guana Tolomato Matanzas, Florida

Gulf of Mexico

- 17. Rookery Bay, Florida
- 18. Apalachicola, Florida
- 19. Weeks Bay, Alabama
- 20. Grand Bay, Mississippi
- 21. Mission-Aransas, Texas

West

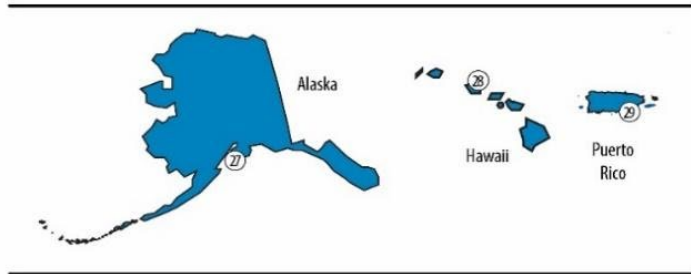
- 22. Tijuana River, California
- 23. Elkhorn Slough, California
- 24. San Francisco Bay, California
- 25. South Slough, Oregon
- 26. Padilla Bay, Washington
- 27. Kachemak Bay, Alaska

Pacific

- 28. He'eia, Hawai'i

Caribbean

- 29. Jobos Bay, Puerto Rico



The Reserve System currently includes 29 reserves. Connecticut will be the 30th reserve in the system.

Each reserve is required to develop a management plan that contains the goals, objectives, and strategies for that reserve. Management plans are updated every five years and must be approved by NOAA. These plans enable the reserves and NOAA to track progress and identify opportunities for growth. Each plan describes how the reserve will carry out its foundational research, education, and training programs. Each plan also outlines administration, resource protection, public access, land acquisition, and facility plans, as well as restoration and resource manipulation plans if applicable. The plans also incorporate strategies designed to help the reserve contribute to the Reserve System's national goals. NOAA periodically evaluates reserves for compliance with federal requirements and their approved management plan.

The most recent strategic plan for the National Estuarine Research Reserve System can be found at <https://coast.noaa.gov/data/docs/nerrs/StrategicPlan.pdf>. It describes the following goals for the system:

1. *Protecting Places*: Enhance and inspire stewardship, protection, and management of estuaries and their watersheds in coastal communities through place-based approaches.
2. *Applying Science*: Improve the scientific understanding of estuaries and their watersheds through the development and application of reserve research, data, and tools.
3. *Educating Communities*: Advance environmental appreciation and scientific literacy, allowing for science-based decisions that positively affect estuaries, watersheds, and coastal communities.

2 Connecticut National Estuarine Research Reserve

This section provides a brief overview of the proposed CT NERR's ecological characteristics and the social attributes of the local area and is designed to orient the reader to the area. The reader is referred to the *Final Environmental Impact Statement* for a more thorough treatment of these topics. If the CT NERR is designated, a full site inventory will be conducted. In other words, neither this document nor the *Final Environmental Impact Statement* are intended to be a site inventory.

2.1 Proposed CT NERR History and Site Description

2.1.1 History of Reserve Designation in Connecticut

Connecticut's history to secure a NERR originated in the offices of Connecticut's Coastal Zone Management Program (CZMP) within the Connecticut Department of Environmental Protection (DEP). The Connecticut CZMP title evolved since its inception in the early 1980s as several organizational units developed within the DEP, going from Coastal Area Management (CAM), to the Office of Long Island Sound Programs (OLISP), and finally to the Land and Water Resources Division (LWRD).

Between 1981 and 1982, Coastal Area Management provided comments on the *Draft Environmental Impact Statement* for the Hudson River NERR in New York. This led to the first effort to select and establish (collectively to "designate") a NERR in Connecticut, targeting the region of the Connecticut River from Long Island Sound north to the limit of tidal action, roughly in Windsor. In 1991, the State of Connecticut sought NOAA support for a proposed Connecticut River NERR. Although favorably received, NOAA was ultimately unable to accept the proposal due to funding limitations for new initiatives and a need to focus on areas of the country that were under-represented in the System.

By the early 2000s, OLISP had renewed designation efforts. In late 2004, Connecticut again contacted NOAA to express an interest in designating a NERR and identified DEP, through OLISP, as the lead agency. Many organizations spanning state, federal, academic, and non-governmental sectors expressed support, but NOAA was unable to commit to pursuing a reserve in Connecticut at that time as they were actively designating reserves in other states. However, by mid-2005, NOAA indicated they could soon provide initial guidance and support for Connecticut. OLISP developed an initial strategy for designating

a reserve and by 2007, this had resulted in a draft selection process. Later that year, staff turnover and attrition within DEP led to another pause, with minimal work done to refine and edit the strategy and selection process over the next several years.

In 2014, capacity within both NOAA and the Connecticut Department of Energy and Environmental Protection (DEEP)—a new Agency combining the original DEP with the Connecticut Public Utility Rate Authority—reached a point where sustained efforts resumed in 2016.

To implement this, a Connecticut Designation Steering Committee provided oversight to ensure the process was compliant with NOAA procedures. The Designation Steering Committee consisted of staff from DEEP Land and Water Resources Division, UConn Department of Marine Sciences, Connecticut Sea Grant, and eventually the Connecticut Audubon Society. A Site Selection Team made up of resource and subject matter experts from a variety of state agencies, academic institutions, and non-governmental organizations was responsible for evaluating potential locations and providing a final version to the Designation Steering Committee. Staff from NOAA Office for Coastal Management (OCM) provided guidance and representatives from existing reserves in New York, Massachusetts, and Rhode Island offered key operational knowledge regarding reserve management and program implementation.

From 2016 to 2019, the teams considered and analyzed many potential options for a reserve, applying criteria to evaluate the capacity for research, education, stewardship, and manageability, as well as resilience to the impacts of climate change. A final version combining several state-owned properties in Lyme, Old Lyme, and Groton, as well as parts of the lower Connecticut River, lower Thames River, eastern Long Island Sound, and western Fishers Island Sound was rated highest. This site was reviewed and approved by the Designation Steering Committee and DEEP, and formally nominated to NOAA in December 2019 through the office of Governor Dannel P. Malloy (DEEP et al. 2018). A subsequent campaign of public engagement resulted in several hundred letters of support sent to NOAA encouraging the acceptance of the nomination. Following a review period in 2019, NOAA accepted the site nomination as proposed and in 2020, Connecticut and NOAA began the next phases of the designation process by developing draft and final versions of the required *Environmental Impact Statement* and *Reserve Management Plan*.

Upon the anticipated completion of the required steps for designation in early 2022, the University of Connecticut (UConn) will assume the role of the lead state agency for the proposed CT NERR, in partnership with DEEP, who will retain the authority for managing lands owned by DEEP.

2.1.2 Site Description

The proposed CT NERR includes several landward properties as well as a substantial area of public-trust and deeper-water riverine and subtidal areas (Figure 2-1), totaling approximately 52,160 acres. The habitats of the upland properties are depicted in Figures 2-2, 2-3, and 2-4. Hard bottom and complex seafloor areas in the mouths of the Connecticut River, Thames River, Long Island Sound, and Fishers Island Sound are presented in Figure 2-5. Additional areas have been mapped for subaqueous soils but

are not shown here because the whole reserve has not been mapped (NRCS USDA 2021); output from mapped areas are included in the Geology section of the *Final Environmental Impact Statement*.

The landward components (approximately 1,955 acres) include the following properties:

- Bluff Point complex in Groton: including Bluff Point State Park, Bluff Point Coastal Reserve (CR), and Bluff Point Natural Area Preserve (NAP)
- Haley Farm State Park in Groton
- Roger Tory Peterson NAP in Old Lyme; formerly Great Island Wildlife Management Area
- Lord Cove NAP in Lyme and Old Lyme; formerly Lord Cove Wildlife Management Area
- Pine Island in Groton, a State Archaeological Preserve
- DEEP Marine District Headquarters in Old Lyme
- UConn Avery Point Campus in Groton

The subtidal area (approximately 50,205 acres) is generally described by:

- a) Eastern Long Island Sound from approximately Crane Reef and Long Sand Shoal west of the mouth of the Connecticut River, east to Mason's Island in western Fishers Island Sound, and southward to just north of the Connecticut-New York state boundary line in The Sounds.
- b) The lower Thames River from approximately the Gold Star Bridge south to the area described in (a).
- c) The lower Connecticut River from approximately Lord Cove south to the area described in (a); which also includes the Lieutenant River, Black Hall River, and Back River to CT Route 156.
- d) The embayments of Baker Cove / Birch Creek / Birch Plain Creek, Poquonnock River, Mumford Cove, and Palmer Cove.

With the following exclusions:

- Two areas proximal to the General Dynamics Electric Boat facility in the Thames River (65 acres) and the Dominion Millstone Power Station in Waterford (45 acres) that are designated as subtidal security zones pursuant to 33 C.F.R. § 165.154.
- The entire area of the designated Eastern Long Island Sound Open Water Disposal Area and the inactive disposal site immediately adjacent and to the east, plus a surrounding gap zone defined by a buffer of approximately 0.3 miles between the proposed CT NERR (approximately 1,940 acres).

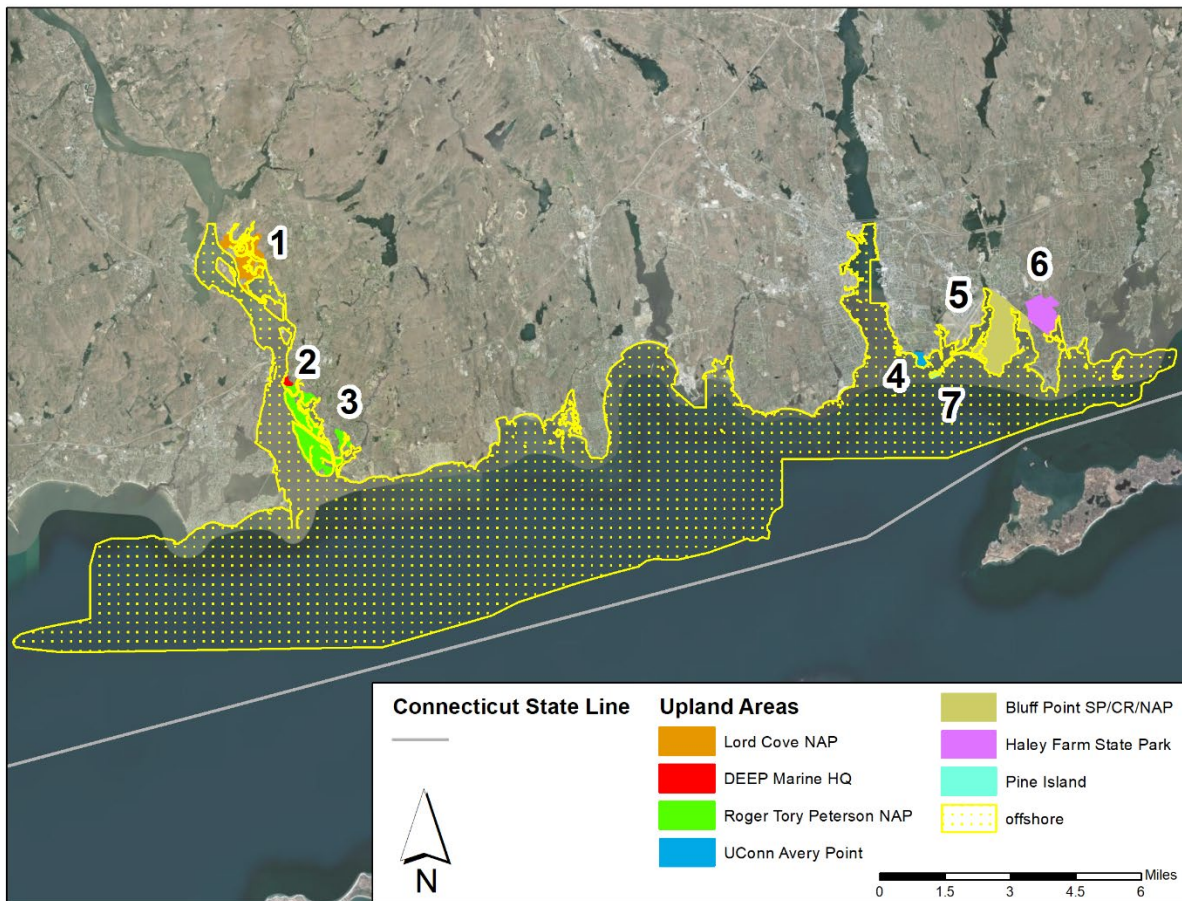


Figure 2-1: Proposed CT NERR

The properties of (1) Lord Cove NAP, (2) DEEP Marine District Headquarters, (3) Roger Tory Peterson NAP, (4) UConn Avery Point, (5) Bluff Point, (6) Haley Farm, (7) Pine Island

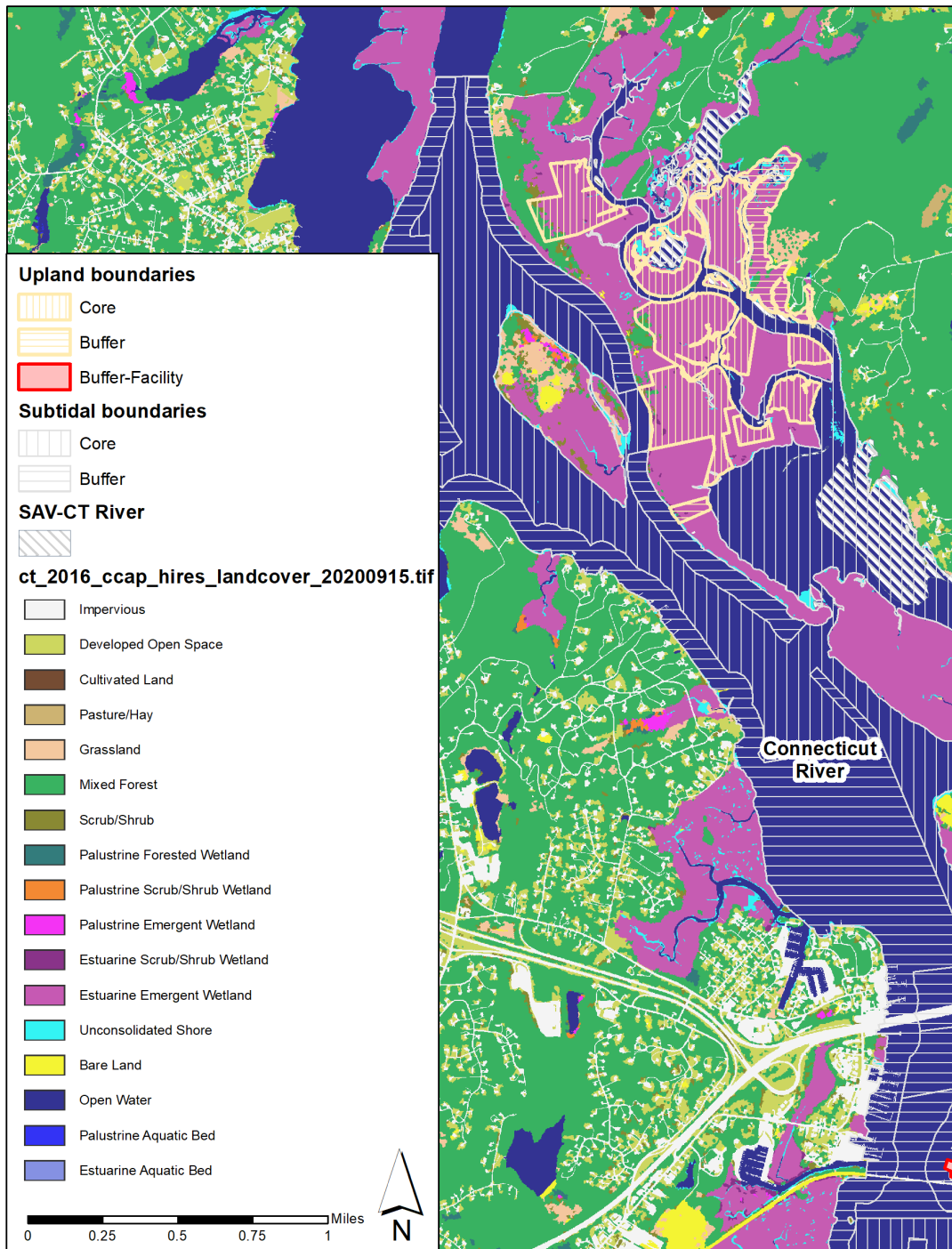


Figure 2-2: Lord Cove NAP—Boundaries and Habitats

Boundaries for core and buffer are designated by angled, horizontal and vertical lines while various habitat types are designated by colored areas provided by 2016 high resolution (1-meter) land cover data (NOAA OCM) as well as mapped submerged aquatic vegetation (DEEP 2019b).

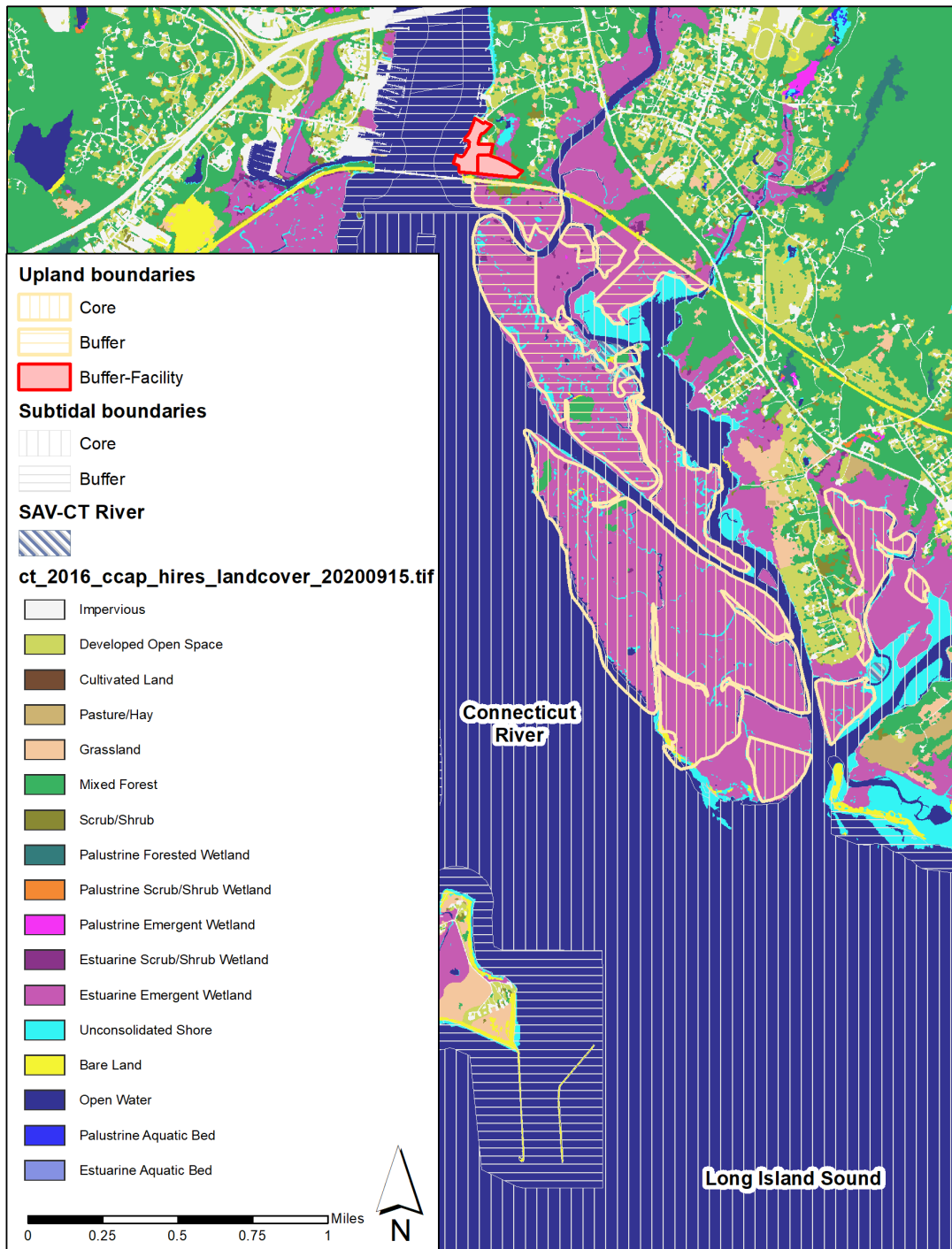


Figure 2-3: Roger Tory Peterson NAP / DEEP Marine District Headquarters—Boundaries and Habitats
 Boundaries for core and buffer areas are designated by angled, horizontal and vertical lines while various habitat types are designated by colored areas provided by 2016 high resolution (1-meter) land cover data (NOAA OCM) as well as mapped submerged aquatic vegetation (DEEP 2019b).

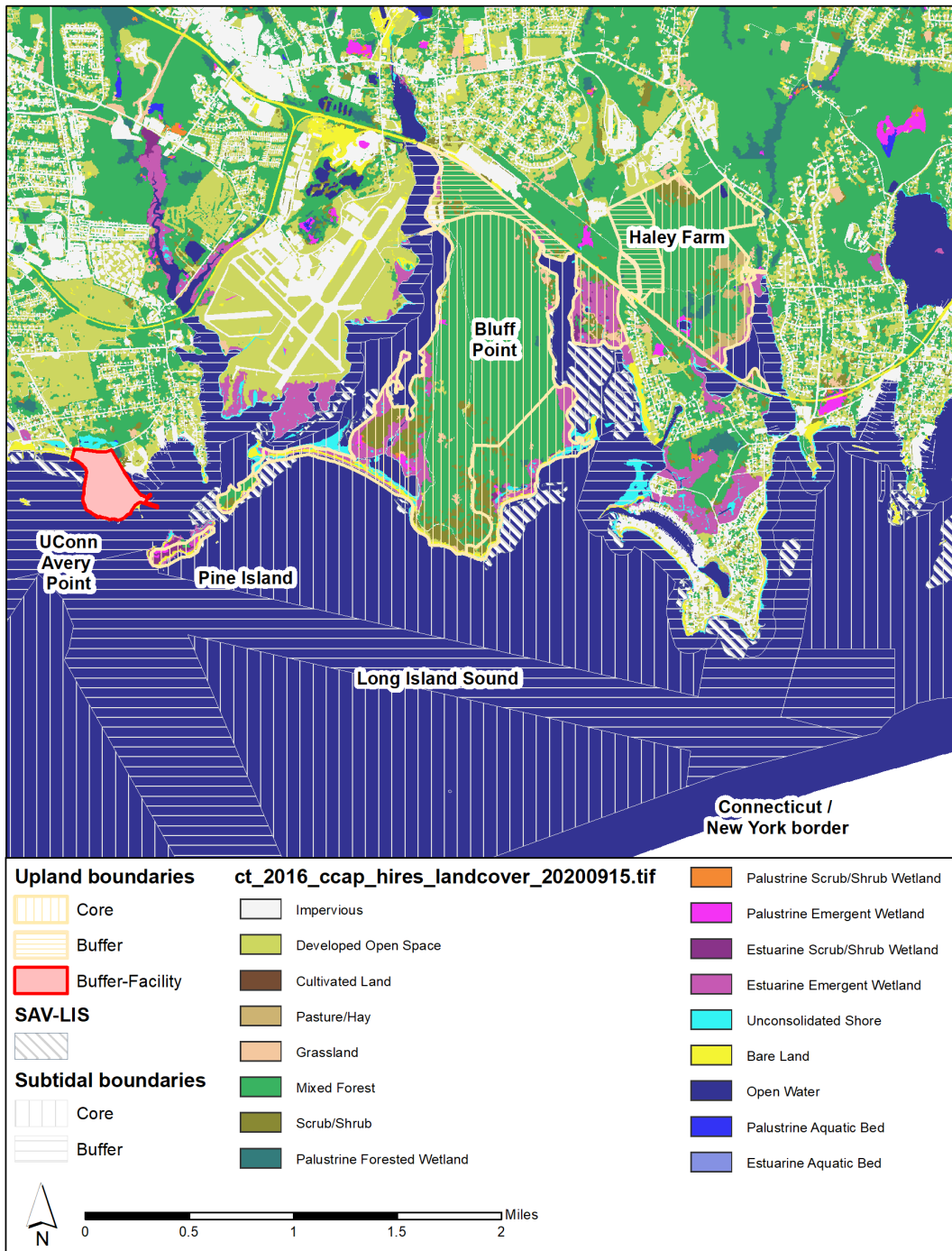
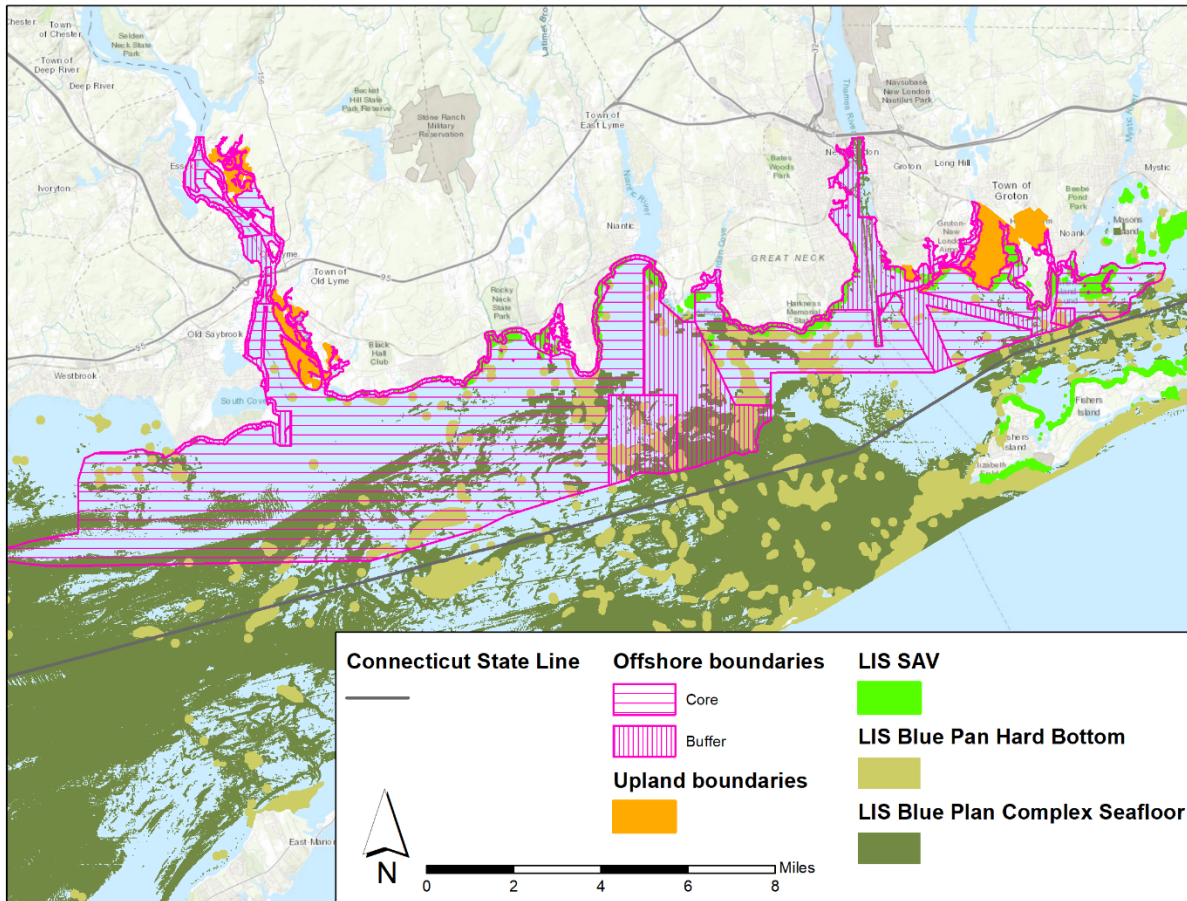
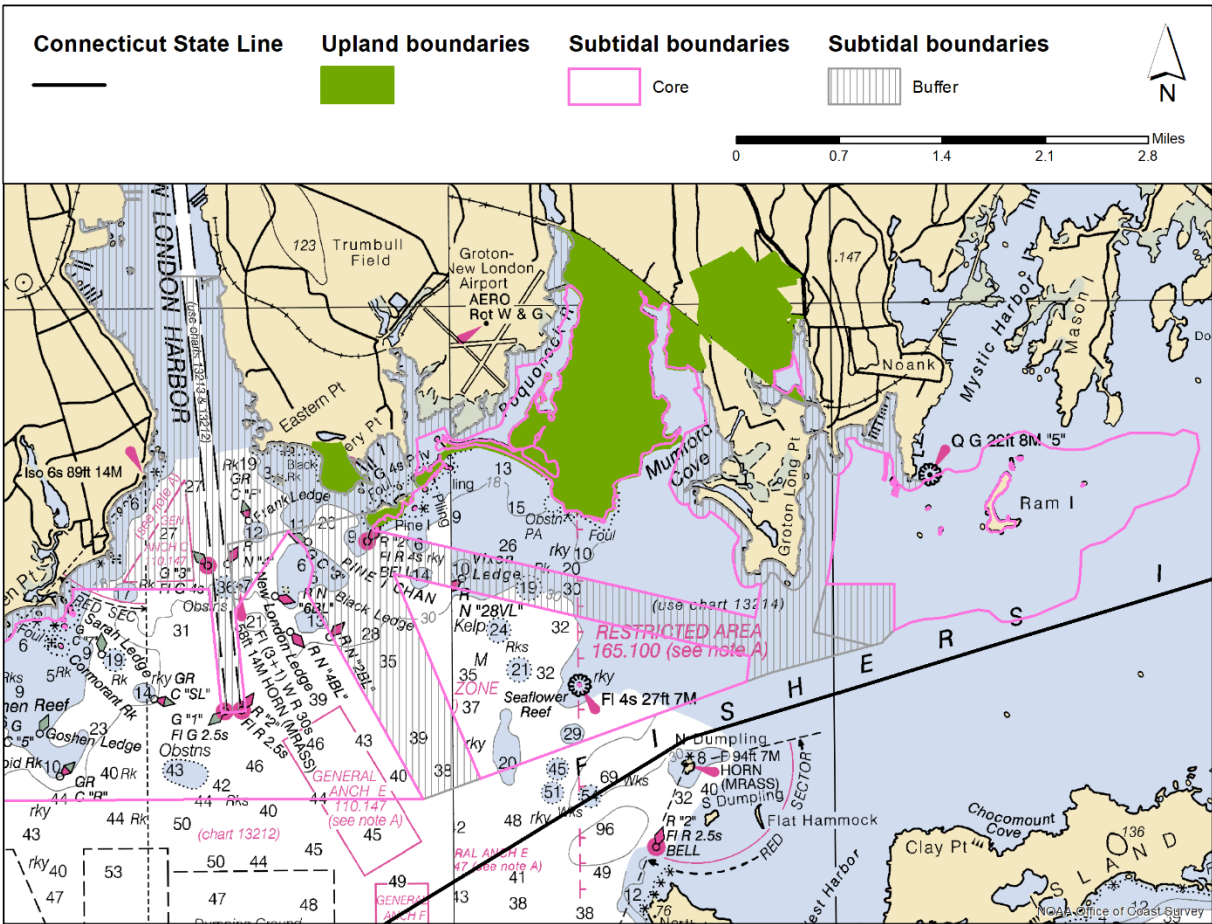
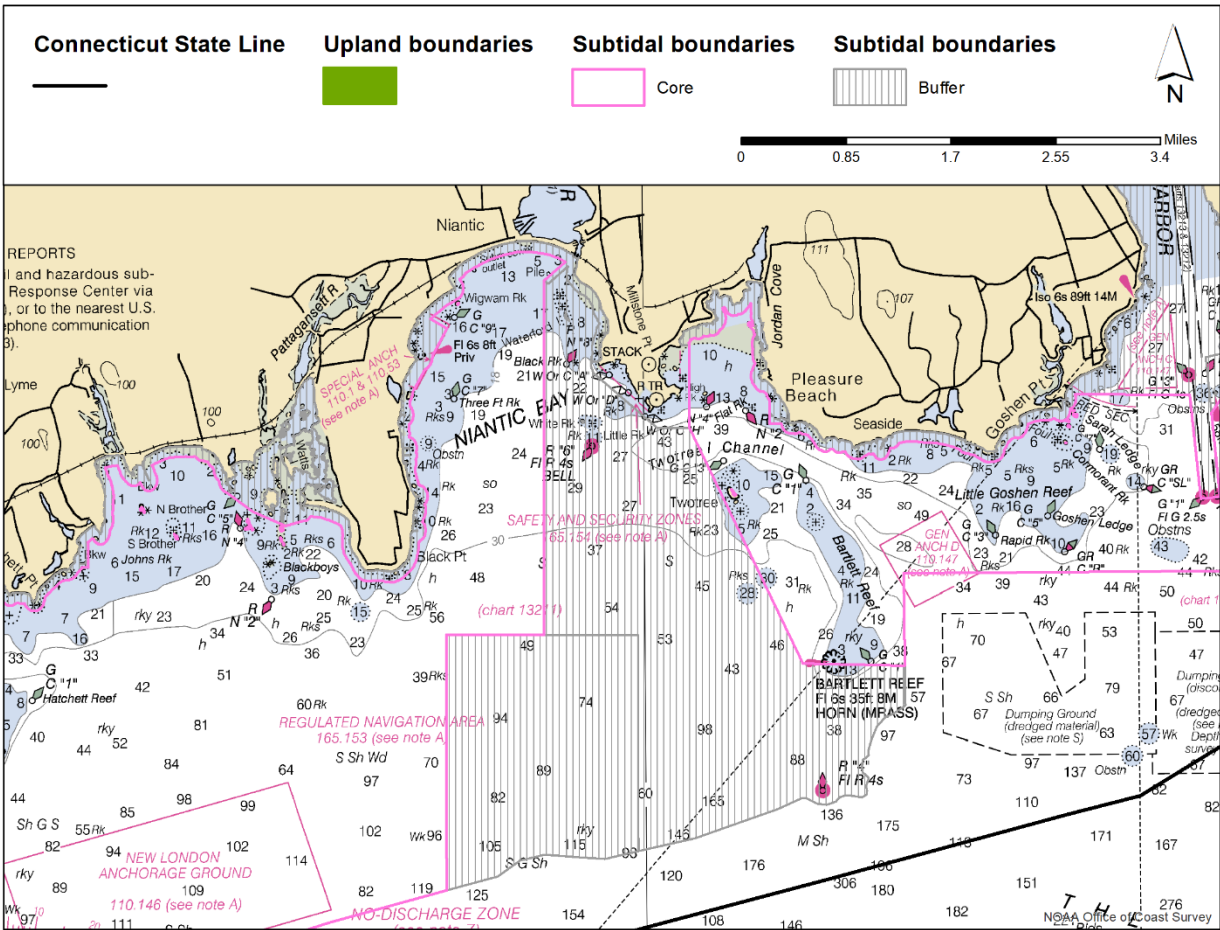


Figure 2-4: Eastern Properties—Boundaries and Habitats

Boundaries for core and buffer areas for Pine Island, the UConn Avery Point campus, Bluff Point (State Park, NAP, Coastal Reserve) and Haley Farm State Park are designated by angled, horizontal and vertical lines while various habitat types are designated by colored areas provided by 2016 high resolution (1-meter) land cover data (NOAA OCM), as well as mapped seagrass (vegetation tolerant of salinity > 15ppt) (Bradley and Paton 2018).







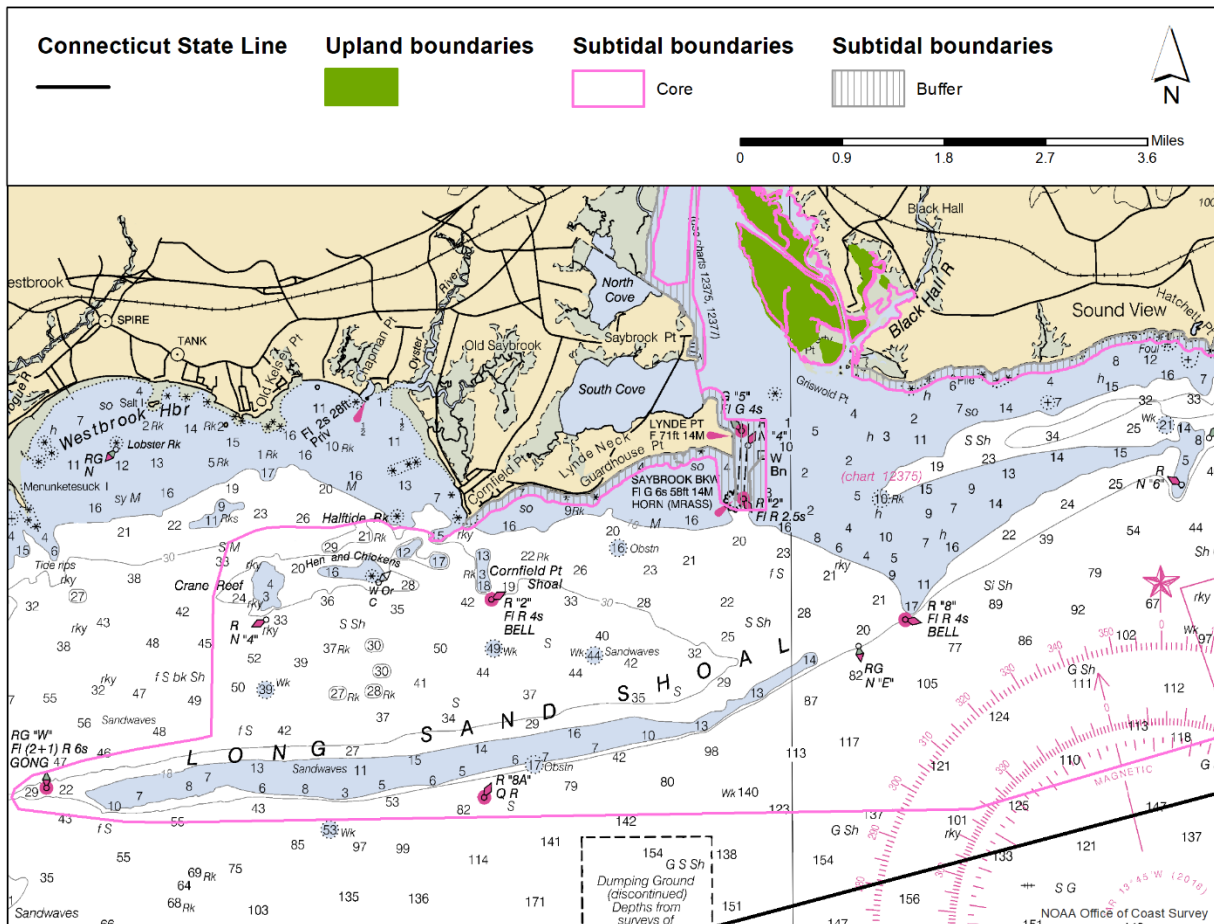


Figure 2-5: Subtidal Boundaries and Habitats

In the top images, boundaries for core and buffer areas for subtidal areas are designated by angled lines. Subtidal habitats are depicted for Long Island Sound submerged aquatic vegetation (Bradley and Paton 2018) and areas of hard and complex seafloor (DEEP 2019b). The subsequent series of three images depict the boundaries on top of NOAA Nautical Charts to identify the names of places and features.

2.1.3 Land Ownership

The upland properties of Lord Cove NAP, Roger Tory Peterson NAP, Bluff Point complex (inclusive of the Bluff Point NAP, Bluff Point State Park, and Bluff Point Coastal Reserve), Haley Farm State Park, and the DEEP Marine District Headquarters facility are owned by DEEP. The other upland properties of the Avery Point Campus and Pine Island are owned by UConn. Thus, all upland properties are state-owned. The riverine and subtidal areas are held in public trust by the State of Connecticut.

2.1.4 Proposed CT NERR Boundary Description

2.1.4.1 Boundary Criteria

NOAA's criteria for determining the boundaries of a NERR are outlined in the Code of Federal Regulations (15 C.F.R. § 921.11). These criteria are summarized below:

- **Key land and water areas that approximate an ecological unit:** Reserve boundaries must encompass an adequate portion of key land and water areas of the natural system to approximate an ecological unit and should encompass resources representative of the total biogeographic habitat.
- **Encompass areas with adequate controls:** NOAA regulations require there be a level of control over uses and activities to ensure the ecological integrity of the reserve is maintained for sustained research and education. Specifically, the regulations indicate that reserve boundaries must encompass an area within which adequate control has or will be established by the managing entity over human activities occurring within the reserve.
- **Management considerations:** The administrative burden and responsibility for operating a reserve and associated research, stewardship, and educational programs should be a significant consideration in the site selection process and in the delineation of the reserve boundaries. Given the limited funds available to support reserve programs, it is also important to develop a reasonable boundary that will establish a credible reserve without creating an overwhelming administrative burden.
- **Research, monitoring, education, and stewardship needs and goals:** The research, monitoring, education, and stewardship needs and goals of the reserve are important considerations in developing a boundary. These needs and goals define the purpose of establishing a reserve and should play a primary role in defining boundaries and guiding future land acquisition needs.

2.1.4.2 Core and Buffer Area Rationale

The federal regulations implementing CZMA (15 C.F.R. Part 921) state that reserve boundaries generally encompass two areas: core areas and buffer zones. (See 15 C.F.R. § 921.11.) The regulations define “core” land and water areas as containing ecological units of a natural estuarine system which preserve, for research purposes, a full range of significant physical, chemical, and biological factors contributing to the diversity of fauna, flora, and natural processes occurring within the estuary (See Section 2.1.4.3 for a description of the core area in the proposed CT NERR). From 15 C.F.R. § 921.11:

[The core area is] so vital to the functioning of the estuarine ecosystem that it must be under a level of control sufficient to ensure the long-term viability of the Reserve for research on natural processes [. . . These areas] should encompass resources representative of the total ecosystem, and which if compromised could endanger the research objectives of the Reserve.

The proposed CT NERR core areas were selected based on the following criteria:

1. They represent natural habitats vital to the ecological functions of the estuary.
2. The state can maintain a sufficient level of control over the areas to ensure the long-term viability of the proposed CT NERR for research and natural processes.
3. The areas encompass resources representative of Long Island Sound and Fishers Island Sound estuaries and natural coastal lands of the watershed.
4. The preservation of the core areas will contribute to the preservation of a full range of significant physical, chemical, and biological factors essential to the diversity of fauna, flora, and natural processes occurring within the estuary.
5. They exclude areas where uses occur that are considered resource manipulation under Reserve System regulations (15 C.F.R. § 921.1(d)).

The Reserve System regulations (15 C.F.R. § 921.11) define a buffer area as an “*area adjacent to or surrounding key land and water areas and essential to their integrity. Buffer zones protect the core area and provide additional protection for estuarine-dependent species.*” The buffer area may include areas for research and education facilities.

The proposed CT NERR buffer areas were selected based on the following criteria:

1. The areas provide additional protection for species that rely on the core area.
2. The buffer areas provide an opportunity to accommodate future shifts in the core area resulting from ecosystem changes.
3. The areas are located adjacent to or are essential to the integrity of the core area.
4. Managers can maintain a level of control over the areas sufficient to support the long-term viability of the proposed CT NERR for the support of natural processes, as well as for research and education.
5. They may contain offshore areas of resource manipulations that involve general coastal structures, dredging, offshore infrastructure (e.g., cable and pipeline areas) and higher concentrations of water-dependent uses.

The uses in the core and buffer areas, and existing state and federal laws, regulations, and policies that govern them, are more fully described in *Section 5, Resource Protection Plan. Section 9, Resource Manipulation Plan* describes these resource manipulation activities and the buffer areas that address them. The designation of the proposed CT NERR will not change any existing uses in which they occur; nevertheless, the reserve managers will maintain awareness of land and water uses and ensure the proposed CT NERR goals and objectives are pursued in harmony with existing uses.

2.1.4.3 Proposed CT NERR Core and Buffer Areas

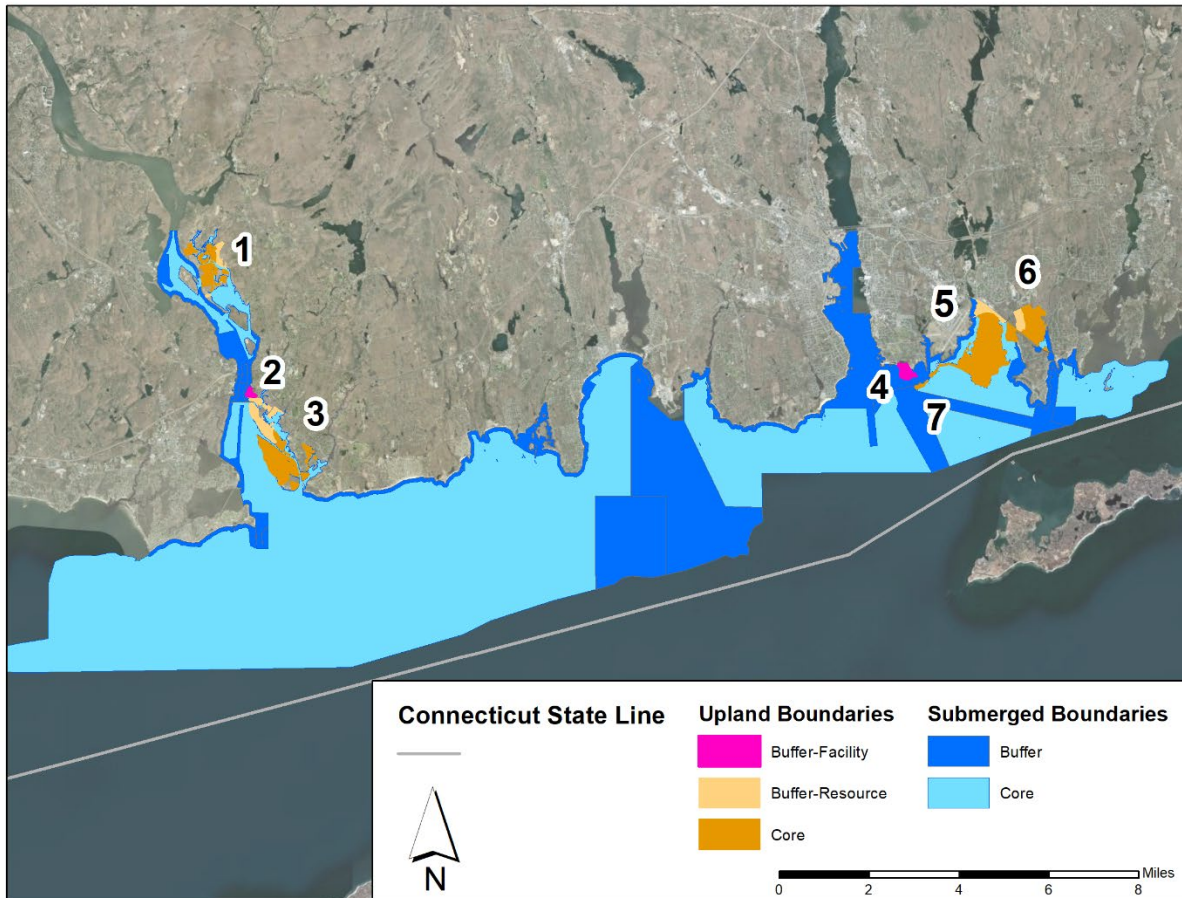


Figure 2-6: Proposed CT NERR—Core and Buffer Areas

Location of core and buffer lands and subtidal areas within this alternative. (1) Lord Cove NAP, (2) DEEP Marine District Headquarters, (3) Roger Tory Peterson NAP, (4) UConn Avery Point Campus, (5) Bluff Point complex, (6) Haley Farm State Park, (7) Pine Island

CORE AREA – BOUNDARIES AND HABITAT TYPES: The core area in the proposed CT NERR encompasses about 39,473 acres that are currently managed by the state and are suitable sites for conducting research and monitoring activities (Figure 2-6).

Upland core areas (approximately 1,564 acres) are defined by the existing boundaries of Bluff Point CR and Bluff Point NAP parcels within the Bluff Point complex: the largest and eastern most parcel of Haley Farm State Park; Pine Island; and those areas of marsh at Lord Cove NAP and Roger Tory Peterson NAP that are currently high marsh dominated but may transition to low marsh as suggested by Sea Level Affecting Marshes Model (SLAMM) land cover scenarios for 25-50 years in the future (Clough et al. 2019).

These core areas are comprised of coastal forests, coastal shrublands and grasslands, and one of Connecticut's only coastal bluffs (Figures 2-2, 2-3, 2-4). Haley Farm State Park hosts a poor fen² (Barrett 2014). A rare sea level fen has been documented at Bluff Point NAP (Barrett 2014), Haley Farm State Park might also host this rare fen. The eastern properties border western Fishers Island Sound and eastern Long Island Sound to the south and the land is bordered to the east and west by embayments. The western properties are located along the tidal, lower Connecticut River. Transitional core areas throughout the reserve include intertidal beaches, mudflats, and coastal marshes, including salt marshes, brackish marshes, and tidal freshwater marshes.

The subtidal core area (37,909 acres) covers all offshore areas within the proposed CT NERR that are not described as subtidal buffers.

BUFFER AREA – BOUNDARIES AND HABITAT TYPES: The buffer areas are contiguous with the core areas and encompass 391 terrestrial acres and 12,296 subtidal areas for a total of approximately 12,687 acres. (Figure 2-6).

Upland buffer areas totaling roughly 333 acres include the Bluff Point State Park, the smaller western parcels at Haley Farm State Park, and those areas of marsh at Lord Cove and Roger Tory Peterson NAP that are identified as likely areas of maintaining or transitioning to high marsh as suggested by SLAMM land cover scenarios for 25-50 years in the future (Figures 2-2, 2-3, 2-4) (Clough et al. 2019). The DEEP Marine District Headquarters property and the UConn Avery Point campus constitute approximately 58 acres of facility-based buffer areas.

The subtidal buffer includes:

1. Approximately 450-feet extended from the shoreline adjacent to core (or more when needed to contain a particular structure or activity).
2. Navigation channels and turning basins as depicted on nautical charts, or in anchorages depicted on nautical charts where the depth range is less than approximately 30 feet.
3. Any other areas that involve or are known to be involved with past dredging activities not already addressed by items 1 & 2.
4. Areas depicted as submerged cable or pipeline areas on nautical charts.

² Fens are peat-forming wetlands that rely on groundwater input and require thousands of years to develop and cannot easily be restored once destroyed. Fens are categorized by soil pH, plant community, and other characteristics. A number of fens are identified in the Connecticut Comprehensive Wildlife Conservation Strategy, including: calcareous spring fen, acidic spring fen, circumneutral spring fen, rich fen (high groundwater pH above 6.9), medium fen (mid-level groundwater pH of 5.5 to 6.9), and poor fen (low groundwater pH of 4.5 to 5.5). In CT, a poor fen is dominated by ericaceous shrubs. Additionally, a sea level fen is found at Bluff Point NAP. Sea level fens are maritime seepage wetlands occurring in a very thin strip just above normal highest high tide levels and in locations where abundant groundwater discharges to the estuary.

5. Areas that, based on reasonable knowledge or expectations, may likely entertain or possibly eventually contain new cable or pipeline infrastructure installations.
6. Any areas of the lower Thames River from the Gold Star Bridge / Interstate 95 to the vicinity of the river mouth that may not necessarily fall within the above categories but may have high concentrations of water-dependent uses.

2.2 Ecological Characteristics

This section provides an overview of the proposed CT NERR's ecological characteristics. As such, it is not intended to provide a complete or up-to-date inventory. For a more robust presentation, the reader is referred to the *Final Environmental Impact Statement* for a more thorough treatment of these topics.

2.2.1 Geology³

Regional Overview: The rock dominated coastline of eastern Connecticut shows irregularities that reflect the shape of the underlying bedrock surface, with this configuration resulting from the history of glaciation in the area. Seventeen glacially smoothed bedrock hills of various sizes extend seaward forming points, and fifteen glacially modified bedrock valleys underlie the intervening embayments. The points are typically overlain by a blanket of thin till and the valleys are filled with layered sands and gravels deposited as deltas within Glacial Lake Connecticut. Wave action against the till-covered bedrock points removes any fine glacial material and leaves behind a cobble / boulder lag sitting on bedrock.

In contrast, the Connecticut River occupies a section of coastline that is sediment dominated. Overlapping glacial deltas overwhelmed and buried the glacially smoothed bedrock surface as meltwater streams delivered large quantities of sediment to Glacial Lake Connecticut. Coastal irregularities result from the presence of boulder- and cobble-laden recessional moraine ridges which form moraine-armored points. Where the moraines are subjected to wave action, fine-grained sediments are removed, and boulder / cobble beaches develop. As is typical all along the Connecticut coast, where glacial delta deposits are subjected to wave erosion, the size of the sandy beaches and spits that form are limited by the size of their deltaic sand source, and the low flat delta surfaces become a platform for extensive marsh development in a rising sea.

Upland Area: Haley Farm State Park and the Bluff Point complex of properties are representative of the general geologic character of the eastern region of coastal Connecticut. However, several interesting geologic features are contained within the Bluff Point complex. This area hosts a barrier spit which developed from erosion of the glacial deltaic sands and gravels that fill the valley between Avery Point and Bluff Point. The large size of this glacial delta allowed for the development of a relatively large-sized spit and provided an expansive substrate for the marsh complex that has grown over it. The Mystic recessional moraine that extends from Pine Island through Bushy Point Island, Bushy Point beach, and

³ Personal communications – Ralph Lewis, Connecticut State Geologist (ret). August, 2017.

Bluff Point beach underlies the marsh behind the barrier spit and crosses the northern third of the glacially-smoothed Bluff Point bedrock ridge. On Bushy Point beach, the wave action has removed finer components of the moraine, and glacial boulders, cobbles, and exposed bedrock form the beach.

The cliff at Bluff Point forms a true bedrock bluff (more than 10 feet in height). Owing to the highly-fractured bedrock there, freeze and thaw cycles weather the bedrock into angular blocks of various sizes. Over time, these fall to the base forming an angular boulder / cobble beach. In addition to this angular boulder / cobble beach, and the rounded boulder / cobble beaches of Bushy Point, four other distinct beach types exist at the Park: (1) the sandy / gravely beach of the barrier spit, (2) the cobble beach between Bluff Point and Mumford Point, (3) the adjacent large glacial boulder / bedrock beach (both derived from wave erosion of the thin till blanket), and (4) the exposed bedrock of Mumford Point. Each of these different beach types has its own compositional and ecological character.

Within the lower Connecticut River area, the proposed CT NERR properties are typical marshes resulting from the basic geological context. However, a recessional ice position is inferred to extend eastward under Roger Tory Peterson NAP. Based on this, the southern half of the Roger Tory Peterson NAP marsh should be underlain by the erosional remnant of a glacial delta deposited between the Saybrook Point ice position and the Saybrook-Wolf Rocks moraine just to the south. The northern half of the Roger Tory Peterson NAP marsh is underlain by deltas that built south from the younger Ferry Point ice position.

Offshore Area: The Long Island Sound basin was initially dominated by fine grained glacial lake sediment (e.g., clays). Over time, tidal scour has removed much of these easily transportable sediments from the eastern areas of eastern Long Island Sound and western Fishers Island Sound and deposited them into Central Long Island Sound where they have coalesced with organics in the relatively quiescent waters. In contrast, the more constricted portions of the eastern Sound, where currents are stronger, tend to have coarser bottom sediments. This dynamic has impacted contaminant distributions—areas with high concentrations of organics and clays are typically more affected based on the geochemical cation and adsorption processes that predominate there.

The subtidal area also offers several noteworthy features. Submerged portions of the bedrock points often extend seaward as identifiable bathymetric features (e.g., boulder reefs and exposed bedrock outcrops associated with Bartlett Reef and Rapid Rock) that extend at least a mile offshore from the Waterford coast. Glacial delta deposits extend offshore of most embayments and the mouth of the Thames River, and partially eroded lake bottom deposits of Glacial Lake Connecticut underlie eastern Long Island Sound and western Fishers Island Sound. This erosion locally exposes bedrock north of The Race (the deep, scoured area at the eastern entrance to Long Island Sound).

Evidence for the draining of Glacial Lake Connecticut comes from stream channels that cut across the glacial lake deposits. Bedforms of various sizes are common in areas just north and west of The Race. Their presence indicates substantial modern sediment transport along the bottom of eastern Long Island Sound. While the overall offshore area is dominated by Glacial Lake Connecticut Deposits (primarily Deltaic, Lake Bottom, and Lacustrine Fan, with the last being the rarer of the three,) it also contains rarer still Glacial Ice laid Deposits. The area is also intersected by three southeast-to-northeast trending

moraines: the Old Saybrook / Wolf Rocks, Mystic, and Clumps-Avondale Moraines. These moraine formations are concentrated in the western and eastern ends of the offshore areas.

2.2.2 Watershed and Hydrology

Surface and Groundwater Hydrology: The freshwater flow in the proposed CT NERR includes two major rivers and several smaller rivers and streams that discharge directly to Long Island Sound or Fishers Island Sound. The lower Connecticut River landward components of the proposed CT NERR are primarily marshes with surface flow driven by freshwater and tidal inputs (Figure 2-7). The Bluff Point properties and Haley Farm State Park comprise areas that are predominantly forested and have less upstream freshwater inflow than the lower Connecticut River landward components. Surface flow at the lower Thames River landward components is limited to tidal creek flow—no perennial streams flow through the sites from upstream. Average streamflow values for sub-areas within the proposed CT NERR from 1971 to 2000 were retrieved from the National Hydrography Dataset Plus (NHDPlus) high resolution NHDPlusEROMMA Table (Moore et al. 2019). Watershed areas were retrieved from the National Hydrography Dataset Plus high resolution value-added attributes (Moore et al. 2019). Risk of flood inundation from FEMA for each area are provided (FEMA 2020).

Haley Farm State Park lies between *Mumford Cove* (which receives fresh water from Fort Hill Brook, average streamflow $4.63 \text{ ft}^3 \text{ s}^{-1}$) and *Palmer Cove* (which receives fresh water from Fishtown Brook, average streamflow $6.65 \text{ ft}^3 \text{ s}^{-1}$) (Figure 2-7). Haley Farm State Park tidal wetlands bordering Palmer Cove receive surface tidal flow from Palmer Cove. Haley Farm State Park includes one poor fen (1.8 acres), likely influenced by acidic ground water, indicating some groundwater discharge-supplied surface water (DEEP n.d.-b). Portions of Haley Farm occur within the FEMA designated 100-year floodplain but most of the area is designated by FEMA as having a less than 0.2 % chance of annual flooding.

Bluff Point State Park and *Bluff Point NAP* lie between the *Poquonnock River* (average streamflow $28.9 \text{ ft}^3 \text{ s}^{-1}$) and *Mumford Cove* (Figure 2-7). *Bluff Point Coastal Reserve* also lies between the Poquonnock River and Mumford Cove, with a section wrapping around the inland boundary of Mumford Cove. The Poquonnock River provides surface water to tidal wetlands in the southwest corner of Bluff Point State Park and tidal flow from Mumford Cove provides surface water to the Bluff Point CR wetlands. The low-lying marshes and sandy spit are designated by FEMA as a coastal high hazard area; a small transition area is in the 100-year floodplain and the interior woodlands and bluff are designated by FEMA as having a less than 0.2 % chance of annual flooding. The barrier beaches at Bluff Point are designated as coastal barriers under the national Coastal Barrier Resources System.

Pine Island is an island; thus, surface water flow is governed by precipitation and groundwater storage is influenced by tidal intrusion of seawater. About half of Pine Island, areas on the eastern and western extremes, are designated by FEMA as having a less than 0.2 % chance of annual flooding; the remainder is designated by FEMA as a coastal high hazard area.

The Thames River drains a 1,413 square mile watershed with an average streamflow of $2,672 \text{ ft}^3 \text{ s}^{-1}$ at the proposed CT NERR boundary. Upland areas in the lower Thames landward components are

designated by FEMA as having a less than 0.2 % chance of annual flooding. Land areas bordering Long Island Sound and adjacent coves are designated as coastal high hazard areas or 100-year floodplain.

Smaller rivers with average streamflow greater than $10 \text{ ft}^3 \text{ s}^{-1}$ that discharge directly to Long Island Sound within the proposed CT NERR boundaries from west to east are Fourmile River ($12.6 \text{ ft}^3 \text{ s}^{-1}$), Pattagansett River ($17.5 \text{ ft}^3 \text{ s}^{-1}$), Niantic River ($63.0 \text{ ft}^3 \text{ s}^{-1}$), Jordan River ($15.0 \text{ ft}^3 \text{ s}^{-1}$), and Poquonnock River ($28.9 \text{ ft}^3 \text{ s}^{-1}$).

The Connecticut River drains a 10,904 square mile watershed with an average streamflow of $17,260 \text{ ft}^3 \text{ s}^{-1}$ at the proposed CT NERR boundary. Lord Cove and Roger Tory Peterson NAPs are located in the lower, estuarine reach of the Connecticut River.

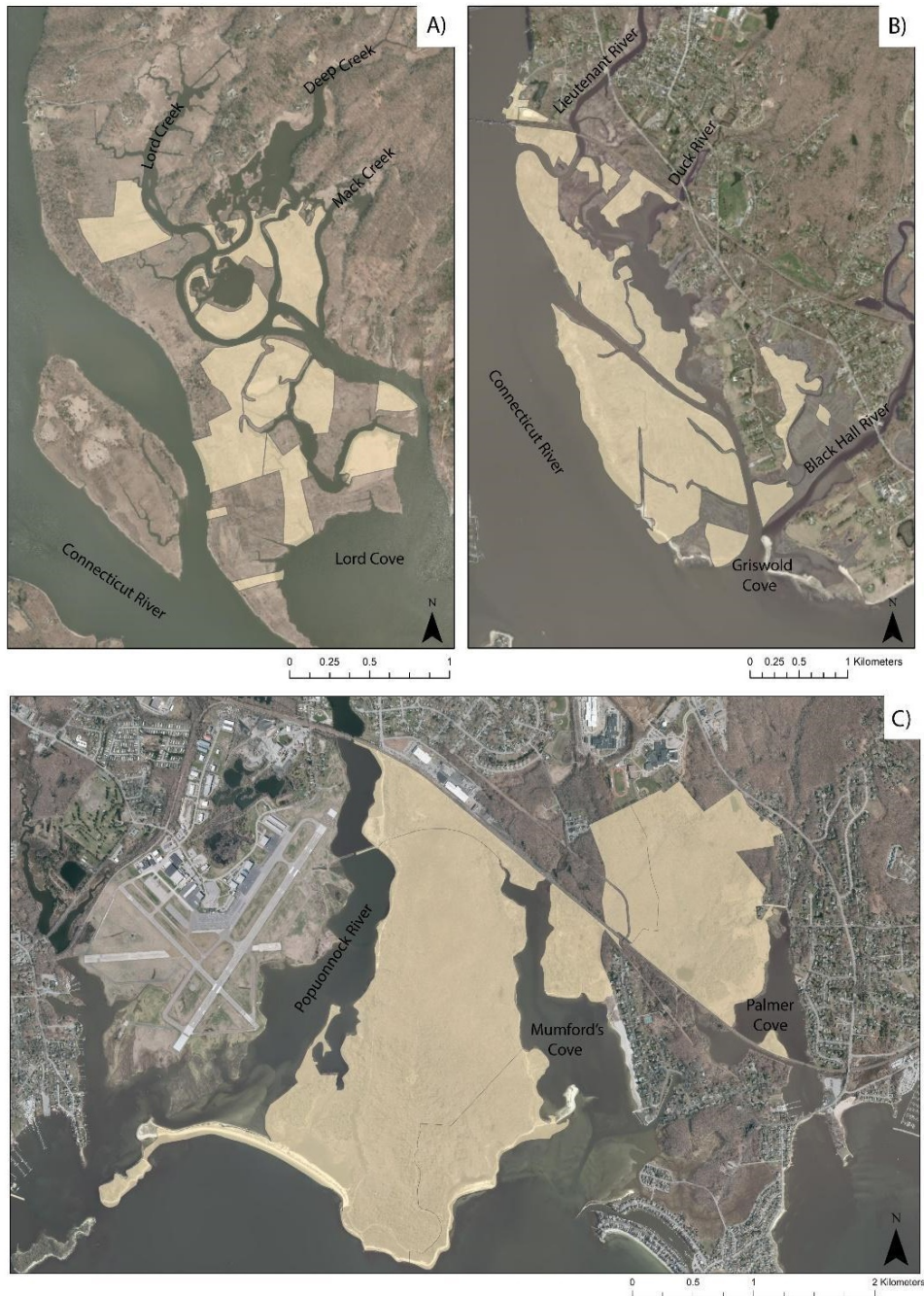


Figure 2-7: Streams and Rivers in Relation to the Proposed CT NERR Water Bodies
 Lighter terrestrial areas are in the proposed CT NERR. Streams and rivers of A) Lord Cove NAP, B) Roger Tory Peterson NAP, and C) Bluff Point properties and Haley Farm State Park.

Roger Tory Peterson NAP: The Lieutenant River flows from east to west across the northern end of the Roger Tory Peterson NAP with an average streamflow of $22.8 \text{ ft}^3 \text{ s}^{-1}$ and discharges to the Connecticut River (Figure 2-7). A small fraction of flow from Lieutenant River (average streamflow $0.10 \text{ ft}^3 \text{ s}^{-1}$) flows

south through the Roger Tory Peterson NAP, joining Duck River (average streamflow $1.47 \text{ ft}^3 \text{ s}^{-1}$). Duck River joins Back River, a side channel of the Connecticut River (average streamflow $3.22 \text{ ft}^3 \text{ s}^{-1}$). Back River joins Black Hall River (average streamflow $9.09 \text{ ft}^3 \text{ s}^{-1}$) at Griswold Cove before discharging to the Connecticut River at the confluence with Long Island Sound. Tidal creeks and relic ditches create surface flow patterns within the site. The majority of the Roger Tory Peterson NAP is designated by FEMA as a coastal high hazard area, with the northern and eastern most sections of the site designated as 100-year floodplain.

Lord Cove NAP: Lord Creek flows through the Lord Cove NAP into Lord Cove and then to the Connecticut River (Figure 2-7). Average streamflow from the headwaters of Lord Creek is $0.77 \text{ ft}^3 \text{ s}^{-1}$. Tributary streams Deep Creek (average streamflow $1.62 \text{ ft}^3 \text{ s}^{-1}$) and Mack Creek (average streamflow $0.18 \text{ ft}^3 \text{ s}^{-1}$) discharge to Lord Creek from the east within the Lord Cove NAP. The Lord Cove NAP drains a watershed area of 2.43 square miles with an average streamflow of $4.78 \text{ ft}^3 \text{ s}^{-1}$ at the confluence of Lord Creek and Lord Cove. Streamflow throughout the Lord Cove NAP is tidally influenced; streams and tidal creeks receive tidal flow from the Connecticut River through Lord Cove. The Lord Cove NAP occurs within the FEMA designated 100-year floodplain, with the southernmost 4.62 acres of the site designated as a coastal high hazard area.

Estuarine Hydrology: The proposed CT NERR features a combination of a large area of eastern Long Island Sound, western Fishers Island Sound, and the mouths of two major Connecticut riverine systems—the Connecticut River and the Thames River. A semi-diurnal tidal cycle of two highs and two lows is present throughout the proposed CT NERR. For the Long Island Sound and Fishers Island Sound components of the proposed CT NERR, exclusive of the major riverine systems of the Connecticut River and Thames River, the mean tidal range is approximately 2.7 feet, increasing to 3.2 feet on a spring tide, although these values differ in various embayments. Average current speeds can range between 1.2 to 2.0 knots on a flood tide and between 0.8 and 3.1 knots on an ebb tide (NOAA 2018).

Water temperatures vary from 32°F in the winter to 68°F in the summer but are moderated daily by the large volume of water moving with the tide. Temperatures in the embayments are influenced by the temperatures in The Sounds, and also flushing rates, depths, and solar radiation. Bottom waters in embayments range annually from 36°F to 75°F while surface waters range annually from 32°F to 86°F .

Both the Connecticut River and Thames River display salt wedge estuarine structure whereby river circulation creates a distinct boundary between a surface layer with lower salinity and a bottom layer with higher salinity. Mean tidal ranges in the mouths of both rivers are comparable at approximately 2.5 feet in the Thames River and 3.5 feet in the Connecticut River (NOAA 2018). While both contribute freshwater inflows to Long Island Sound, the Connecticut River contributes the largest share – about 75 % of total freshwater input (Latimer et al. 2014). Further, the Connecticut River has a different seasonal cycle from the Thames River due to the significant size and extent of its watershed (ranging from Long Island Sound to the mountains of northern New England and Canada) which results in large spring freshets and associated sediment plumes.

Salinity across most of the area of eastern Long Island Sound and western Fishers Island Sound is relatively constant, averaging 30-32 ppt (ppt = parts per thousand) at the bottom and 28-30 ppt at the

surface⁴. The horizontal salinity gradient between the ocean and freshwater sources generates characteristic circulation patterns such that on average, the bottom waters flow shoreward where they mix with surface waters. In the embayments. Salinity regimes are influenced by fresh water at the riverine source and are at their lowest during periods of spring runoff or spring freshet (Dreyer and Caplis 2001). Waters north of Deep River (northward of Lord Cove) are freshwater and from Deep River south, waters are brackish⁵. Highest salinity values typically occur in the summer when rainfall is low and air and water temperatures are high. The salinity ranges in the marshes and near the beaches of the Connecticut River may vary quickly and extremely – variations from 0 to 26 ppt in a day have been recorded. Variations in the salinity at the mouth of the Thames River are also substantial, but not as extreme – here the range is typically 16 to 28 ppt (Latimer et al. 2014).

2.2.3 Water Quality

Water quality refers to the chemical, physical, biological, and radiological characteristics of water (DEEP 2017). It is a measure of the condition of water relative to the requirements of one or more biotic species or to any human need or purpose. It is most frequently used by reference to a set of standards, the most common of which relate to health of ecosystems, safety for human contact, and safety for use as drinking water. Connecticut DEEP maintains a formal set of Connecticut Water Quality Standards (CTWQS) (R.C.S.A. §§ 22a-426-1—22a-426-9, inclusive) that function to convey policies regarding uses and classifications (Tables 2-1 and 2-2), and to provide the criteria needed to support them (DEEP 2019a). These standards are reviewed triennially.

Table 2-1: Designated Use Definitions, Under the CTWQS

The CTWQS lists designated uses for water bodies; those uses are defined here.

USE	DESCRIPTION
Recreation	Swimming, water skiing, surfing, or other full body contact; as well as boating, canoeing, kayaking, fishing, aesthetic appreciation, or other activities that do not require full body contact.
Aquatic Life	Suitable for the protection, maintenance, and propagation of a viable community of aquatic life and associated wildlife.
Shellfish Harvesting for Direct Consumption	Waters from which shellfish can be harvested both recreationally and commercially and consumed directly without depuration or relay. Waters may be conditionally approved.
Commercial Shellfish Harvesting	Waters supporting commercial shellfish harvesting for transfer to a depuration plant or relay (transplant) to approved areas for purification prior to human consumption (may be conditionally approved); also support seed oyster harvesting.

⁴ Salinity from 30 to 35 ppt is termed euhaline or marine and is equivalent to ocean water; salinity from 18 to 30 ppt is termed polyhaline, the highest salinities considered estuarine or brackish. Estuarine waters are further characterized as mesohaline (5 to 18 ppt) and oligohaline (0.5 to 5 ppt), with fresh water < 0.5 ppt.

⁵ Waters at the mouth of the river are in the high end of mesohaline (5 to 18 ppt) and the waters at Lord Cove are oligohaline (0.5 to 5 ppt). Upstream, the river is fresh water (< 0.5 ppt).

USE	DESCRIPTION
Drinking Water Supply	Presently used for public drinking water supply or officially proposed for future public water supply; and waters that have not been identified officially but may be considered for public drinking water supply in the future.
Navigation	Capable of being used for shipping, travel, or other transportation by private, military, or commercial vessels.
Industrial Water Supply	Suitable for industrial supply.
Agriculture	Suitable for general agricultural purposes.

Table 2-2: Designated Use Support Level Definitions, Under the CTWQS

For each designated use, a water body may be assessed to determine the level to which it supports the designated use. Definitions of the support level are provided here in support of the CTWQS. NOTE: these are general definitions, refer to the 2018 Integrated Water Quality Report for more specific information (DEEP 2019a).

SUPPORT LEVEL	DEFINITION
Fully Supporting	The designated use is fully achieved in the waterbody.
Not Supporting	The designated use is not supported in the waterbody
Insufficient Information	Insufficient data / information available to support an evaluation of attainment of designated uses in the waterbody.
Not Assessed	No current readily available information is available to assess use support.
Not Viable	Area is not suitable for shellfish growth.

Section 305(b) of the Federal Clean Water Act (33 U.S.C. § 1315(b)) requires states to monitor, assess and report on the quality of its waters relative to designated uses established in accordance with their water quality classification (DEEP 2021j). Section 303(d) of the Clean Water Act (33 U.S.C. § 1313(d)) requires each state to list waters not meeting water quality standards and prioritize those waters for Total Maximum Daily Load (TMDL) development or other management. Total Maximum Daily Loads provide the framework for restoring impaired waters by establishing the maximum amount of a pollutant that a waterbody can receive without adverse impact to fish, wildlife, recreation, or other uses. Total Maximum Daily Loads can also be developed to protect water bodies that are meeting water quality standards. Although a Total Maximum Daily Load for Long Island Sound was implemented to address the excessive discharge of nitrogen, this Total Maximum Daily Load is primarily focused in the western portion of Long Island Sound and not in the vicinity of the proposed CT NERR. Within the context of 303(d), the state also maintains a list of impaired water bodies which identifies those that do not fully support all designated uses. Reporting for Clean Water Act sections 305(b) and 303(d) is submitted to the USEPA every two years.

Data from the *2018 Integrated Water Quality Report* are representative of current water quality status, though small changes occur year-to-year (DEEP 2019a; DEEP 2020a). A review of changes in the 2020 report relative to the 2018 report indicate the Thames River mouth is now listed for non-attainment of bacteria levels; this addition does not substantially change the data presented below as the Thames River mouth was already listed as impaired (DEEP 2020a). A number of efforts have analyzed water quality trends in Long Island Sound (Dam et al. 2010; Save the Sound and Connecticut Fund for the Environment 2017; Whitney and Vlahos 2021), though these efforts typically focus on the

western end of Long Island Sound. Efforts for analyzing trends in embayments are underway, pending additional years of data still to be collected (Save the Sound and Connecticut Fund for the Environment 2017; Save the Sound et al. 2020). As a general trend, overall water quality is improving. However, sub-areas within the proposed CT NERR may show improvement, no change, or worsening conditions (as in the Thames River mouth area, noted above).

The data below characterize Long Island Sound as a whole and more specifically within the eastern Long Island Sound and western Fishers Island Sound proximal to the proposed CT NERR, including both estuarine and riverine components within relevant subregional watersheds. Not all water bodies are assessed for all possible designated uses and some that were assessed previously as “Fully Supporting” may have changed to “Not Supporting” due to use-specific data age limitations (DEEP 2017). Any waterbody assessed as “Not Supporting” in a prior report retains that assessment until new data confirm that the use category meets improved standards.

With respect to fish consumption, fresh waters of the state are addressed by a statewide limited consumption advisory for all freshwater fish, except trout, due to atmospheric deposition of mercury. Similarly, all estuarine waters have a statewide advisory on striped bass and bluefish due to polychlorinated biphenyl (PCB) contamination. An emerging concern is contamination by perfluoroalkyl and polyfluoroalkyl substances (PFAS) (USEPA 2021a). The Connecticut Department of Public Health has consumption advisories related to PCBs and PFAS throughout the tributaries of the proposed CT NERR (DPH 2021). The waters summarized below contain fish consumption advisories beyond the statewide advisories (DPH 2021).

ESTUARINE AND RIVERINE WATER QUALITY CHARACTERIZATION – LONG ISLAND SOUND, EAST BASIN

Table 2-3 summarizes the designated Use Assessments for the subunits (inner estuary, shore, midshore, and offshore) that comprise the East Basin of the Sound, where the proposed CT NERR is located (Figure 2-8). For a more complete depiction of these areas, see both the 2018 Integrated Water Quality Report and appendices and the associated Geographic Information System (GIS) data (DEEP 2019a; DEEP 2021k).

Table 2-3: Designated Use Assessments in the East Basin, Summary

Use assessments for the sum of the inner estuary, shore, midshore and offshore components.

	Fully Supporting		Not Supporting		Not Assessed		Not Viable	
	area (sq. miles)	area (%)	area (sq. miles)	area (%)	area (sq. miles)	area (%)	area (sq. miles)	area (%)
Aquatic Life	75.7	57%	24.9	19%	33.0	25%	0.0	0%
Recreation	8.2	6%	9.4	7%	115.8	87%	0.0	0%
Shellfishing	61.9	46%	62.6	47%	6.6	5%	2.3	2%

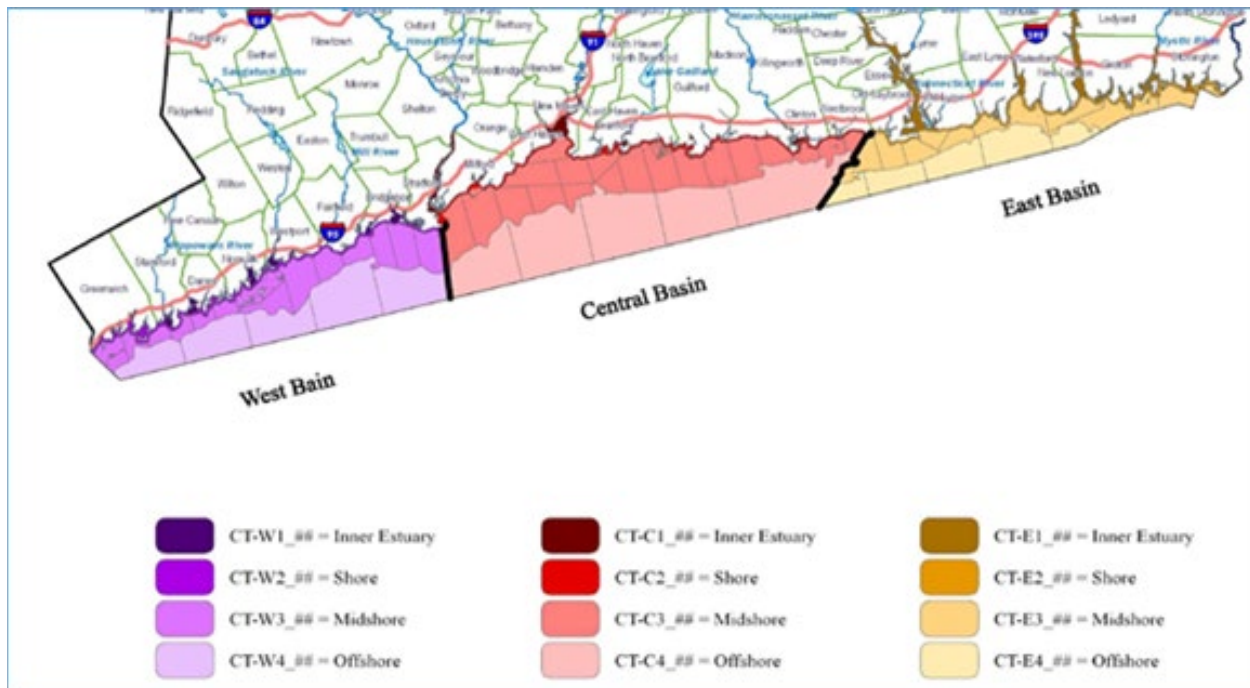


Figure 2-8: Connecticut-Long Island Sound Water Quality Subunits

The Connecticut portion of Long Island Sound is divided into three basins. Within each basin, subunits define the inner estuary, shore, midshore, and offshore areas; these subareas roughly mirror the depth distribution.

For the purposes of this report, riverine waters are defined as those waters landward of the salt water limit within the subregional watershed basins of the Thames River, Great Brook, Fourmile River, Jordan Brook, Pattagansett River, Lieutenant River, Niantic River, Bride Brook, Black Hall River, and the Southeast Shoreline. Table 2-4 summarizes the uses assessments for these riverine areas.

Table 2-4: Designated Use Assessments in the East Basin, Riverine

Use assessments for the 43.5 square miles of the Riverine subarea.

	Fully Supporting		Not Supporting		Not Assessed		Not Viable	
	area (sq. miles)	area (%)	area (sq. miles)	area (%)	area (sq. miles)	area (%)	area (sq. miles)	area (%)
Aquatic Life	14.7	34%	9.1	21%	15.3	35%	4.5	10%
Recreation	0.3	1%	9.3	21%	27.6	63%	6.4	15%
Shellfishing	0.0	0%	41.74	96%	1.8	4%	0.0	0%

In general, the inner, more landward portions exhibit water quality issues while the main stem of Long Island Sound and Fishers Island Sound exhibit better water quality, due to greater exchange with the Atlantic Ocean. Within the overall proposed CT NERR (which does not include the rivers listed in Table

2-4), water quality is supportive of aquatic life in 57% of the assessed area and 46% of the area is supportive of shellfishing (Table 2-3). Water quality supportive of recreation is not assessed for most of the deeper waters of the proposed CT NERR, including the midshore and offshore areas, though these areas are assumed to support recreation. Within the shore area, 13% is not supportive of recreation, with 42% of the area not assessed; these non-supporting areas include the outer portions of embayments as well as areas with direct frontage on Long Island Sound or Fishers Island Sound. Within the inner embayments (inner estuary area), 34% is not supportive of recreation, with 19% of the area not assessed.

The proposed CT NERR includes four embayments with some form of impairment, including Baker Cove, Poquonnock River, Mumford Cove, and Palmer Cove. Other water bodies with listed impairments include lower Thames River, Niantic Bay, Niantic River mouth, and the lower Connecticut River (including Lord Cove), though the east side of the Connecticut River mouth is unimpaired. Within the midshore areas, the far east and far west are unimpaired with impairments between, in areas off the Connecticut River eastward to the area off the Mystic River. All included offshore areas are unimpaired.

2.2.4 Climate and Weather

The coastal region of eastern Connecticut can be characterized as a combination of humid subtropical and temperate ocean climates, bringing a mix of hot, humid summers with mild to moderate winters consisting of a mix of rain with infrequent snow (Weather Atlas 2021) and seasonal storms, including winter Nor'easters and summer hurricanes. Average monthly temperatures can range from lows in the 20s (°F) in January to highs above 80°F in July and August. Average annual temperatures range from the mid-40s (°F) to low 60s (°F). Rainfall is fairly consistent throughout the year at about four inches per month. The average annual snowfall is about 24 inches per year, with the highest snowfall typically occurring in January and February (NOAA 2021a).

Climate change impacts can include increased air and water temperatures, rising sea level, ocean acidification, and changes to precipitation and fresh water supply. The steadily declining snowpack of northern New England has caused reductions in the volume and timing of the annual spring flood (or spring freshet). In the future, the existing salt wedge is expected to shift upstream due to decreased freshwater input from the declining snowpack and resulting changing salinity patterns will likely be reflected by changes in distribution of tidal marsh vegetation.

Connecticut is actively pursuing efforts to mitigate climate change and to develop strategies to make the state resilient to and prepared for the impacts of climate change while “considering racial, class, gender, geographic and generational equity in both costs and benefits” (Governor's Council on Climate Change 2018b). The Governor's Council on Climate Change (GC3) has established interim goals for reducing greenhouse gas emissions, requiring a 45% reduction in greenhouse gas emissions below 2001 levels by 2030 (Governor's Council on Climate Change 2018b); this puts the state on the path towards achieving the 2050 goal of an 80% reduction relative to 2001 levels. This effort is largely targeted at green energy production, but also includes transportation and clean, efficient, and resilient buildings (Governor's Council on Climate Change 2018a).

In September 2019, the GC3 was re-established and expanded. In addition to continuing to address mitigation strategies to reduce greenhouse gases, the newly expanded GC3 will also consider adaptation and resilience in the face of climate change impacts (Governor's Council on Climate Change 2021b). The GC3 recently engaged in public meetings structured around sub-working groups, including the “Working and Natural Lands” group (Governor's Council on Climate Change 2021a). This sub-group is especially relevant to the proposed CT NERR as its charge is to, “evaluate the role of nature-based solutions (e.g., scaling up the preservation and restoration of forests and wetlands, green and natural infrastructure, agricultural lands) in climate change mitigation and adaptation and how to best incorporate the economic, social, and environmental co-benefits of these solutions into Connecticut’s climate change planning strategies.” An additional charge to the GC3 is to, “develop and implement adaptation strategies to assess and prepare for the impacts of climate change in areas such as infrastructure, agriculture, natural resources, and public health.” This includes tasks such as: (1) conducting an inventory of vulnerable assets and operations; (2) revising and updating the 2011 Connecticut Climate Change Preparedness Plan; and (3) reporting on the alignment of climate change adaptation strategies incorporated into state agency planning processes and documents. The Phase 1 report detailing near-term actions was released in early 2021 (Governor's Council on Climate Change 2021c).

2.2.5 Habitats and Species

The proposed CT NERR is composed of assorted upland properties, marshes, shallow freshwater and saltwater areas, and an offshore area including parts of eastern Long Island Sound, western Fishers Island Sound, and the lower Connecticut River and Thames River areas that include a variety of habitat types (Barrett 2014; DEEP n.d.-c; Dreyer and Caplis 2001; USFWS 1994). Descriptions of the flora for each habitat were drawn from the *Long Island Sound Stewardship Ecological Sites Inventory Update* for terrestrial and marsh plants and from *Long Island Sound: Prospects for the Urban Sea* for aquatic plants and algae (Barrett 2014; Latimer et al. 2014). *Seaweeds of Long Island Sound* and *A Field Guide to Long Island Sound* were referenced for all relevant habitats (Lynch 2017; Van Patten 2009). The fauna found within the intertidal and coastal areas of the proposed CT NERR are well-documented and described in *A Field Guide to Long Island Sound* (Lynch 2017) which provides a broad overview of the dominant species found in all habitats of the proposed CT NERR, from coastal forests to subtidal areas. The list of terrestrial species was supplemented using a census of New England terrestrial species (DeGraaf and Rudis 1983) and the *National Audubon Society Field Guide to New England* (Alden et al. 1998). For a deeper overview of coastal, estuarine, and marine fauna, refer to *Marine Animals of Southern New England and New York* (Weiss 1995). Additional resources include *Amphibians and Reptiles of Connecticut and Adjacent Regions* (Klemens 1993) and *Connecticut Wildlife: Biodiversity, Natural History, and Conservation* (Hammerson 2004).

The Connecticut Wildlife Action Plan (CT-WAP) and associated Natural Diversity Data Base are an essential resource for the current status of Connecticut’s habitats, flora, and wildlife—both common species and those which are endangered, threatened, or of special concern (DEEP 2015a; DEEP 2015b; DEEP 2016). The CT-WAP lists threats, stressors, and best management practices by habitat and by species; the CT-WAP provides a sound foundation for the ecosystem-based management carried out by

DEEP and partner organizations. Reserve staff will work closely with DEEP when conducting the site inventory of the proposed CT NERR and reserve staff will obtain all necessary permits and permissions necessary to conduct work in the proposed CT NERR.

Invasive plants in Connecticut are detailed in the *Connecticut Invasive Plant List (Oct, 2018)* which includes invasive and potentially invasive plants as determined by the Connecticut Invasives Plant Council in accordance with C.G.S. §§ 22a-381a to -381d (Connecticut Invasives Plant Council 2018). Nonindigenous species not identified as invasive by the Plants Council were determined using the *USGS Nonindigenous Aquatic Species Database* (USGS 2021a). DEEP and USGS provide information on invasive and nonindigenous flora and fauna within Connecticut (DEEP n.d.-a; USGS 2021b; USGS 2021c). DEEP manages invasive species in all state-owned properties and as the landowner, will continue with this activity if the NERR is designated.

2.2.5.1 Terrestrial Habitats, Flora, and Fauna

The proposed CT NERR lies within the eastern coastal ecoregion (Dowhan and Craig 1976), a seaboard region that is five to seven miles wide where Coastal Hardwoods dominate the regional forest. The terrestrial areas include a variety of coastal upland habitats. Focusing on only those areas which are above the mean higher high water tide line, the habitats include: coastal forests-woodland, coastal meadows / grassland, coastal shrublands, beach and dune grasslands, and coastal bluff. A few State of Connecticut-defined Critical Habitats (Metzler and Barrett 2006) are found within the proposed CT NERR, these include: coastal woodland / shrubland and coastal grassland.

Over 200 bird species have been seen at the Bluff Point properties, including a number that are uncommon in Connecticut. Many of these uncommon species occur in migration, when Bluff Point acts as a landfall in the spring and a land trap in the fall. Similar diversity is seen in other areas of the proposed CT NERR. There is also a great diversity of nesting species, thanks to the variety of habitat types near one another. The Connecticut River marshes included in the NERR are Wetlands of International Importance under the Ramsar Convention (Dreyer and Caplis 2001; USFWS 1994), providing habitat for resident bird species and migrants. Cruises along the Connecticut River allow birdwatchers and tourists to witness the massive congregations of tree swallows (*Tachycineta bicolor*) in August as they take a break from their migration and bald eagles (*Haliaeetus leucocephalus*) may be seen along the shoreline in February and March, eating fish caught in the River. Cruise participants may spot as many as 40 eagles as they make their way up the River, as well as occasional seals.

Terrestrial Flora: Forests are a dominant feature of Haley Farm State Park and the Bluff Point complex, and include large stands of birch (*Betula lenta*), oak (*Quercus* sp.), hickory (*Carya tomentosa*; *Carya glabra*) and black cherry trees (*Prunus serotina*). The shrublands found within the proposed CT NERR include highbush blueberry (*Vaccinium corymbosum*), black huckleberry (*Gaylussacia baccata*), and sumac (*Rhus* sp.). The open grasslands are dominated by switchgrass (*Panicum virgatum*) and little bluestem (*Schizachyrium scoparium*). These grasslands contain a variety of plants that are preferred habitat for some insects and birds. The beach and dune grasslands include American beachgrass (*Ammophila breviligulata*), beach rose (*Rosa rugosa*), and seaside goldenrod (*Solidago sempervirens*). These plants are essential for stabilizing the dunes, preventing wind from carrying away the sand, and

preventing waves from entering the marshes behind the dunes. A coastal bluff is located in Bluff Point Coastal Reserve, at the southern tip of the point. This area is affected by salt spray and only plants that tolerate such conditions can live here.

Invasive plant species are widespread in the terrestrial habitats within the proposed CT NERR. A recent survey of Bluff Point found at least one invasive plant species in 78% of the forested sample plots, with higher frequency in more open sites (C. Jones, 2020 unpublished report to DEEP). The Connecticut Invasive Plant Working Group, hosted by UConn Extension, evaluates and tracks invasive plants, delivers educational opportunities on invasives to the general public (13,406 hours in 2020), and provides information on the control of a subset of invasive plants, including plants known to occur in the proposed CT NERR area. The most common invasive plants in terrestrial sites within the proposed CT NERR include: Asiatic bittersweet (*Celastrus orbiculatus*), Japanese honeysuckle (*Lonicera japonica*), Morrow's honeysuckle (*Lonicera morrowii*), multiflora rose (*Rosa rugosa* Thunb.), Japanese barberry (*Berberis thunbergii*), autumn olive (*Elaeagnus umbellata*) and Japanese knotweed (*Polygonum cuspidatum*) (Connecticut Invasives Plant Council 2018). Black swallowwort (*Cynanchum louiseae*) is particularly pervasive at the coastal bluff in Bluff Point Coastal Reserve. Other invasive plants which potentially exist in the proposed CT NERR and for which the Council lists control measures include: garlic mustard (*Alliaria petiolata*), purple loosestrife (*Lythrum salicaria*), and spotted knapweed (*Centaurea biebersteinii*). Within the list of 97 species, the beach rose (*Rosa rugosa*) is noted as especially aggressive in coastal areas.

Terrestrial Fauna: The fauna found in terrestrial areas include a variety of mammals, reptiles, amphibians, insects, and birds. Mammalian species once extirpated from Connecticut but now increasing in abundance include the bobcat (*Lynx rufus*) and the black bear (*Ursus americanus*); DEEP tracks and provides maps of recent sightings for both of these species (DEEP 2020e; DEEP 2020f). New England cottontail (*Sylvilagus transitionalis*), Connecticut's only native rabbit, has experienced drastic population declines over the last several decades but is still seen at Bluff Point (DEEP 2020g). Osprey (*Pandion haliaetus*) and bald eagle (*Haliaeetus leucocephalus*) populations have increased throughout the state—both were impacted by pesticides which led to a drastic decline following World War II (Dreyer and Caplis 2001). There are now more than 400 active osprey nests in Connecticut (Audubon Connecticut 2021) and as of 2010, there were 18 pairs of bald eagles making nesting attempts in the state with more than 100 eagles seen overwintering in Connecticut (DEEP 2010).

Because of the isolation of the Bluff Point peninsula, white-tailed deer over-population was a problem in the past. Their numbers became so great that vegetation was heavily impacted and starvation of deer became common. By 1995, DEP determined to reduce the population and a series of controlled hunts were used to reduce the herd to the estimated carrying capacity of the area. A public hunt in 1996 and DEEP deer removal efforts after 1996 have successfully reduced the overabundant deer population from 222 deer per square mile to 20 deer per square mile between 1996 and 2001. No action was implemented in January 2002 or 2003. In January 2004, the deer management plan was modified to incorporate a new authority (C.G.S. § 26-3) to increase the efficiency of deer removal activities at Bluff Point. Currently, deer are removed at night by DEEP staff to maintain the deer herd at 20 deer per square mile.

Invasive insects tracked and managed by DEEP include the emerald ash borer (*Agrilus planipennis*) which can be found throughout most of the state; this species was first detected in Connecticut in 2012 (DEEP 2020d). As this species is considered established in North America, efforts focus on slowing the spread into new areas and reducing population numbers rather than eradication. The state is actively looking for the Asian longhorned beetle (*Anoplophora glabripennis*); although not yet detected in Connecticut, this species is found in both New York and Massachusetts. The Asian longhorned beetle is an insect of federal regulatory concern; this status obligates the federal government to take direct action in partnership with the state and other local partners to contain and eradicate the pest. Other invasive insects of note in Connecticut include the gypsy moth (*Lymantria dispar*), Japanese beetle (*Popillia japonica*), the hemlock woolly adelgid (*Adelges tsugae*), and the European elm bark beetle (*Scolytus multistriatus*).

2.2.5.2 Riparian and Freshwater Habitats, Flora, and Fauna

The proposed CT NERR includes freshwater ponds and freshwater tidal marshes. A few State of Connecticut-defined Critical Habitats (Metzler and Barrett 2006) are found within the proposed CT NERR. These include: beachshore, intertidal marsh, freshwater aquatic, and poor fen.

The Connecticut River is the longest tidal river in the northeastern United States. With its headwaters in the Connecticut Lakes region of New Hampshire, near the Canadian border. This river flows for 410 miles before discharging into Long Island Sound, constituting a 7.2-million-acre watershed. The Connecticut River has the most extensive fresh and brackish tidal wetland systems in the Northeast. The Connecticut River is an important riverine migratory corridor for fish within this region and is federally-designated ESA Critical Habitat (16 U.S.C. § 1532(5); 50 C.F.R. § 424.12) for the Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*). This area is recognized as containing Wetlands of International Importance under the intergovernmental Ramsar Convention (Dreyer and Caplis 2001; USFWS 1994).

Riparian and Freshwater Flora: Swampy areas within the proposed CT NERR are characterized by red maple (*Acer rubrum*) and tulip trees (*Liriodendron tulipifera*). Haley Farm State Park hosts a poor fen (Barrett 2014). These acidic, groundwater-fed wetlands are typically poor in species diversity and dominated by mosses. A rare sea level fen has been documented at Bluff Point NAP (Barrett 2014). Haley Farm State Park might also host this rare fen. In both locations, this fen is likely to be a very small area, at the upland edge of the salt marsh. Throughout the upland areas, freshwater tidal flats typically support dwarf spikerush (*Eleocharis parvula*), eastern grasswort (*Lilaeopsis chinensis*), tidal arrowhead (*Sagittaria* sp.), and Atlantic mudwort (*Limosella australis*). The subtidal fresh waters of the Connecticut River support an assortment of submerged aquatic vegetation with horned pondweed (*Zannichellia palustris*), wild celery (*Apium graveolens*), widgeon grass (*Ruppia maritima*), water-milfoil (*Myriophyllum* sp.), and common waterweed (*Elodea canadensis*) as the primary species (Barrett 1997).

Freshwater invasive plants known to occur within the towns hosting the reserve include: common reed (*Phragmites australis*), Eurasian water-milfoil (*Myriophyllum spicatum*), variable-leaf water-milfoil (*Myriophyllum heterophyllum*), curly leaf pondweed (*Potamogeton crispus*), water chestnut (*Trapa natans*), and hydrilla (*Hydrilla verticillata*) (CAES IAPP 2021; Capers et al. 2005). Recently, 200 acres of

hydrilla were mapped in the Connecticut River (CAES IAPP 2021; CT RC&D 2021; Werth 2020). Common reed has been controlled in many of the tidal marshes at and south of Lord Cove.

Riparian and Freshwater Fauna: Terrestrial species are often found at the edges of riparian and freshwater habitats, as these habitats are a vital source of fresh water for most species. Some groups of animals, such as the freshwater turtles, can be found on land and in the water. The freshwater marshes are habitats for a variety of animals, such as the bald eagle (*Haliaeetus leucocephalus*), osprey (*Pandion haliaetus*), northern harrier (*Circus hudsonius*), American bittern (*Botaurus lentiginosus*), and northern diamond-back terrapin (*Malaclemys terrapin terrapin*). The freshwater marshes included in the proposed CT NERR are particularly important as both a movement corridor and migratory stopover for numerous avian species, especially waterfowl, and in particular, American black duck (*Anas rubripes*). Here, the river and marshes provide open-water wintering habitat when many inland areas are frozen over.

Freshwater invasives of concern in Connecticut include the zebra mussel (*Dreissena polymorpha*), quagga mussel (*Dreissena bugensis*), rusty crayfish (*Orconectes rusticus*), Chinese mitten crab (*Eriocheir sinensis*), and New Zealand mud snail (*Potamopyrgus antipodarum*); none of these species have been observed in the proposed CT NERR (DEEP n.d.-a; USGS 2021b; USGS 2021c). The Asian clam (*Corbicula fluminea*) is a freshwater invasive of concern to DEEP that has been observed in the lower Connecticut River (USGS 2021b). The *USGS Nonindigenous Aquatic Species Database* lists additional nonindigenous species found within or neighboring the proposed CT NERR (USGS 2021b); these species may not rise to the level of invasive for DEEP if they are not causing undue harm to the environment. Nonindigenous species of exotic origin within the area include one jellyfish (freshwater jellyfish, *Craspedacusta sowerbyi*), one mollusk (Chinese mysterysnail, *Cipangopaludina chinensis*), and a variety of fish: red-bellied pacu (*Piaractus brachypomus*), unidentified piranha (*Pygocentrus* sp. or *Serrasalmus* sp.), Jack Dempsey (*Rocio octofasciata*), goldfish (*Carassius auratus*), common carp (*Cyprinus carpio*), zebra danio (*Danio rerio*), ide (*Leuciscus idus*), suckermouth catfish (*Hypostomus* sp.), Siamese fighting fish (*Betta splendens*), guppy (*Poecilia reticulata*), and brown trout (*Salmo trutta*).

2.2.5.3 Estuarine Habitats, Flora, and Fauna

Including estuarine⁶ areas below the mean higher high water line, habitats within the proposed CT NERR include: tidal marshes, rocky intertidal, intertidal beaches, intertidal mud and sand flats, intertidal algae beds, subtidal hardbottom, subtidal softbottom, and submerged aquatic vegetation. Commercially leased and recreational shellfish beds are concentrated in the eastern end of the proposed CT NERR while two large natural shellfish beds are in the lower Connecticut River (109 acres). Most of the terrestrial sites within the proposed CT NERR include tidal salt marshes, tidal brackish marshes, or freshwater marshes along some part of their coastline. The offshore areas of the proposed CT NERR include an array of submerged aquatic vegetation, softbottom, and hardbottom (reefs, bedrock / gravel

⁶ Salinity from 30 to 35 ppt is termed euhaline or marine and is equivalent to ocean water. Below 30 ppt, waters are considered estuarine or brackish: salinity from 18 to 30 ppt is termed polyhaline, 5 to 18 ppt is mesohaline, 0.5 to 5 ppt is oligohaline, with fresh water < 0.5 ppt.

zones, rocky / boulder areas), which span a depth regime from 1 to over 150 feet in depth (UConn et al. 2010). A few State of Connecticut-defined Critical Habitats (Metzler and Barrett 2006) are found within the proposed CT NERR, these include: beachshore and intertidal marsh.

The coastal and estuarine habitats of Long Island Sound and Fishers Island Sound—such as seagrass, shellfish beds, and salt marsh—provide a home, feeding area, and nursery for marine fish, marine invertebrates, sea turtles, marine mammals, and birds. As foundational, biogenic habitats essential for marine biodiversity and function, seagrass, shellfish, and salt marsh ecosystems represent a source of food security for humans through recreational and commercial fishing activities, and nursery habitat provision for major fisheries along the eastern seaboard. These habitats create structures that stabilize sediments and dampen wave energy, helping reduce coastal erosion and the impacts of storms. Seagrass and salt marsh are also important carbon sinks, sequestering and storing up to ten times the amount of carbon by area as their terrestrial forest equivalents (Millenium Ecosystem Assessment 2005; Valiela 1995). Whales, sea turtles, and fish that migrate or move between coastal, estuarine, and ocean habitats as they feed and reproduce, depend on Long Island Sound, Fishers Island Sound, the rivers, and offshore habitats throughout their life histories—both directly and indirectly.

Estuarine Flora: Most of the terrestrial sites within the proposed CT NERR include salt marsh, brackish marsh, or tidal freshwater marsh along some part of their coastline. The Connecticut River sites are predominantly brackish marsh with short meadow grasses at the south and tall reedy vegetation at Lord Cove while the Bluff Point complex hosts a small amount of salt marsh. Each habitat hosts a suite of characteristic submerged aquatic vascular plants and seaweed.

TIDAL SALT AND BRACKISH MARSHES: A comprehensive study of salt marsh plants within the proposed CT NERR has not been done, but a typical progression of vegetation from the upper to lower marsh is likely. The upper boundary of salt marsh in the proposed CT NERR can be expected to contain bayberry (*Morella* sp.) and marsh elder (*Iva frutescens*). Landward of this is either the freshwater marsh dominated by switchgrass (*Panicum virgatum*) or the forested wetland dominated by tupelo (*Nyssa sylvatica*). The brackish border of the salt marsh typically supports a band of black grass (*Juncus gerardii*) but in places this meadow has been replaced by common reed (*Phragmites australis*). However, where tupelo replaces switchgrass, common reed (*Phragmites australis*) is steadily declining from shading. The high marsh zone includes saltmeadow cordgrass (*Spartina patens*), spike grass (*Distichlis spicata*), blackgrass (*Juncus gerardii*), jointed glasswort (*Salicornia depressa*) and sea lavender (*Limonium carolinianum*).

ROCKY INTERTIDAL ALGAE BEDS: Within the rocky intertidal zones, located primarily at Bluff Point and other headland areas within the proposed CT NERR, exposed boulders often exhibit zonation which appears as distinct color bands (Niering et al. 1978). At the high tide line a black band is formed by microscopic blue-green algae. The mid- to lower-zone of the intertidal may consist of one or more color bands. A typical Southern New England zonation includes the green macroalgae stone hair (*Blidingia marginata*) which is found above the barnacle zone in the high intertidal, nori (*Porphyra purpurea*) a bit deeper in the intertidal at the bottom of the barnacles, and brown macroalgae (*Fucus* sp., *Ascophyllum nodosum*) in the lower intertidal intermingled with green gut weed (*Ulva* sp.) (Van Patten 2009). In areas

experiencing nutrient pollution, the lower intertidal may harbor other green macroalgae, including sea lettuce (*Ulva* sp.) and green hair (*Cladophora* sp.).

INTERTIDAL MUD AND SAND FLATS: The major primary producers in these zones are benthic microalgae, including diatoms, euglenoids, dinoflagellates, and cyanobacteria (Latimer et al. 2014). Intertidal mud and sand flats are typically devoid of macroalgae. However, in areas experiencing nutrient pollution, these regions can be coated with macroalgae that may range from less than one inch to more than one foot deep.

INTERTIDAL BEACHES: Due to the mobility of coarse-grained sediments on beaches, macroalgae are typically not present, though some macroalgae wash ashore from deeper areas. The major primary producers in these zones are benthic microalgae, primarily benthic diatoms (Latimer et al. 2014).

SUBTIDAL HARD BOTTOMS: As with all photosynthetic organisms, macroalgae will occur in areas where sufficient light is available to sustain their growth (Latimer et al. 2014). The most common species of macroalgae occurring in the proposed CT NERR include sea lettuce (*Ulva* sp.) and gut weed (*Ulva* sp.), stone hair (*Blidingia marginata*), green fleece (*Codium fragile*), Irish moss (*Chondrus crispus*), graceful red weed (*Gracilaria* sp.), Agardh's red weed (*Aghardiella subulata*), the rockweeds (*Fucus* sp.), knotted wrack (*Ascophyllum nodosum*), and kelp (*Saccharina* sp.). In areas experiencing nutrient pollution, monocultures of macroalgae may develop; typical species include sea lettuce (*Ulva* sp.), graceful red weed (*Gracilaria* sp.), and a composite of green hair (*Cladophora* sp.) and green thread (*Chaetomorpha linum*) (Latimer et al. 2014). The vascular plant, eelgrass (*Zostera marina*), can be found in some hard bottom areas (see "submerged aquatic vegetation" below).

SUBTIDAL SOFT BOTTOMS: Very few species of macrophytes colonize the soft bottom areas, the flora in these locations are often dominated by benthic microalgae. The vascular plant, eelgrass (*Zostera marina*), can be found in some soft bottom areas (see "submerged aquatic vegetation" for more on eelgrass). Polly (*Polysiphonia* sp.) species are one of the few macroalgae to colonize mud flats. Other species can be found on soft bottom areas if a few pebbles or shells are available for attachment.

SUBMERGED AQUATIC VEGETATION: The proposed CT NERR hosts two fully submerged higher salinity (> 15 ppt) estuarine vascular plants: eelgrass (*Zostera marina*) and widgeon grass (*Ruppia maritima*), collectively called seagrass. Dominant species in the lower salinity brackish areas (< 12 ppt), including the Connecticut River, are widgeon grass (*Ruppia* sp.), horned pondweed (*Zannichellia palustris*), and American eelgrass (*Vallisneria americana*) (Twilley and Barko 1990). Submerged aquatic vegetation, including seagrass and its lower salinity water relatives, provides habitat, nursery grounds, and foraging areas for many ecologically and economically important fauna. These beds of plants also function in reducing sediment in the water column and sequestering nutrients into the sediment, including carbon sequestration (Latimer et al. 2014). While seagrass beds have been noted for their exceptional carbon sequestration ability (Al-Haj and Fulweiler 2020; Howard et al. 2014; Pendleton et al. 2012), the sequestration rate in Long Island Sound is unknown.

Mapping of Long Island Sound and Fishers Island Sound eelgrass via aerial images is conducted periodically, coordinated by the USFWS; surveys were conducted in 2002, 2006, 2009, 2012, and 2017 (Bradley and Paton 2018). Historically, eelgrass meadows were abundant throughout the bays and

harbors of Long Island Sound and Fishers Island Sound (Johnson et al. 2007; Rozsa 1994; Vaudrey 2008; Yarish et al. 2006). Today, eelgrass is restricted to the shallow areas of eastern Long Island Sound and Fishers Island Sound, with the western-most occurrence of eelgrass found at the mouth of Clinton Harbor and north of the Duck Island breakwater in Clinton; this western-most occurrence was not captured in the 2017 aerial flights, though the beds still exist. Based on the 2017 survey, the proposed CT NERR includes 539.69 acres of eelgrass. The proposed CT NERR will encompass 53% of Connecticut's eelgrass beds and 37% of Long Island Sound and Fishers Island Sound's (New York plus Connecticut) eelgrass beds.

Estuarine Fauna: Marine mammals such as seals, porpoises, dolphins, and humpback whales have been observed foraging in and transiting through the area. Rock clumps within the proposed CT NERR and along the shorelines of Fishers Island, NY provide haul-out spots for large congregations of seals during the winter. Sea turtles such as loggerheads (*Caretta caretta*) and green sea turtles (*Chelonia mydas*) also visit The Sounds.

Wetlands throughout southeastern Connecticut provide vital breeding, foraging, resting, and migratory pathways for rare and diverse bird species. Prominent species include the American black duck (*Anas rubripes*), mallard (*Anas platyrhynchos*), Virginia rail (*Rallus limicola*), piping plover (*Charadrius melodus*), osprey (*Pandion haliaetus*), snowy egret (*Egretta thula*), and bald eagle (*Haliaeetus leucocephalus*).

The lower Connecticut River contains the highest fish diversity in the region, in part due to the nutrient rich interface between fresh water and salt water. Over seventy species of fish have been documented in the area including freshwater residents like largemouth bass (*Micropterus salmoides*), channel catfish (*Ictalurus punctatus*), and white catfish (*Ameiurus catus*); estuarine species such as striped bass (*Morone saxatilis*), bluefish (*Pomatomus saltatrix*), winter flounder (*Pseudopleuronectes americanus*), and cunner (*Tautoglabrus adspersus*); and diadromous species such as Atlantic salmon (*Salmo salar*), American shad (*Alosa sapidissima*), and the federal and state endangered shortnose sturgeon (*Acipenser brevirostrum*) and Atlantic sturgeon (*Acipenser oxyrinchus*). Forage fish, fast-growing species which form the main diet of larger fish, include American menhaden (*Brevoortia tyrannus*), Atlantic butterfish (*Peprilus triacanthus*), and blueback herring (*Alosa aestivalis*). Saltwater marshes see large congregations of minnows, including the migratory Atlantic silverside (*Menidia menidia*) and local residents like mummichogs and killifish (both *Fundulus* sp.). Saltwater intertidal flats provide a spawning and nursery area for winter flounder (*Pseudopleuronectes americanus*), as well as other finfish and shellfish. Seagrass beds and macroalgae flats provide habitat for northern pipefish (*Syngnathus fuscus*) and lined seahorse (*Hippocampus erectus*). At a minimum, the offshore area serves as nursery grounds for nearly three dozen species of fish; a migration area for eight diadromous fish species, and a concentration area for eight fish species (Barrett 2014).

Invertebrates can be found from the intertidal to the offshore. A variety of crabs are present, including green crabs (*Carcinus maenas*), blue crabs (*Callinectes sapidus* sp.), and hermit crabs (*Pagurus* sp.). Many of these are being displaced by the Asian shore crab (*Hemigrapsus sanguineus*) (Latimer et al. 2014). The horseshoe crab (*Limulus polyphemus*), actually an arthropod, makes its home around the

shores and marshes, laying eggs along some of The Sounds' beaches during the late spring and early summer (Sacred Heart University 2021).

Boulder and gravel areas are the most spatially complex habitats. These areas range in structure from large piles of boulders to flat pavements of small cobbles and pebbles. The relative stability of rock substrates provides a home for many encrusting (including cold water corals) and mobile organisms, and the crevices between and under boulders provide cover from predators and refuge from swift currents. These areas are well known for their populations of tautog (*Tautoga onitis*) and other rock-associated fish species. These hardbottom and rocky reef habitats support a variety of seaweed species and are colonized by diverse marine invertebrates—from the mobile echinoderms, cnidarians, and mollusks to the sessile sponges and tunicates. These habitats attract mature striped bass (*Morone saxatilis*) and a wide variety of other gamefish and forage species. Extensive shell bottom (e.g., *Crepidula* sp.) areas may occur adjacent to these hard bottom habitats.

The commercially important northern lobster (*Homarus americanus*), eastern oyster (*Crassostrea virginica*), and northern quahog (*Mercenaria mercenaria*) use estuarine areas as nursery and spawning grounds. Natural oyster beds (109 acres) are located in the lower Connecticut River. Lobster (*Homarus* sp.) were once a commercially important species in The Sounds, but declines in the population since 2003 have caused the local collapse of this fishery. The decline has been attributed to warmer temperatures directly affecting the lobsters (they do better in cool waters) coupled with increased populations of warmer tolerant fish that feed on lobster (LISS 2021a). Eastern oyster and northern quahog are harvested directly from Long Island Sound and Fishers Island Sound, both recreationally and commercially, and grown as part of aquaculture efforts (DA/BA 2021; LISS 2021b).

Certain invasive species are tracked and managed by DEEP (DEEP 2020c). Saltwater invasives of concern in Connecticut include the Chinese mitten crab (*Eriocheir sinensis*) which has been found in Fairfield County, with no sightings in the area of the proposed CT NERR (USGS 2021b). Additional nonindigenous estuarine species of exotic origin within the proposed CT NERR include: Asian shore crab (*Hemigrapsus sanguineus*) and green crab (*Carcinus maenas*) (USGS 2021a). The common periwinkle (*Littorina littorea*) has been identified as invasive in the northwestern Atlantic (CABI 2021). The periwinkle arrived in Long Island Sound around 1880 and now dominates portions of the intertidal zone, displacing the native mud snail (*Ilyanassa obsoleta*) (Brenchley and Carlton 1983).

2.2.5.4 Special Status Species and Habitats

The upland and offshore areas, owing to the overall size and the range of habitats, include numerous special-status species. Additional species considered here are proposed for listing, are candidate species for listing, or are species with active petitions for consideration for listing, delisting, or designation of federally-designated ESA Critical Habitat (16 U.S.C. § 1532(5); 50 C.F.R. § 424.12).

2.2.5.4.1 Endangered Species Act - Threatened and Endangered

The upland and offshore areas of the proposed CT NERR, owing to the overall size and the range of habitats include numerous special-status species that may be affected by the proposed action

(Table 2-5). Listed species, and in some cases their habitats, are protected under the State and Federal Endangered Species Acts (16 U.S.C. §§ 1531–1544), Marine Mammal Protection Act (16 U.S.C. 1361), Magnuson-Stevens Fishery Conservation and Management Act (6 U.S.C. §§ 1801–1891(d)), the Bald and Golden Eagle Protection Act (16 U.S.C. § 668(a)-(d)), the Migratory Bird Treaty Act (16 U.S.C. §§ 703–712) and its associated Executive Order (Exec. Order No. 13,186), and C.G.S. 26-92 which protects wild birds other than game birds. Additional species considered here are proposed for listing or are candidate species for listing. The State of Connecticut lists any species that are listed on the Federal Endangered Species List on the Connecticut State List of Endangered, Threatened and Special Concern Species and provides these species with state protection in addition to federal protection. However, addition of new, federally-listed species to the state list is not automatic (C.G.S. §§ 26-303 to -316).

Table 2-5: Threatened and Endangered Species

Federally listed threatened and endangered species known to occur or having the potential to occur within or near the proposed CT NERR are listed first, followed by species listed by USFWS and NOAA Fisheries as protected in the Connecticut area, but with no known observations in the proposed CT NERR. Connecticut River holds a federally-designated ESA Critical Habitat (16 U.S.C. § 1532(5); 50 C.F.R. § 424.12) Designation for Atlantic Sturgeon; no other species have federally-designated Critical Habitat in the reserve area. For “Use of Area”, nesting indicates a breeding population of bird, resident indicates the species uses the habitat throughout the year or over multiple life stages, migrant indicates an occasional visitor during migration, foraging indicates the species is an occasional visitor who comes to feed to seek refuge, nearby indicates the species is found in the proximity of the proposed CT NERR and could occur but has not been observed in the reserve property.

COMMON NAME	SCIENTIFIC NAME	USE OF AREA	FEDERAL STATUS
SPECIES WITH KNOWN OCCURRENCE IN OR AROUND THE PROPOSED CT NERR			
pipin plover	<i>Charadrius melodus</i>	nesting	Threatened
red knot	<i>Calidris canutus</i>	migrant	Threatened
roseate tern	<i>Sterna dougallii</i>	foraging	Endangered
Atlantic sturgeon, New York Bight Distinct Population Segment	<i>Acipenser oxyrinchus oxyrinchus</i>	resident	Endangered
shortnose sturgeon	<i>Acipenser brevirostrum</i>	resident	Endangered
green turtle, North Atlantic Distinct Population Segment	<i>Chelonia mydas</i>	foraging	Threatened
Kemp's ridley turtle	<i>Lepidochelys kempii</i>	foraging	Endangered
leatherback turtle	<i>Dermochelys coriacea</i>	foraging	Endangered
loggerhead turtle, North West Atlantic Distinct Population Segment	<i>Caretta caretta</i>	foraging	Threatened
northern long-eared bat	<i>Myotis septentrionalis</i>	nearby	Threatened
SPECIES WITH NO KNOWN OCCURRENCE IN OR AROUND THE PROPOSED CT NERR			
giant manta ray	<i>Manta birostris</i>	none	Threatened
oceanic whitetip shark	<i>Carcharhinus longimanus</i>	none	Threatened
blue whale	<i>Balaenoptera musculus</i>	none	Endangered
fin whale	<i>Balaenoptera physalus</i>	none	Endangered

COMMON NAME	SCIENTIFIC NAME	USE OF AREA	FEDERAL STATUS
North Atlantic right whale	<i>Eubalaena glacialis</i>	none	Endangered
sei whale	<i>Balaenoptera borealis</i>	none	Endangered
sperm whale	<i>Physeter macrocephalus</i>	none	Endangered

2.2.5.4.2 Endangered Species Act - Candidate and Proposed Species for Listing

U.S. Fish and Wildlife Service (USFWS) and NOAA Fisheries manage the review and evaluation of species for protection under the Endangered Species Act. In addition to considering threatened and endangered species, species proposed for listing and candidate species. There are no Proposed Species for listing under the Endangered Species Act found in Connecticut (USFWS 2021). There is one Candidate Species for listing under the Endangered Species Act found within the proposed CT NERR: the monarch butterfly (*Danaus plexippus*).

2.2.5.4.3 Endangered Species Act – Species of Concern

Several species in Connecticut have active petitions for listing or designation of federally-designated ESA Critical Habitat (16 U.S.C. § 1532(5); 50 C.F.R. § 424.12) received by the USFWS or NOAA Fisheries. If under review for listing, these are species about which there are some concerns regarding status and threats, but for which insufficient information is currently available to indicate a need to list the species under the Endangered Species Act. An active petition does not carry any procedural or substantive protections under the Endangered Species Act. While not all of these species are likely to occur in the proposed CT NERR, species with active petitions with USFWS or NOAA Fisheries where Connecticut is identified include: regal fritillary (*Speyeria idalia*), northeastern beach tiger beetle (*Cicindela dorsalis dorsalis*), yellow banded bumble bee (*Bombus terricola*), tricolored bat (*Perimyotis subflavus*), golden winged warbler (*Vermivora chrysoptera*), roseate tern (*Sterna dougallii*), and leatherback turtle (*Dermochelys coriacea*). In addition, the saltmarsh sparrow (*Ammospiza caudacuta*) is under review by USFWS to determine whether or not the saltmarsh sparrow warrants protection under the Endangered Species Act; this species is not in the USFWS species list of candidates, proposed, or petitions.

The leatherback turtle (*Dermochelys coriacea*), with an active petition for delisting, has been observed throughout all coastal areas of the proposed CT NERR. The golden winged warbler (*Vermivora chrysoptera*), with an active petition for listing, has been sighted as a migrant in the Bluff Point properties. Coastal areas of the full proposed CT NERR are used as a foraging ground by the roseate tern (*Sterna dougallii*); this species has an active petition for designation of federally-designated ESA Critical Habitat (16 U.S.C. § 1532(5); 50 C.F.R. § 424.12).

2.2.5.4.4 State of Connecticut Listed Species

In addition to federally listed species, there are numerous species identified as State Endangered, State Threatened, or State Special Concern (Table 2-6). The Connecticut Endangered Species Act recognizes

the importance of Connecticut plant and animal populations and the need to protect them from threats that could lead to their extinction. Species are listed according to their level of risk, and their status is reviewed every five years (DEEP 2020b).

Table 2-6: Connecticut Species of Concern—State Listed

This is a sub-sample of the state list for species of concern, focused on species that may occur in the proposed CT NERR based on NDDDB results (DEEP 2021g), iNaturalist, and expert opinion and is not meant to be a complete inventory of what is found in the proposed CT NERR. Only species from the CT-WAP with a state listing (endangered, threatened, special concern) are listed here (DEEP 2015a; DEEP 2016). Within groups, species are sorted by common name. Where applicable, common names include (E) to denote Federally Endangered or (T) to denote Federally Threatened. Use of Area references the likelihood the species will be found within the proposed CT NERR: present = observed in the proposed CT NERR; nearby = observed near the proposed CT NERR but no current observation in the proposed CT NERR; possible = not observed in proposed CT NERR or nearby but presence may be detected with further investigation; migrant = observed in proposed CT NERR during known migration; passage = observed in proposed CT NERR while passing through the area, but not a regular resident. For birds, nesting = confirmed nests in the proposed CT NERR.

(E) = Federally Endangered (T) = Federally Threatened			
COMMON NAME	SCIENTIFIC NAME	USE OF AREA	STATE LISTING
PLANTS			
American reed	<i>Phragmites americanus</i>	present	Special Concern
awl-leaved arrowhead	<i>Sagittaria subulata</i>	present	Special Concern
bayonet grass	<i>Bolboschoenus maritimus ssp. paludosus</i>	present	Special Concern
bitter panicgrass	<i>Panicum amarum var. amarum</i>	possible	Threatened
bracted orache	<i>Atriplex glabriuscula</i>	present	Special Concern
bushy frostweed	<i>Crocanthemum dumosum</i>	believed extirpated	Endangered
Canada sand-spurry	<i>Spergularia canadensis</i>	present	Threatened
clasping-leaved water-horehound	<i>Lycopus amplexens</i>	present	Special Concern
cutleaf water-milfoil	<i>Myriophyllum pinnatum</i>	present	Endangered
dragon's-mouth	<i>Arethusa bulbosa</i>	believed extirpated	Special Concern
eastern prickly-pear	<i>Opuntia humifusa</i>	present	Special Concern
Eaton's beggarticks	<i>Bidens eatonii</i>	present	Endangered
field paspalum	<i>Paspalum laeve</i>	present	Threatened
lilaeopsis	<i>Lilaeopsis chinensis</i>	present	Special Concern
mudwort	<i>Limosella australis</i>	present	Special Concern
New England blazing-star	<i>Liatris novae-angliae</i>	nearby	Special Concern
Parker's pipewort	<i>Eriocaulon parkeri</i>	nearby	Endangered
purple milkweed	<i>Asclepias purpurascens</i>	present	Special Concern
pygmyweed	<i>Crassula aquatica</i>	present	Endangered
salt marsh bulrush	<i>Bolboschoenus novae-angliae</i>	present	Special Concern
saltpond grass	<i>Leptochloa fusca ssp. fascicularis</i>	present	Endangered

(E) = Federally Endangered (T) = Federally Threatened			
COMMON NAME	SCIENTIFIC NAME	USE OF AREA	STATE LISTING
scotch lovage	<i>Ligusticum scoticum</i>	present	Endangered
seabeach knotweed	<i>Polygonum glaucum</i>	present	Special Concern
seabeach sandwort	<i>Honckenya peploides</i>	present	Special Concern
sea-coast angelica	<i>Angelica lucida</i>	present	Endangered
seaside crowfoot	<i>Ranunculus cymbalaria</i>	possible	Endangered
sickle-leaved golden-aster	<i>Pityopsis falcata</i>	nearby	Endangered
violet wood-sorrel	<i>Oxalis violacea</i>	present	Special Concern
Virginia copperleaf	<i>Acalypha virginica</i>	present	Special Concern
white thoroughwort	<i>Eupatorium album</i>	present	Endangered
whitlow-grass	<i>Draba reptans</i>	present	Special Concern
whorled pennywort	<i>Hydrocotyle verticillata</i>	present	Endangered
woolly beach-heather	<i>Hudsonia tomentosa</i>	present	Threatened
yellow thistle	<i>Cirsium horridulum</i>	present	Endangered
ARTHROPODS, TERRESTRIAL			
coastal heathland cutworm	<i>Abagrotis nefascia benjamini</i>	present	Threatened
coppery emerald	<i>Somatochlora georgiana</i>	possible	Threatened
false heather underwing	<i>Drasteria graphica atlantica</i>	present	Threatened
hairy-necked tiger beetle	<i>Cicindela hirticollis</i>	present	Special Concern
midland clubtail	<i>Gomphus fraternus</i>	present	Threatened
noctuid moth	<i>Sympistis perscripta</i> (Guenée, 1852)	present	Special Concern
pink streak	<i>Dargida rubripennis</i>	present	Threatened
saltmarsh tiger beetle, margined tiger beetle	<i>Ellipsoptera marginata</i> (Fabricius, 1775) (formerly: <i>Cicindela marginata</i>)	present	Special Concern
sand wainscot moth	<i>Apamea lintneri</i>	present	Special Concern
scribbled sawfly moth	<i>Sympistis perscripta</i>	present	Special Concern
seaside goldenrod stem borer	<i>Papaipema duovata</i>	present	Threatened
slender flower moth	<i>Schinia gracilentia</i>	present	Endangered
spinose flower moth	<i>Schinia spinosae</i>	present	Special Concern
MOLLUSCS, FRESHWATER			
brook floater	<i>Alasmidonta varicosa</i>	nearby	Endangered
dwarf wedge mussel	<i>Alasmidonta heterodon</i>	nearby	Endangered
eastern pearlshell	<i>Margaritifera margaritifera</i>	present	Special Concern
eastern pondmussel	<i>Ligumia nasuta</i>	present	Special Concern
lymnaeid snail	<i>Fossaria rustica</i>	present	Special Concern
tidewater mucket	<i>Leptodea ochracea</i>	present	Special Concern
woodland pondsnail	<i>Staginicola catascopium</i>	present	Special Concern
yellow lampmussel	<i>Lampsilis cariosa</i>	present	Endangered
AMPHIBIANS			
mudpuppy	<i>Necturus maculosus</i>	present	Special Concern
SNAKES			
eastern ribbon snake	<i>Thamnophis sauritus</i>	possible	Special Concern

(E) = Federally Endangered (T) = Federally Threatened			
COMMON NAME	SCIENTIFIC NAME	USE OF AREA	STATE LISTING
TURTLES (NOT SEA TURTLES)			
eastern box turtle	<i>Terrapene carolina carolina</i>	present	Special Concern
northern diamondback terrapin	<i>Malaclemys terrapin terrapin</i>	present	Special Concern
spotted turtle	<i>Clemmys guttata</i>	present	Special Concern
SEA TURTLES			
green turtle (T)	<i>Chelonia mydas</i>	passage	Threatened
Kemp's ridley turtle (E)	<i>Lepidochelys kempii</i>	passage	Endangered
leatherback turtle (E)	<i>Dermochelys coriacea</i>	passage	Endangered
loggerhead turtle (T)	<i>Caretta caretta</i>	passage	Threatened
ANADROMOUS FISH			
Atlantic sturgeon (E)	<i>Acipenser oxyrinchus oxyrinchus</i>	passage / present	Endangered
blueback herring	<i>Alosa aestivalis</i>	passage / present	Special Concern
rainbow smelt	<i>Osmerus mordax</i>	passage / present	Endangered <i>anadromous only</i>
shortnose sturgeon (E)	<i>Acipenser brevirostrum</i>	passage / present	Endangered
MARINE FISH			
Atlantic seasnail	<i>Liparis atlanticus</i>	present	Special Concern
radiated shanny	<i>Ulvaria subbifurcata</i>	present	Special Concern
sand tiger shark	<i>Carcharias taurus</i>	present	Special Concern
BIRDS			
American bittern	<i>Botaurus lentiginosus</i>	migrant	Endangered
American oystercatcher	<i>Haematopus palliatus</i>	nesting	Threatened
bald eagle	<i>Haliaeetus leucocephalus</i>	present	Threatened
barn owl	<i>Tyto alba</i>	migrant	Endangered
bobolink	<i>Dolichonyx oryzivorus</i>	migrant	Special Concern
broad-winged hawk	<i>Buteo platypterus</i>	migrant	Special Concern
brown thrasher	<i>Toxostoma rufum</i>	present	Special Concern
cerulean warbler	<i>Setophaga cerulea</i>	migrant	Special Concern
common moorhen	<i>Gallinula chloropus</i>	nesting	Endangered
common loon	<i>Gavia immer</i>	migrant	Special Concern
common tern	<i>Sterna hirundo</i>	nesting	Special Concern
glossy ibis	<i>Plegadis falcinellus</i>	present	Special Concern
golden-winged warbler	<i>Vermivora chrysoptera</i>	migrant	Endangered
grasshopper sparrow	<i>Ammodramus savannarum</i>	rare migrant	Endangered
great egret	<i>Ardea alba</i>	present	Threatened
horned lark	<i>Eremophila alpestris</i>	migrant	Endangered
Ipswich sparrow	<i>Passerculus sandwichensis</i> ssp. <i>princeps</i>	migrant	Special Concern
king rail	<i>Rallus elegans</i>	nesting	Endangered (nesting population only)
least bittern	<i>Ixobrychus exilis</i>	nesting	Threatened
least tern	<i>Sternula antillarum</i>	nesting	Threatened
little blue heron	<i>Egretta caerulea</i>	present	Special Concern

(E) = Federally Endangered (T) = Federally Threatened			
COMMON NAME	SCIENTIFIC NAME	USE OF AREA	STATE LISTING
long-eared owl	<i>Asio otus</i>	migrant	Endangered
northern harrier	<i>Circus hudsonius</i>	present	Endangered
northern saw-whet owl	<i>Aegolius acadicus</i>	migrant	Special Concern
peregrine falcon	<i>Falco peregrinus</i>	present	Threatened
pied-billed grebe	<i>Podilymbus podiceps</i>	migrant	Endangered
piping plover (T)	<i>Charadrius melodus</i>	nesting	Threatened
purple martin	<i>Progne subis</i>	present	Special Concern
red-headed woodpecker	<i>Melanerpes erythrocephalus</i>	migrant	Endangered
roseate tern (E)	<i>Sterna dougallii</i>	present	Endangered
saltmarsh sharp-tailed sparrow	<i>Ammodramus caudacuta</i>	nesting	Special Concern
Savannah sparrow	<i>Passerculus sandwichensis</i>	migrant	Special Concern
seaside sparrow	<i>Ammodramus maritima</i>	nesting	Threatened
sharp-shinned hawk	<i>Accipiter striatus</i>	migrant	Endangered
short-eared owl	<i>Asio flammeus</i>	migrant	Threatened (wintering populations only)
snowy egret	<i>Egretta thula</i>	present	Threatened
whip-poor-will	<i>Caprimulgus vociferus</i>	nesting	Special Concern
yellow-breasted chat	<i>Icteria virens</i>	nesting	Endangered
yellow-crowned night-heron	<i>Nyctanassa violacea</i>	present	Special Concern
MAMMALS, TERRESTRIAL			
Eastern small-footed bat	<i>Myotis leibii</i>	possible	Endangered
hoary bat	<i>Lasiurus cinereus</i>	possible	Special Concern
little brown bat	<i>Myotis lucifugus</i>	possible	Endangered
northern long-eared bat (T)	<i>Myotis septentrionalis</i>	possible	Endangered
red bat	<i>Lasiurus borealis</i>	possible	Special Concern
silver-haired bat	<i>Lasiurus noctivagans</i>	possible	Special Concern
MAMMALS, MARINE			
harbor porpoise	<i>Phocoena phocoena</i>	passage	Special Concern

2.2.5.4.5 Other Marine Mammals

All marine mammals are protected under the federal Marine Mammal Protection Act (16 U.S.C. §§ 1361 *et seq.*). In addition to the marine mammals considered under the Endangered Species Act, there are eight additional species of marine mammals observed in Long Island Sound and Fishers Island Sound, but which are not protected under the Endangered Species Act (Table 2-7).

Table 2-7: Other Marine Mammals

All species listed are covered under the Marine Mammal Protection Act (16 U.S.C. §§ 1361 et seq.). This list includes all North Atlantic species observed or expected in Long Island Sound and Fishers Island Sound based on the iNaturalist database; use of the area is indicated, referencing the likelihood the species will be found within the proposed CT NERR. None of the species are federally listed as endangered or threatened. Asterisks denote the Connecticut Wildlife Action Plan (CT-WAP) status, where ** = very important and * = important. SSC indicates a State Species of Concern.

COMMON NAME	SPECIES NAME	USE OF AREA
Atlantic white-sided dolphin	<i>Lagenorhynchus acutus</i>	passage
common bottlenose dolphin	<i>Tursiops truncatus</i>	passage
gray seal	<i>Halichoerus grypus atlantica</i>	winter resident
harbor porpoise ** SSC	<i>Phocoena phocoena</i>	passage
harbor seal*	<i>Phoca vitulina</i>	resident
harp seal	<i>Pagophilus groenlandicus</i>	passage
hooded seal	<i>Cystophora cristata</i>	passage
humpback whale	<i>Megaptera novaeangliae</i>	passage

2.2.5.4.6 Essential Fish Habitat

Under the Magnuson-Stevens Fishery Conservation and Management Act, Fishery Management Councils identify Essential Fish Habitat for marine and anadromous species, as defined in 16 U.S.C. § 1855(b). Essential Fish Habitat includes all waters and substrate necessary for fish for spawning, breeding, feeding, or growth to maturity. Pursuant to the act, the marine water column and seafloor in and surrounding the proposed CT NERR have been designated as Essential Fish Habitat which supports various life stages of management unit species identified in the New England and Mid-Atlantic Fishery Management Council’s plans as listed in Table 2-8. In particular, the area of the proposed CT NERR, eastern Long Island Sound, has been designated as a Habitat Area of Particular Concern for summer flounder. The Habitat Area of Particular Concern designation does not confer additional protection or restrictions upon an area but can help prioritize conservation efforts.

Table 2-8: Essential Fish Habitat

Essential Fish Habitat in or near the proposed CT NERR as identified by NOAA (NOAA Fisheries 2021a). The proposed CT NERR includes Habitat Area of Particular Concern for this summer flounder

COMMON NAME (SPECIES NAME)	LIFESTAGES(S) FOUND	MANAGEMENT COUNCIL	FISHERY MANAGEMENT PLAN
EFH THROUGHOUT PROPOSED CT NERR			
little skate (<i>Leucoraja erinacea</i>)	Juvenile Adult	New England	Amendment 2 to the Northeast Skate Complex Fishery Management Plan
Atlantic herring (<i>Clupea harengus</i>)	Juvenile Adult	New England	Amendment 3 to the Atlantic Herring Fishery Management Plan

COMMON NAME (SPECIES NAME)	LIFESTAGES(S) FOUND	MANAGEMENT COUNCIL	FISHERY MANAGEMENT PLAN
pollock (<i>Pollachius virens</i>)	Juvenile Adult	New England	Amendment 14 to the Northeast Multispecies Fishery Management Plan
red hake (<i>Urophycis chuss</i>)	Eggs Larvae Juvenile Adult	New England	Amendment 14 to the Northeast Multispecies Fishery Management Plan
windowpane flounder (<i>Scophthalmus aquosus</i>)	Eggs Larvae Juvenile Adult	New England	Amendment 14 to the Northeast Multispecies Fishery Management Plan
winter flounder (<i>Pseudopleuronectes americanus</i>)	Eggs Larvae Juvenile Adult	New England	Amendment 14 to the Northeast Multispecies Fishery Management Plan
winter skate (<i>Leucoraja ocellata</i>)	Juvenile Adult	New England	Amendment 2 to the Northeast Skate Complex Fishery Management Plan
sand tiger shark (<i>Carcharias taurus</i>)	Neonate Juvenile	Secretarial	Amendment 10 to the 2006 Consolidated Highly Migratory Species Fishery Management Plan: Essential Fish Habitat
smoothhound shark complex (<i>Mustelus canis</i> & <i>Mustelus norrisi</i> (Atlantic stock))	ALL	Secretarial	Amendment 10 to the 2006 Consolidated Highly Migratory Species Fishery Management Plan: Essential Fish Habitat
bluefish (<i>Pomatomus saltatrix</i>)	Juvenile Adult	Mid-Atlantic	Amendment 1 to the Bluefish Fishery Management Plan
Atlantic mackerel (<i>Scomber scombrus</i>)	Eggs Larvae Juvenile Adult	Mid-Atlantic	Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan Amendment 11
longfin inshore squid (<i>Doryteuthis pealeii</i>)	Eggs Juvenile Adult	Mid-Atlantic	Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan Amendment 11
Atlantic butterfish (<i>Peprilus triacanthus</i>)	Eggs Larvae Juvenile Adult	Mid-Atlantic	Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan Amendment 11

COMMON NAME (SPECIES NAME)	LIFESTAGES(S) FOUND	MANAGEMENT COUNCIL	FISHERY MANAGEMENT PLAN
scup (<i>Stenotomus chrysops</i>)	Eggs Larvae Juvenile Adult	Mid-Atlantic	Summer Flounder, Scup, and Black Sea Bass Fishery Management Plan
summer flounder (<i>Paralichthys dentatus</i>)	Juvenile Adult	Mid-Atlantic	Summer Flounder, Scup, and Black Sea Bass Fishery Management Plan
black sea bass (<i>Centropristis striata</i>)	Juvenile	Mid-Atlantic	Summer Flounder, Scup, and Black Sea Bass Fishery Management Plan
EFH IN PORTIONS OF PROPOSED CT NERR			
albacore tuna (<i>Thunnus alalunga</i>), east of Thames River	Juvenile	Secretarial	Amendment 10 to the 2006 Consolidated Highly Migratory Species Fishery Management Plan: Essential Fish Habitat
Atlantic cod (<i>Gadus morhua</i>), east of Niantic Bay	Adult	New England	Amendment 14 to the Northeast Multispecies Fishery Management Plan
spiny dogfish, (<i>Squalus acanthias</i>), east and west end of proposed CT NERR, not Thames R. mouth	Sub-Adult Female Adult Male	Mid-Atlantic	Amendment 3 to the Spiny Dogfish Fishery Management Plan

2.3 Social Attributes

2.3.1 Population Demographics and Education

Data and descriptions for this *Section* use the U.S. Census-based American Community Survey (ACS) metropolitan / micropolitan district area of Norwich / New London for approximating the regional geographic basis of the proposed CT NERR (Figure 2-9) (United States Census Bureau 2021).

2.3.1.1 Population

The following paragraphs highlight several common demographic statistics that describe the Norwich / New London area during the 5-year period of 2014-18. These, as well as additional information, are available from the ACS 5-Year Narrative Profile and are incorporated for reference (United States Census Bureau 2021)



Figure 2-9: Norwich / New London Area Map

The metropolitan / micropolitan district area of Norwich / New London from American Community Survey (ACS) (City Population 2021).

Population, Density, Households / Families: The Norwich / New London region encompasses an area of approximately 665 square miles with a population of 268,881, and a population density of roughly 404 people per square mile. There were 107,402 households, with an average size of 2.4 people. Roughly two-thirds of the households were families (defined as married or other families); the remaining one-third consisted of single residents or non-family respondents.

Gender and Age: There was a nearly equal split between males and females. The median age was 41.4 years. Approximately 20% of the population were under 18 years, 34% were 18 to 44 years, 29% were 45 to 64 years, and 17% was over 65.

Race and Ethnicity: For people reporting one race alone, 80.7% were White; 5.8% were Black or African American; 0.6% were American Indian and Alaska Native; 4.1% were Asian; 0.0% were Native Hawaiian and Other Pacific Islander, and 3.3% were some other race. An estimated 5.3% reported two or more races. An estimated 10.6% of the people were Hispanic. An estimated 75.7% of the people were White non-Hispanic. People of Hispanic origin may be of any race.

Nationality: An estimated 92% of the Norwich / New London population were U.S. natives, with 52.0% living in the state where they were born. Of the roughly 8% of foreign-born residents, nearly 75% come from Asia and Latin America (37% and 36%, respectively) with Europe, Africa, Northern America, and Oceania making up the remaining percentage.

Environmental Justice: The Environmental Justice movement emerged in response to a growing body of evidence nationally and statewide indicating that low income racial and ethnic minority groups may be exposed to higher-than-average amounts of environmental pollution (DEEP 2021I). The DEEP Environmental Justice Program incorporates principles of environmental justice into aspects of the Agency’s program development, policy making, and regulatory activities. Effective January 1, 2009, C.G.S. § 22a-20a along with DEEP’s existing Environmental Justice Policy, requires applicants seeking a permit for a new or expanded applicable facility proposed to be located in an environmental justice community, to file a Public Participation Plan with and receive approval from DEEP prior to filing any permit application. An applicable facility can include, but is not limited to, types of electric generation stations, solid waste incinerators, sewage treatment plants, and waste processing plants (DEEP 2021I). The term “environmental justice community” is so designated using the Connecticut Department of Economic and Community Development list of Distressed Municipalities. Updated annually, this identifies the state’s 25 most fiscally and economically distressed municipalities and is used by state agencies to target funds for needs such as housing, insurance, open space, brownfield remediation, and economic development programs, among others. As of the most current list (2020), there are seven communities in the Norwich / New London area that are listed. None of the communities in the proposed CT NERR in Middlesex County were identified as distressed communities. Lower ranks reflect a higher degree of distress (Table 2-9) (DECD 2021).

Table 2-9: Distressed Municipalities

Connecticut Department of Economic Community Development, Distressed Municipalities (DECD 2021) in the American Community Survey (ACS) metropolitan / micropolitan district area of Norwich / New London. Lower ranks reflect a higher degree of distress.

DISTRESSED MUNICIPALITY	RANK (OUT OF 25)
New London	3
Sprague	11
Norwich	12
Montville	14
Griswold	15
Voluntown	16
Preston	22

2.3.1.2 Education

Within the Norwich / New London area (Figure 2-9, page 68) during the five-year period of 2014-18, the total school enrollment was 61,472 (United States Census Bureau 2021). Pre-K through 12th grade enrollment was 44,328. College or graduate school enrollment was 17,144. Nearly 92% of people 25 years and over had graduated from high school and 42% had an Associate’s Degree or higher.

The region surrounding the proposed CT NERR is home to an economically and culturally diverse mix of people. Communities range widely in permanence, from North America’s oldest Indian Reservation (the

Mashantucket Pequot Tribal Nation) to Ledyard and Groton, which experience high population turnover each year because of personnel movement in and out of Naval Submarine Base New London, Groton, CT. The cities of New London, Norwich, and Groton are ethnically diverse, with higher poverty rates relative to surrounding towns, while towns such as Lyme and Old Saybrook are relatively wealthy (see Section 11.2—*Education Program*, page 187, for more detail). Despite this diversity, communities in this region are connected by the estuary they share and by common vulnerabilities to climate change and related environmental hazards.

2.3.2 Jobs and Employment Trends

The following describes the Norwich / New London area during the five-year period of 2014-2018. These, as well as additional information, are available from the ACS 5-Year Narrative Profile and are incorporated for reference (United States Census Bureau 2021).

Employment Statistics: Approximately 60% of the population 16 and over were employed across a variety of industries (Table 2-10). Of the employed population,

- nearly 80% were private wage and salary workers,
- 15% were federal, state, or local government workers,
- 5% were self-employed in their own (not incorporated) business.

Table 2-10: Norwich / New London Employment Categories

Norwich / New London industry employment for employed workers (United States Census Bureau 2021).

INDUSTRY	PERCENT OF EMPLOYED WORKERS IN THIS FIELD (%)
agriculture, forestry, fishing and hunting, and mining	1
construction	6
manufacturing	13
wholesale trade	2
retail trade	11
transportation and warehousing, and utilities	4
information	2
finance and insurance, and real estate and rental and leasing	5
professional, scientific, and management, and administrative and waste management services	9
educational services, and health care and social assistance	24

INDUSTRY	PERCENT OF EMPLOYED WORKERS IN THIS FIELD (%)
arts, entertainment, and recreation, and accommodation, and food services	15
other services, except public administration	4
public administration	5

Several employers of note within the Norwich / New London area include (CT.gov 2021):

- General Dynamics / Electric Boat (defense contracting) – Groton, CT
- Pfizer (pharmaceuticals) – Groton, CT
- US Foods (foodservice distribution) – Norwich, CT
- Lawrence Memorial Hospital (healthcare) – New London, CT
- Backus Hospital (healthcare) – Norwich, CT
- Foxwoods Casino (retail / entertainment) – Mashantucket, CT (within Ledyard, CT)
- Mohegan Sun Casino (retail / entertainment) – Uncasville, CT (within Montville, CT)

The median income of households in Norwich / New London was \$71,368. An estimated 4.9% of households had income below \$10,000 a year and 7.5% had income of \$200,000 or more (Table 2-11).

Table 2-11: Norwich / New London Income Distribution

Distribution of the household income in the Norwich / New London area (United States Census Bureau 2021).

Income range	Households Within the Range (%)	Income range	Households Within the Range (%)
Less than \$10,000	4.9	\$50,000 to \$74,999	18.6
\$10,000 to \$14,999	3.8	\$75,000 to \$99,999	13.5
\$15,000 to \$24,999	7.5	\$100,000 to \$149,999	17.7
\$25,000 to \$34,999	7.0	\$150,000 to \$199,999	8.8
\$35,000 to \$49,999	10.7	\$200,000 or more	7.5

The State of Connecticut county breakdown by Middlesex and New London counties identifies some of the distinctive elements each area contributes to the region as a whole.

Middlesex County: Middlesex county data were available from the Lower Connecticut River Valley Council of Governments (RiverCOG). As of a 2016 report (Ninigret Partners and Fitzgerald & Halliday Inc. 2016), the RiverCOG region is home to approximately 4,100 businesses, the majority being small and

mid-sized companies (52% having less than four employees and 25% with between 10 and 100 employees).

The data note this area is subset into four distinct economies. In order of importance: Manufacturing / Trade, Local, Lifestyle, Tourism.

MANUFACTURING / TRADE remains a mainstay of the regional economy. While it is the third largest sector in terms of direct employment with approximately 9,000 employees, it is a key economic driver in terms of wages. In 2014, manufacturing had \$3.5 billion in wages. Including manufacturing supply and value chains, wholesale trade, and logistics, this adds approximately 13,000 more people and \$850 million more in wages. Subsectors with the highest level of employment and wages include fabricated product metal manufacturing, machinery manufacturing, transportation equipment, and durable goods wholesalers.

THE LOCAL ECONOMY supports roughly 21,000 jobs connected to local resident's financial health and spending through businesses such as healthcare, social services, government, etc.

LIFESTYLE ECONOMY. Because the region supports a high quality of life, many people choose to work and live in the region. From second-home residents to employees of professional / technical companies whose services can be performed anywhere, an estimated 13,000 to 15,000 jobs and nearly \$450 million in wages can be attributed to this.

TOURISM focuses on assets surrounding culture, water-centric activities, and natural resources. General estimates suggest this economy supports about 5,000 to 7,000 jobs with payrolls totaling close to \$150 million.

New London County: New London county data was available from the Southeastern Connecticut Economic Development District. In a 2017 report (The Southeastern Connecticut Enterprise Region et al. 2017), they highlight the region by using several economic clusters:

TOURISM makes up 19% of the regional economy with 27,430 jobs in 2016 (increasing to 28% if an estimated 13,232 jobs related to the gaming industry are included). The region has considerable recreation amenities including three locations boasting millions of annual visitors: Mystic Aquarium, Mystic Seaport, and Olde Mistick Village. It is also home to two world-renowned resort casinos both with retail outlets, historic sites (including a new unique Heritage Park), numerous accommodations and diverse food service businesses, and outdoor and indoor recreational opportunities.

HEALTHCARE SERVICES account for a significant 14% of the regional economy with 20,846 jobs in 2016 and contribute about 8.4% or \$1.22 billion to the entire region's gross regional product. The region is home to three hospitals with affiliations to larger healthcare organizations such as Yale New Haven, Hartford Healthcare, and Sloan Kettering. Note that industries such as pharmaceuticals, medical research, etc., while similar, are not included here but rather considered within the bioscience category.

DEFENSE includes ship building driven by military ship and submarine manufacturing at Electric Boat and federal government military-related employment driven by the federal military base. It currently makes

up about 13% of the regional economy with 19,319 jobs in 2016 and contributes about 15% or \$2.23 billion to the gross regional product, the largest of any category for New London County.

ENERGY / ENVIRONMENT was defined broadly for this analysis and includes all utilities related to:

- power generation;
- waste management;
- skilled trades typically relied upon including heating, plumbing, and electrical trades;
- manufacturing related to fuel / energy production including chemicals and fuel production, and equipment, machinery and devices;
- warehousing and distributions related to energy and environment; and
- professional services including engineering, testing, research and development, and consulting services.

It makes up between 3% and 4% of the regional economy with 5,513 jobs in 2016 and contributes 9% or \$1.32 billion to the GRP.

BIOSCIENCE includes the industries of pharmaceutical manufacturing, medical device manufacturing, and research and development related to life sciences. It excludes healthcare and social services which are included within a separate healthcare category. It currently makes up about 2% of the regional economy with 2,994 jobs in 2016 and contributes about 8.5% or \$1.24 billion to the gross regional product.

AGRICULTURE / FISHING AND AQUACULTURE / FOOD PRODUCTION includes activities related to food production and distribution (including crop / animal production and fishing); and food and beverage related manufacturing, wholesale, and distribution. It excludes any retail and restaurant businesses. It consistently makes up 1% to 2% of the regional employment with 2,144 jobs and contributes about 1% or \$175 million to the gross regional product.

CREATIVITY / ARTS includes graphic design, teaching, advertising, news / media, etc. One of the smallest clusters, it makes up only about 1% of the regional economy with 1,928 jobs in 2016 and contributes less than 1% or \$112 million to the gross regional product.

MANUFACTURING (ADVANCED) includes all manufacturing industries that require advanced technologies or skills. It excludes pharmaceutical and medical-related manufacturing, shipbuilding, and boat building as they are included in other categories. It makes up about 1% of the regional economy with 1,917 jobs in 2016 and contributes about 1.6% or \$239 million to the gross regional product.

MARITIME includes industries related to boat building (excluding defense ship building), boat dealers, marine transportation, scenic and sightseeing transportation, and marine cargo handling. It makes up less than 1% of the regional economy with 422 jobs in 2016 and contributes less than 1% or \$48 million to the gross regional product.

2.3.3 Ecosystem Services

At this stage, a well-formed suite of ecosystem services specifically for the proposed CT NERR is not readily available. However, a broader look at Long Island Sound and its watersheds provides meaningful context. A recent valuation of the economic services provided by Long Island Sound estimated an asset value between \$690 billion and \$1.3 trillion (4% discount rate over 100 years) with an annual assets flow of \$17 billion to \$36.6 billion (Kocian et al. 2015). Of the 21 ecosystem services identified as possible for Long Island Sound, 14 were evaluated across nine land cover types (Table 2-12 and Figure 2-10). As stated by the authors, *“Benefit transfer methodology was applied using over 40 primary ecological economic valuation studies from the East Coast. Similar to valuations in financial markets, these studies made use of multiple valuation methodologies including market pricing, cost avoidance, replacement cost, travel cost, hedonic values, and contingent valuation. The range in values represents the lowest and highest possible values in the academic peer reviewed literature and can be used for comparison to other financial assets”* (Kocian et al. 2015).

Table 2-12: Ecosystem Service Classification

Twenty-one ecosystem services were identified for consideration in the Long Island Sound economic valuation. Fourteen of these had sufficient data and were evaluated (Kocian et al. 2015). Text in table copied from Kocian et al. (2015).

SERVICE	DESCRIPTION	EVALUATED
PROVISIONING SERVICES		
energy and raw materials	Providing fuel, fiber, fertilizer, minerals, and energy.	X
food	Producing crops, fish, game, and fruits.	X
medicinal resources	Providing traditional medicines, pharmaceuticals, and assay organisms.	
ornamental resources	Providing resources for clothing, jewelry, handicraft, worship, and decoration.	
water supply	Provisioning surface and groundwater for drinking, irrigation, and industrial use.	X
INFORMATION SERVICES		
aesthetic information	Enjoying and appreciating the presence, scenery, sounds, and smells of nature.	X
cultural and artistic inspiration	Using nature as motifs in art, film, folklore, books, cultural symbols, architecture, and media.	X
recreation and tourism	Experiencing natural ecosystems and enjoying outdoor activities.	X
science and education	Using natural systems for education and scientific research.	X

SERVICE	DESCRIPTION	EVALUATED
spiritual and historical	Using nature for religious and spiritual purposes.	
REGULATING SERVICES		
air quality	Providing clean, breathable air.	
biological control	Providing pest and disease control.	X
climate stability	Supporting a stable climate through carbon sequestration and other processes.	X
moderation of extreme events	Preventing and mitigating natural hazards such as floods, hurricanes, fires, and droughts.	X
pollination	Pollinating wild and domestic plant species.	X
soil formation	Creating soils for agricultural use and ecosystems integrity; maintaining soil fertility.	X
soil retention	Retaining arable land, slope stability, and coastal integrity.	
waste treatment	Improving soil, water, and air quality by decomposing human and animal waste and removing pollutants.	X
water regulation	Providing natural irrigation, drainage, groundwater recharge, river flows, and navigation.	
SUPPORTING SERVICES		
genetic resources	Improving crop and livestock resistance to pathogens and pests.	
habitat and nursery	Maintaining genetic and biological diversity, the basis for most other ecosystem functions; promoting growth of commercially harvested species.	X



Figure 2-10: Economic Valuation of Long Island Sound

Squares represent the fraction of the annual asset flow of the \$17 billion to \$36.6 billion related to fourteen ecosystem services evaluated for Long Island Sound; modeled after Figure 11 in the project report (Kocian et al. 2015). The range in value is associated with the error of estimating the many numbers that enter into the calculation. Categories are described in Table 2-12. The area of each block represents the fractional worth of the service. M = moderation of extreme weather events. Five categories contribute <1% to the value: S = soil formation, H = habitat and nursery, A = aesthetic information, E = energy and raw materials, B = biological control. The valuation includes all of Long Island Sound and its watershed, reaching up to Canada.

2.4 Threats / Stressors

The following, adapted from the NOAA Fisheries website (NOAA Fisheries 2021d), provides a useful synthesis of potential threats and stressors that the proposed CT NERR should consider. Note that threats and stressors for climate related themes are covered in a separate, later section (*Section 2.4.2*). A high-level assessment on the potential sensitivity of the proposed CT NERR to these threats follows in *Section 2.4.3*. The *Connecticut Wildlife Action Plan* (CT-WAP) lists threats, stressors, and best management practices by habitat and by species; the CT-WAP provides a sound foundation for the ecosystem-based management carried out by DEEP and partner organizations (DEEP 2015a; DEEP 2015b; DEEP 2016). Reserve staff will work closely with DEEP when conducting the site inventory of the proposed CT NERR and reserve staff will obtain all necessary permits and permissions necessary to conduct work in the proposed CT NERR.

2.4.1 Natural and Anthropogenic

Coastal Development: Coastal development and shoreline structures are leading to the loss of nesting beach habitat for some birds and horseshoe crabs, fragment coastal habitats, block marsh and seagrass migration inland as sea level rises, and create pollution which may enter neighboring natural habitats

often worsened by the increase in impervious cover. Shoreline hardening or armoring (e.g., seawalls) can result in the complete loss of intertidal habitats and wave action can alter the subtidal habitats through erosion, sedimentation, and wave reflection. Artificial lighting disturbs many wildlife species, including birds and insects, and interferes with bat foraging and migration. Light pollution may interfere with communication, detecting and avoiding predators, finding food, and navigating.

Barriers / Dams: Physical barriers, which may include shoreline and offshore structures for development (e.g., for oil and gas, dredging, pile driving) as well as dams along rivers, can limit access to important migration, breeding, feeding, or reproductive areas.

Noise: Ocean noise from human activities such as shipping, boating, construction, and energy exploration and development has increased in the Northwest Atlantic. Noise from these activities can interrupt the normal behavior of marine mammals and interfere with their communication. It may also reduce their ability to detect and avoid predators and human hazards, navigate, identify physical surroundings, find food, and find mates.

Marine Debris: Ingestion of marine debris is a threat to all marine species, from microscopic copepods to whales. For example, sea turtles (e.g., green turtle) may ingest marine debris such as fishing line, balloons, plastic bags, floating tar or oil, and other materials which they can mistake for food, leading to increased injury and mortality.

Pollution: Contaminants, including excess nutrients, enter ocean waters from many sources, including oil and gas development, wastewater discharges and septic systems, agricultural and urban runoff, and other industrial and commercial processes. Contaminants and excess nutrients may travel to the estuary through groundwater, surface waters (rivers and streams), or be directly discharged into the estuary. Once in the environment, these substances may degrade water quality and fuel harmful algae blooms, or move up the food chain and accumulate in top predators, including recreational and commercial fishery species. Some of these chemicals do not degrade and may harm individuals and their offspring.

Habitat Degradation: Habitat can be disrupted or lost because of various human activities such as dredging and dredged material disposal, dams, water withdrawals, intrusion by salt water (often caused by pumping of ground water from freshwater wells or drought), chemical contamination of sediments, and other development-related impacts. Land use practices can degrade fresh water, coastal, and marine habitats. For example, forestry, agriculture, and development projects damage or destroy riparian areas that protect streams from erosion and filter pollutants. These areas also provide habitat structure, essential nutrients, and forage that animals depend on in the form of falling trees, leaf litter, and bugs that fall from the forest canopy.

Habitat Loss: Over the past century, habitat loss has been the most common cause of extinction for freshwater fish in the United States. Many saltwater fish are also in decline due to habitat degradation. When habitats are damaged or lost, they are difficult and costly to restore. Since the early 1600s, the United States has lost more than half of its wetlands (more than 110 million acres) (NOAA Fisheries 2021c). Coastal wetlands continue to disappear at higher rates than those further inland. The coastal watersheds of the continental United States lost wetlands at an average rate of 80,000 acres a year from 2004 to 2009. In addition, fish nursery grounds are significantly affected by the loss of seagrass habitat.

Recent trends indicate seagrass habitat losses of 50% in Tampa Bay, 76% in the Mississippi Sound, and 90% in Galveston Bay (NOAA Fisheries 2021c). Seagrass beds in the Chesapeake Bay declined 46% from 2008 to 2012. Seagrass beds in Long Island Sound may have declined between 2 and 10% between 2002 and 2017; the number is uncertain as mapping occurs every three to five years and ground-truthing of aerial photos was not possible in all years (Bradley and Paton 2018). The Long Island Sound Study Comprehensive Conservation and Management Plan goal of 3,827 acres in Long Island Sound is based on the possible habitat in which eelgrass could occur under good water quality conditions and accounting for the fact that eelgrass will not occupy all areas predicted by model outputs (Vaudrey et al. 2013). Current eelgrass coverage in Long Island Sound and Fishers Island Sound represents a minimum of a 60% loss relative to estimated historic values.

Invasive / Nonindigenous Species: Invasive species are considered to be one of the greatest threats to marine and coastal biodiversity worldwide, second only to habitat loss (NOAA Fisheries 2021b). Exotic or nonindigenous species are animal or plant species moved from their original range (location) to a new one, but are not yet reproducing in that new range. Once enough individuals of an exotic species establish and begin to reproduce in the new range and they create ecological or economic harm, it is considered an invasive species.

Human Harassment: Harassment applies to both animals and plants. For example, harassment of seals, including repeated exposure to vessel traffic and other disturbance, can degrade important nursery, molting, and haul out areas. Increased vessel traffic can also cause altered behavior, increased energetic expenditures, and increased exposure to stress. Mountain bikes, motorized vehicles and unleashed dogs can kill birds, destroy nests and disrupt breeding of beach-nesting and other ground-nesting birds. For plants, trampling by walking or biking may damage individual plants and open the habitat up for encroachment of invasive species. Certain endangered and threatened plants may be collected illegally. In the water, boat wakes, propellers, anchors, and conventional mooring systems scar, crush and uproot seagrass plants.

Hunting / Direct Harvest: Historically, some marine mammals and turtles were killed in extraordinarily high numbers for their fat, meat, and eggs. This led to the catastrophic global decline of these species. While illegal in the United States, killing of U.S. federally listed endangered and threatened animals (including birds and fish) may remain legal in some countries and this can disrupt regional efforts to recover the species. Hunting is and will continue to be allowed within sections of the proposed CT NERR. Species hunted include small and large mammals, and land and water fowl. Hunting is a regulated and legal activity that is also an important tool used for wildlife management. "Poaching" (i.e., illegal hunting) will be a more accurate term to describe a threat associated with direct take for these terrestrial species.

Fishing / Overfishing: In areas with recreational fishing, fishermen might accidentally or unknowingly catch federally listed species or managed species. Even if fish are released after being caught, they are particularly susceptible to post-release mortality from injury or stress. Some types of fishing gear, such as trawls and traps, can damage or destroy benthic habitats and sessile wildlife.

Bycatch: A primary threat to some marine animals is their unintended capture in fishing gear which can result in drowning or cause injuries that lead to death or debilitation (e.g., swallowing hooks, flipper / fin

entanglement, capture in nets). The term for this unintended capture is bycatch. The primary types of gear that result in bycatch include trawls, gillnets, longlines, hook and line, and pots / traps.

Vessel Strikes / Turbine Strikes: Strikes typically refer to direct impacts from vessels on marine mammals, sea turtles, and some fishes, but strikes from other vehicles (automobiles, planes) may also impact terrestrial animals and birds. These collisions can cause broken bones and massive internal injuries, cuts, and in some cases, death. Wind turbines may impact birds and bats in the same way.

Entanglement: Entanglement in fishing gear, plastic bags, or other human-sourced items impacts all wildlife. Fishing gear or plastic items can cut into an animal's body, cause serious injuries, and result in infections and mortality. Even if gear is shed or removed through disentanglement efforts, the time spent entangled can severely stress the animal, weaken it, prevent it from feeding, and sap the energy it needs to move, feed, and reproduce.

2.4.2 Climate Phenomena and Impacts

Threats and stressors from climate phenomena that can be expected to impact the proposed CT NERR include changes in storm events (both in terms of precipitation rates and their distribution over time), increases in temperature, and sea level rise.

The overall health of Long Island Sound—the largest component of the proposed CT NERR—is directly linked to the health of waterbodies that flow into it. The Connecticut Physical Climate Science Assessment Report (Seth et al. 2019) indicates the annual total precipitation is projected to increase by 4 to 5 inches by the midcentury. In terms of water quantity, the State Water Plan predicts that, “*there may be conditions that make it more difficult for a basin to satisfy all out-of-stream and instream needs*” and “*higher risk of flooding during winter months*” (CT.gov 2019). Water quality issues may include an increase in harmful algal blooms, a change in temperature regimes and increase in nutrient loads that will lead to a loss of high-quality headwater streams and cold-water habitat and further degradation of impaired waters. Those in vulnerable communities will be most impacted by the latter. Declines in water quality also have negative impacts on recreational use that can subsequently impact local economies (Governor's Council on Climate Change 2021a).

Rapid sea level rise (characterized by 20 inches or more by 2050) will likely result in impacts to coastal marsh habitat within the proposed CT NERR. While the degree of impact will vary, changes are expected to include conversion of rare habitat types (e.g., tidal marsh to submerged lands), loss or replacement of ecologically critical and rare species dependent on select habitats, and the increased susceptibility of habitats to other on-going threats (e.g., fragmentation due to development, establishment of invasive species) (Governor's Council on Climate Change 2021a).

2.4.3 Reserve Sensitivity and Vulnerability to Impacts

Sensitivity is a measure of whether and how a reserve or group of reserves is likely to be affected by climate and non-climate stressors. Vulnerability is the degree to which a system is susceptible to or

unable to adjust to adverse effects (Trueblood et al. 2013). At this stage, assessing vulnerability involves too many unknowns to provide value; instead, a slightly less ambitious look is provided (Table 2-13) for sensitivity to threats and stressors identified in *Sections 2.4.1* and *2.4.2* using a three-tiered scale (highly likely, somewhat likely, unlikely).

Ecosystem-based management, an integrated adaptive management approach to help us consider tradeoffs in resource uses and protect and sustain diverse and productive ecosystems and the services they provide (NOAA 2021b), is a key tactic for considering and managing the reserve sensitivity and vulnerability. Informed by science, ecosystem-based management incorporates the entire ecosystem, including humans, into resource management decisions. The State of Connecticut and DEEP engage in ecosystem-based management throughout its’ programs and divisions, with the notable recent examples being the May 14, 2021 State Legislature’s adoption of DEEP’s Blue Plan for Long Island Sound (DEEP 2019b) and the actions of the Governor’s Council on Climate Change (Governor’s Council on Climate Change 2021c).

Table 2-13: Reserve Sensitivity to Threats

Sensitivity to threats identified for the reserve are characterized by three broad categories: highly likely, somewhat likely, and unlikely.

THREAT	SENSITIVITY
climate change (storms – increasing temperature)	highly likely
climate change (sea level rise)	highly likely
coastal development	somewhat likely
barriers / dams	unlikely
noise	unlikely
marine debris	somewhat likely
pollution	somewhat likely
habitat degradation	somewhat likely
habitat loss	somewhat likely
invasive / nonindigenous species	somewhat likely
human harassment	somewhat likely
hunting / direct harvest	unlikely
fishing / overfishing	unlikely
bycatch	unlikely
vessel strikes	somewhat likely
Entanglement	unlikely

2.5 Cultural and Archaeological Resources

The proposed CT NERR includes the traditional lands of the Mashantucket Pequot Tribal Nation, Mohegan Tribe, Western Nehântick Tribal Nation, Hammonasset Tribe, Wappinger Tribe, and Wangunks Tribe. The area hosts six historic lighthouses, including one located on the Avery Point campus, with a

view of three additional lighthouses located outside the proposed CT NERR. Shipwrecks in the area (approximately 69) date from the 17th to the 20th centuries. Haley Farm State Park, Bluff Point complex, and Pine Island have a rich history of human occupation and use. The other terrestrial properties, mostly marsh, were not as hospitable for human occupation, though resources from these properties were likely harvested. Archaeologically significant areas include two Archaeological Preserves, one at Pine Island, and a second at the Midway Railroad Roundhouse in Bluff Point State Park (Table 2-14). A prehistoric shell midden (Blackhall site, or Old Lyme Shell Heap site) is submerged at the mouth of the Connecticut River. Submerged Holocene-era sediments off the mouth of the Connecticut River may yield additional evidence of prehistoric habitation. New London and Mystic were significant ports throughout history from both a socio-political and economic perspective.

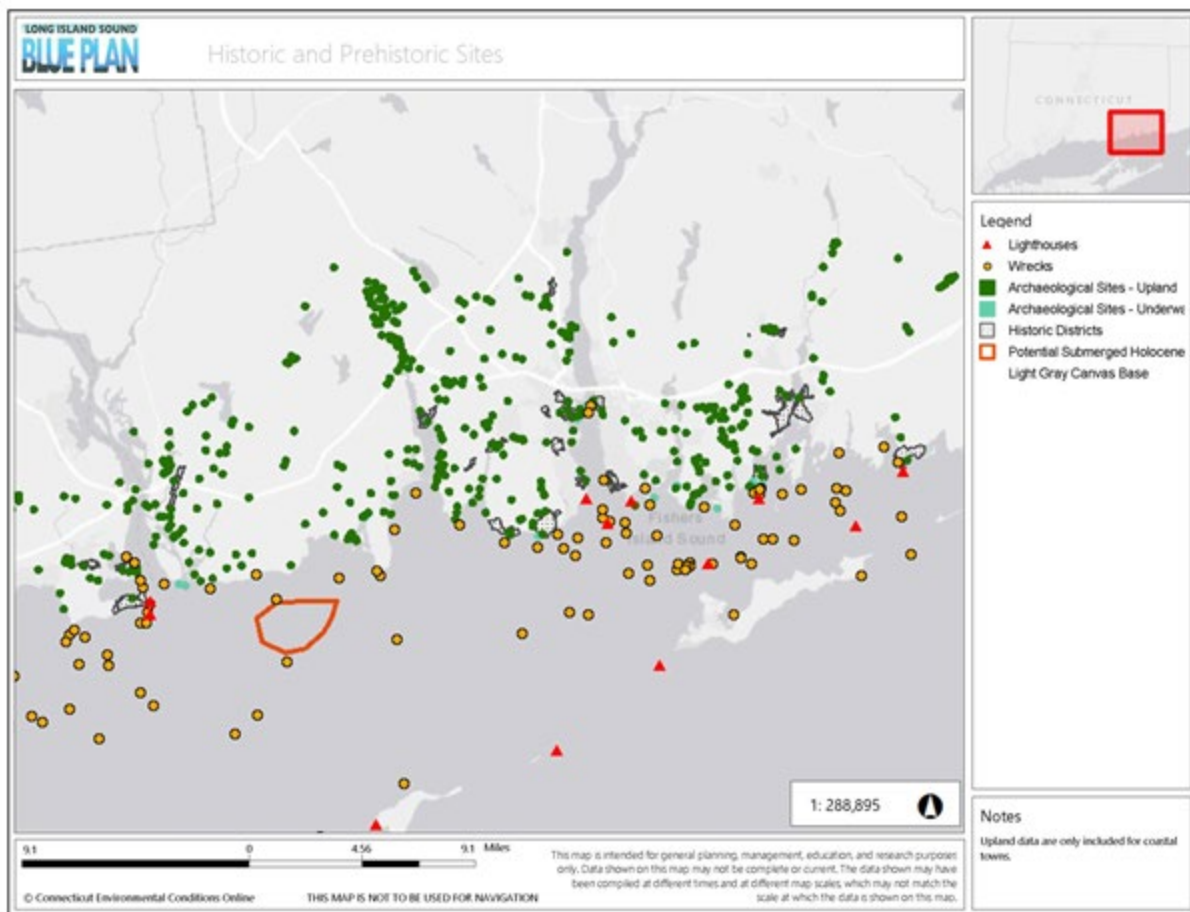


Figure 2-11: Historic and Prehistoric Sites in the Area

Locations of archaeological finds, both historic and prehistoric, are shown as green points for the upland sites and orange points for shipwrecks. The upland archaeological sites include both significant sites with many artifacts recovered as well as sites where single artifacts were recovered. Holocene-era sediments have been mapped in Long Island Sound; these sediments may contain evidence of the early inhabitants of the area. Historic districts and lighthouses represent historically significant areas, often from a socio-political viewpoint. Map generated using the online Long Island Sound Blue Plan Viewer (CTECO 2021).

Figure 2-11 provides an overview of historic and prehistoric sites in the proposed CT NERR and the surrounding area of southeastern Connecticut. Given that sea level was once much lower, underwater archaeology is key to accessing prehistoric sites; the UConn Maritime Studies Program on the Avery Point campus offers a minor in Maritime Archaeology and many of the neighboring colleges and universities also offer similar programs or classes. The Office of State Archaeology is located at UConn and is the official repository for the State’s collection of over 500,000 anthropological and archaeological artifacts. The Office of State Archaeology coordinates with the State Historic Preservation Office (SHPO), a state office in the Connecticut Department of Economic and Community Development.

State Archaeological Preserves are an important mechanism for protecting Connecticut's archaeological heritage (Table 2-14). Many agencies and private citizens work together to preserve that heritage, including the State Historic Preservation Office, the Historic Preservation Council, the Office of the State Archaeologist at UConn, Connecticut’s archaeological community, and concerned citizens and property owners.

Table 2-14: Summary of Significant Archeological Sites in the Proposed CT NERR

The location and inclusion in the proposed CT NERR are provided for each property. A short overview of the site is provided; readers are directed to the references for a more thorough history.

SITE	LOCATION	HISTORY
STATE ARCHAEOLOGICAL PRESERVES		
Pine Island Archaeological Site	Pine Island, Groton	Variety of uses through time, including: haying, residence, harvest of seaweed, fish processing factory for fish oil transitioning to fertilizer production, recreational use, and military operations. The island hosts a gravesite. (Ebbin 2010)
Midway Railroad Roundhouse Archaeological Complex	Bluff Point State Park, Groton	In 1912, the New York, New Haven and Hartford Railroad (commonly known as “The New Haven”) was operating over 2,000 miles of tracks in the region. The Midway yard and specifically the turntable were upgraded in 1917 to accommodate all the different types of engines that were used by the New Haven. By 1926, as other yard facilities were constructed along the New Haven Line, Midway lost its status as the preeminent yard. For a few years, the yard was used for storage until the Great Depression made keeping the yard staffed unfeasible. (Mascia n.d.)
ARCHAEOLOGICAL DIG SITES – PAST and POTENTIAL		
Blackhall site, or Old Lyme Shell Heap site at the confluence of the Connecticut River and Black Hall River. Submerged.	off Griswold Point, Old Lyme	Shell midden used during the Terminal Archaic, Middle Woodland and Late Woodland periods. Extended at least 800 feet along the coast and ranged in overall width from eight to over 100 feet. In addition to shellfish, over 3,000 faunal remains were found, as well as many tools. Artefacts suggest finfishing occurred at the site, including deep sea fishing of cod. A single seal bone indicated that marine mammals were also exploited. referenced in: (Lavin and Banks 2008)
Holocene-era sediments have been identified in Long Island Sound.	Long Island Sound	The potential for these sediments to contain evidence of early inhabitants led to the designation of possible Holocene-era submerged sediments as a significant area for archaeological sensitivity or significance in the Long Island Sound Blue Plan, including this location just eastward and offshore from the mouth of the Connecticut River. (DEEP 2019b; Lavin 2013)

3 Proposed CT NERR Reserve Strategic Plan

The Strategic Plan provides a framework and direction for the proposed CT NERR over the next five years.

The proposed CT NERR is entering an organizational landscape already populated with groups working in the fields of environmental education, research and monitoring, coastal training, and stewardship of natural habitats through ecosystem-based management approaches. Ecosystem-based management is a management approach embraced by the Reserve System that considers a variety of interactions within an ecosystem, including humans and their impacts, rather than considering single aspects in isolation. During the strategic planning process, a key theme that emerged was the need to find a niche for the proposed CT NERR that complements these other programs without directly competing for the same audience or service need. The Reserve System provides excellent support for program development and already targets groups or needs not currently serviced by other organizations operating within southeastern Connecticut.

An overriding direction for the proposed CT NERR during the next five years is to identify and focus on audiences and needs not currently met by other organizations with a particular focus on underserved communities. Additionally, the proposed CT NERR as a place-based entity can play a role not only in providing services and access to the proposed CT NERR, but also in linking local communities to the services provided by these partner organizations.

Areas and themes identified as opportunities for the proposed CT NERR within southeastern Connecticut include:

1. Place-based education – the proposed CT NERR opens up new opportunities for responsible access to the outdoors as a classroom, both in partnership with other organizations and through the development of new programs.
2. Deliver the Reserve System programs of Teachers on the Estuary (TOTE) and the K-12 Estuary Education Program (KEEP), coordinating with local education partners, to reach a broader swath of audiences and offer place-based education that builds on and links to existing educational opportunities and adapts to school teaching protocols.
3. Serving as a local expert on the status of ongoing research and monitoring efforts in the area as a link to past efforts and connection to complementary efforts pursued within the National Estuarine Research Reserve System (hereinafter, Reserve System).
4. Working with ongoing monitoring efforts to take advantage of and add to existing monitoring networks. By actively engaging with organizations currently monitoring the local environments (DEEP, USGS, LISICOS / NERACOOS, Unified Water Study), the proposed CT NERR can choose monitoring locations which add to the landscape and provide greater resolution of data within the local area.

5. Develop a series of place-based training programs for coastal managers at all levels. Coordinate with current state-based training efforts by Connecticut Institute for Resilience & Climate Adaptation (CIRCA), Center for Land Use Education and Research (CLEAR), and Connecticut Sea Grant to add to the offerings and opportunities for training without replicating what is already available. Leverage programs developed and implemented within the National Estuarine Research Reserve System where appropriate.
6. Partner with DEEP and as appropriate, other organizations to increase the level of habitat protection within the proposed CT NERR. Collaborate with DEEP and as appropriate, other organizations when possible, to fund and implement restoration or activities and projects of mutual benefit.

A particular area of emphasis that resulted from a series of stakeholder meetings to help develop this plan (*Appendix C: Public Engagement / Meetings*) was to ensure that the proposed CT NERR works to address and improve issues surrounding diversity, equity, inclusion, and environmental justice through staffing, projects, and programs. As these important issues permeate through numerous aspects of society and culture in general, the proposed CT NERR will include these themes holistically throughout its organizational structure and portfolio of work.

As a new reserve, the proposed CT NERR will initially focus primarily on gathering baseline information; developing monitoring, research, education, and stewardship efforts; fostering community engagement; and establishing an active friends group. Included among these are implementing required Reserve System programs (e.g., the System Wide Monitoring Program - SWMP, Teachers on the Estuary -TOTE, etc.). Accordingly, the adaptive management approach of promoting a flexible plan that may be adjusted as information becomes available is especially well-suited for this early stage. Moreover, this adaptive approach is in alignment with the state's Coastal Management Program (DEEP 2021e) as well as the strategic plans of NOAA and the Reserve System (NOAA 2010; NOAA OCM 2017).

A thoughtful and responsible course of action is to proceed with the implementation of the proposed CT NERR *Strategic Plan* with a focus on coordinated research and monitoring, education, stewardship, resource management, and financial prudence rather than initiating redundant and unaligned programs. There is broad support for the idea of adaptive management as a practical tool; meaning that as information becomes available, the management plan can be reassessed and adjusted accordingly.

3.1 Proposed CT NERR Vision and Mission

Estuaries are biologically rich, economically valuable, and highly vulnerable ecosystems. The vision and mission of the entire Reserve System reflects the importance of these systems within our communities:

Reserve System Vision: Resilient estuaries and coastal watersheds where human and natural communities thrive.

Reserve System Mission: To practice and promote stewardship of coasts and estuaries through innovative research, education, and training using a place-based system of protected areas.

The proposed CT NERR vision statement is the overarching description of what the reserve would like to achieve or accomplish and encapsulates how our reserve wants to be distinguished.

Proposed Connecticut National Estuarine Research Reserve Vision

A resilient, healthy Long Island Sound estuary and watershed where human and natural communities thrive.

The reserve mission statement describes the reserve’s core purpose and focus, the reserve’s reason for existence. This statement describes our organization’s unique contributions.

Proposed Connecticut National Estuarine Research Reserve Mission

To collaboratively integrate science with conservation, learning, recreation, and economic viability using ecologically diverse sites in southeastern Connecticut.

3.2 Coastal Management Issues

Many coastal management issues for the proposed CT NERR were identified during various formal and informal public meetings, presentations, and through written comments. These interconnected issues include natural processes and anthropogenic effects, ranging from: invasive species, loss of habitat and habitat connectivity, erosion and sedimentation, urbanization and human activities in the area, water quality issues (including point and nonpoint source pollution and impacts from climate change), terrestrial (i.e., non-water related) climate change impacts, equitable access to coastal resources, and balancing the blue economy with protection of the natural environment.

These were synthesized into a refined suite of priorities and aligned with the theme areas of Applying Science, Protecting Places, and Educating Communities that can be found in the Reserve System’s 2017-2022 strategic plan (NOAA OCM 2017).

Applying Science – Climate related impacts related largely to sea level rise and increasing storm frequency and intensity in the context of resilient human communities and natural habitats. Communities need to address coastal erosion and protection of critical infrastructure, but traditional shoreline hardening puts marshes, habitat integrity, and habitat connectivity at risk. Innovative solutions grounded in ecosystem-based management approaches will be important.

Continuing attention to impacts on water quality are necessary to support habitat integrity in an era where climate change can act synergistically with nutrient pollution to impair water quality. For example, climate variability exacerbating existing eutrophication can be further magnified by human influenced point and nonpoint source pollution.

Protecting Places - Maintaining habitat connectivity, diversity, and integrity support success of native species, from plants and seaweed to birds, fish, and invertebrates. Stewardship of endangered species, other species of conservation concern, and critical terrestrial and aquatic habitats, maintaining habitat connectivity, and supporting decisions that consider the carrying capacity of the ecosystem are identified as priorities in Connecticut.

Developing solutions and making decisions which integrate the needs of humans with supporting and protecting the natural environment requires an understanding of both the compatible and competing uses of the coastal zone. Encouraging green development ranges from stormwater management to decreasing impacts of point and nonpoint nutrient impacts on water quality. Understanding the interconnectedness of our local environment and the most important areas for our natural diversity and the ecosystem services they provide requires expanded monitoring and assessment of both natural and built environments.

Educating Communities - Community engagement allows for coordination among the many organizations currently stewarding our local environment. Balancing the multiple uses of the coastal environment requires coordination and understanding among the varied user groups of the coastal zone. Education, training, and outreach can be an effective tool in connecting communities to the estuary, increasing equitable and responsible access to coastal resources, and increasing the capacity for informed decision making.

3.3 Reserve Niche

A reserve's niche is the unique suite of functions it provides to meet audience needs that are not currently fulfilled to their full potential. Based on feedback from the stakeholder meeting series and observations on the range of interests, activities, and capacities within the region, the proposed CT NERR niche will include:

- Increasing environmental data and monitoring capacity across terrestrial, intertidal, and underwater ecosystems.
- Synthesizing existing and new environmental information and delivering it to stakeholders.
- Using diverse habitats to increase the access to place-based estuarine research, training, and educational experiences.
- Contributing to the Reserve System network that improves our ability to understand regional implications and warning signs of climate change and translating that information into effective management and funding allocations.

Coordination with ongoing research and monitoring efforts will amplify the work of others and extend the capabilities of the reserve to deliver sound science for use in management, education, and stewardship. Pathways for connecting managers and already-active stakeholders exist and will be utilized to translate information on water quality, habitat quality, and climate change impacts to these

groups while providing opportunities to engage in collaborative grant writing for relevant opportunities. The proposed CT NERR is uniquely situated to develop new pathways of information flow between reserve activities and other research and stewardship activities within the state and target audiences that are currently less engaged with environmental issues. Education, outreach, and training opportunities are critical mechanisms for fostering peoples' connection to their local natural environments, both through bringing people (including underserved populations) to these environments and through other means of raising awareness of these special places.

3.4 Goals and Objectives

The proposed CT NERR management plan incorporates goals and objectives based on an adaptive management planning framework. The goals identified below reflect priorities during our first five years and speak to the long-term future of the proposed CT NERR. Objectives support goals and are statements describing what the proposed CT NERR intends to accomplish within the first five years. In *Chapters 4 and 11*, this management plan details specific strategies and actions for achieving the objectives shown below, including addressing issues of social diversity, equity, inclusion and environmental justice. This concept underpins all aspects of the proposed CT NERR management plan, both in programming considerations and as a place.

Program objectives are linked to three reserve goals. Each objective has an alphanumeric prefix identifying the specific reserve sector that contributes toward that objective and the objective number, where the sector-specific codes are:

A = Administration (Chapter 4)

R = Research and Monitoring (Section 11.1)

E = Education (Section 11.2)

C = Coastal Training Program (Section 11.3)

Goal 1: Increase our understanding of the effects of human activities and natural events through collaborative research and monitoring to improve informed decision making and support adaptive management of coastal ecosystems.

Accompanying Objectives for Goal 1:

- **A1.** Establish the infrastructure, both physical and personnel, to support proposed CT NERR programs.

- **A2.** Foster and maintain relationships with University of Connecticut, Connecticut Department of Energy and Environmental Protection, the Friends Group, the Reserve Advisory Committee, and other strategic partners to support the continued success of the proposed CT NERR.
- **R1.** Improve opportunities to support and conduct basic and applied research within the reserve.
- **R2.** Contribute to status and trends assessments and forecasting of environmental quality by tracking short-term variability and long-term changes in abiotic and biological parameters within the reserve through establishment of the System Wide Monitoring Program (SWMP).
- **R3.** Encourage and assist in a multi-agency approach to research, monitoring, and science ecosystem-based management.
- **R4.** Provide coastal resource managers, the scientific community, and general education practitioners with appropriate scientific and technical information to foster informed decision-making.

Goal 2: Strengthen stewardship, protection, and management of estuaries and their watersheds through place-based approaches to training and education in order to maintain and enhance natural environments.

Accompanying Objectives for Goal 2:

- **A1.** Establish the infrastructure, both physical and personnel, to support proposed CT NERR programs.
- **A2.** Foster and maintain relationships with University of Connecticut, Connecticut Department of Energy and Environmental Protection, the Friends Group, the Reserve Advisory Committee, and other strategic partners to support the continued success of the proposed CT NERR.
- **E1.** Use education to develop and support the next generation of environmental stewards and environmentally literate citizens by providing hands-on, experiential, place-based learning opportunities in the NERR to students and teachers, particularly those from underserved and Environmental Justice Communities.
- **E2.** Promote environmental stewardship, environmental literacy, and science-based management and decision-making across a wide variety of sectors, including businesses, municipalities, and the public.
- **C1.** Establish the proposed CT NERR's Coastal Training Program as a reliable and relevant source for training and support on coastal management issues.

- **C2.** Deliver science-based knowledge and skills appropriate to the needs of coastal decision-makers in Connecticut, taking advantage of relationships with other Reserve System staff to support program content.
- **C3.** Increase access of CTP target audiences to science-based information to increase networking and information sharing.

Goal 3: Advance environmental appreciation and scientific literacy utilizing a place-based approach, to enhance people’s ability to make science-based decisions that positively affect estuaries, watersheds, and coastal communities.

Accompanying Objectives for Goal 3:

- **A1.** Establish the infrastructure, both physical and personnel, to support proposed CT NERR programs.
- **A2.** Foster and maintain relationships with University of Connecticut, Connecticut Department of Energy and Environmental Protection, the Friends Group, the Reserve Advisory Committee, and other strategic partners to support the continued success of the proposed CT NERR.
- **E1.** Use education to develop and support the next generation of environmental stewards and environmentally literate citizens by providing hands-on, experiential, place-based learning opportunities in the NERR to students and teachers, particularly those from underserved and Environmental Justice Communities.
- **E2.** Promote environmental stewardship, environmental literacy, and science-based management and decision-making across a wide variety of sectors, including businesses, municipalities, and the public.

4 Administrative Plan

The administrative plan describes the context of the state and federal agencies under which the reserve is managed, as well as the state agency administrative and management structure for the proposed CT NERR (*Section 4.1*). The administrative plan also describes the roles and responsibilities of the proposed CT NERR’s core staff and additional staff (*Section 4.2*), identifies strategic partnerships (*Section 4.3*), and describes the Reserve Advisory Committee (RAC) and other advisory groups (*Section 4.4*), and introduces a supportive Friends Group (*Section 4.5*). During the initial five years, it is anticipated that some expertise needs of the proposed CT NERR will be met with part-time hires, interns, and strategic partners, as well as project volunteers.

4.1 Organizational Framework and Management Authorities

All reserves in the national system operate as federal–state partnerships. The State of Connecticut, through UConn, will manage the operation of the proposed CT NERR in partnership with DEEP and ensure sufficient matching funds for the operational award from NOAA; while the federal government, represented by NOAA, will provide funding, national guidance, and technical assistance. The landowners in the proposed CT NERR, notably DEEP, have a major role to play in implementing the goals, objectives, and strategies developed in this management plan.

The state role in the Reserve System includes providing 30% total project match for the proposed CT NERR program base funding (where base funding refers to the federal award plus the required match), demonstrating adequate control over non-federal lands included in the proposed CT NERR (either through ownership or cooperative agreements), providing adequate staffing for the proposed CT NERR, and overseeing program implementation. Responsibility for land management will remain with the governmental agency (e.g., DEEP) that has statutory or legal authority. Notably, DEEP has management authority over DEEP-owned lands and waters and public trust waters, which can include but are not limited to habitat management activities, restoration, wildlife conservation, endangered species issues, and permitting of activities on state lands and waters. Similarly, UConn has responsibilities for the Avery Point campus and Pine Island. In either case, no statutory or legal land rights will be transferred or revoked as part of the establishment of the proposed CT NERR.

NOAA’s role in the Reserve System includes providing NERR program funding, subject to appropriations, coordinating between the national system and local programs, and supplying technical assistance for NERR program implementation. Also, pursuant to the Coastal Zone Management Act (16 U.S.C. §§ 1458, 1461), NOAA periodically conducts performance evaluations of the operation and management of reserves.

The proposed CT NERR will operate as a UConn Center with UConn supporting overall operations of the proposed CT NERR and with day-to-day operations managed by the proposed CT NERR staff (Figure 4-1). The proposed CT NERR Manager will report to the University of Connecticut’s Office of the Vice President for Research (OVPR). University of Connecticut OVPR will provide administrative, financial, and human resources (personnel) support under applicable policies and procedures. The proposed CT NERR Reserve Manager will provide overall program direction and oversee day-to-day administration and coordination within the organizational structure. A Fiscal Officer employed by the proposed CT NERR will provide financial and personnel management, grants support, purchasing, logistics, and support community interaction. Initially, six dedicated positions (full-time or part-time) are suggested to provide overall management of the proposed CT NERR and implement proposed CT NERR programs for research, education, training, and stewardship, as described in the next section. An additional four positions will be filled six months post-opening, with an additional four positions after a year post-opening.

Currently, each NERR receives a share amount of federal funding annually, authorized sites under the Coastal Zone Management Act, Section 315. Establishing state-funded positions at UConn will provide the 30% total project match requirement. Additional support may include salaries from state-funded

personnel performing work or research within the proposed CT NERR, in-kind match of volunteer labor, or materials provided by community organizations or site partners, additional funding for the proposed CT NERR from the state legislature (via various partner agency budgets), state or private grant awards, or donations.

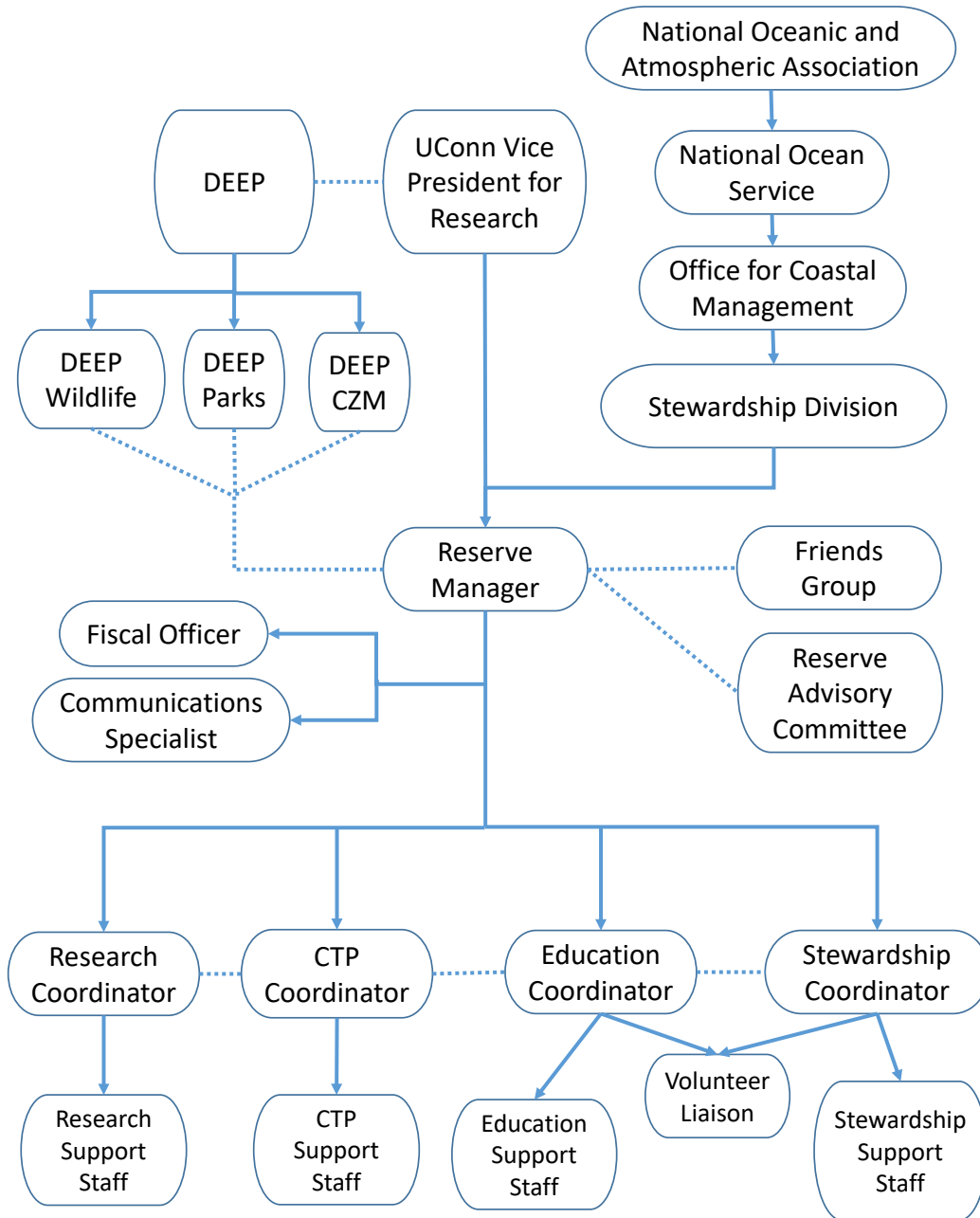


Figure 4-1: Proposed CT NERR Administrative Organization Chart

Specification of the relationships and lines of reporting for an expected “final state” of the proposed CT NERR, likely to be achieved towards the later stages of the initial management plan. Solid lines indicate lines of direct reporting authority. Dashed lines indicate primary communication and coordination pathways, but not authority. It should be noted that the nature of the reserve heavily emphasizes internal and external collaboration; thus, there are likely many more possible communication and coordination paths that will develop over time.

Two other groups complete the organizational structure (Figure 4-1): a Reserve Advisory Committee (RAC) which may include as-needed sector-specific advisory groups (see *Section 4.4*), and a Friends Group of the proposed CT NERR (see *Section 4.5*).

- *The Reserve Advisory Committee and sector advisory groups (Section 4.4)* consists of stakeholders of the reserve who have an interest in its success. The Committee's role is advisory; it has no line authority within the proposed CT NERR organization, although the caliber of its members lends considerable weight to its evaluations and recommendations. Sector-specific advisory groups mimic the RAC but are more directly focused on the programmatic areas of research and monitoring, education, and the Coastal Training Program.
- *The Friends of the proposed CT NERR (Section 4.5)* will be legally incorporated as a separate 501(c)3 charitable entity and, upon establishment, will enter into a Memorandum of Understanding (MOU) with the reserve that defines the special nature of the two organizations' interdependencies and accountability.

Section 4.3 discusses Strategic Partners which represent organizations the proposed CT NERR may partner with to deliver programs or services as well as support other functions of the proposed CT NERR. The administration of a reserve occurs through a collaborative process involving a variety of agencies and organizations at various levels of engagement. Partnerships such as these examples are those that can leverage specific resources to carry out core functions of the reserve. These can be informal or formal depending on the nature of functions or services provided. As appropriate, MOUs, contracts, or similar agreements with partners may be developed to properly address the interests of all parties for more formalized arrangements.

4.2 Initial Staff and Future Needs

The University of Connecticut will support the proposed CT NERR as a UConn Center. The proposed CT NERR will support staff positions to meet its goals and objectives as outlined in this management plan. Core staff as required by NOAA include a Reserve Manager, Research Coordinator, and Education Coordinator; these will be full-time positions hired as soon as possible. Additional roles necessary for support of the proposed CT NERR include a Fiscal Officer, a Stewardship Coordinator, and a Coastal Training Program Coordinator; these positions will be hired as soon as possible and will be part-time with a goal of moving to full-time as needs and funding allow. Additional roles expected to be filled midway through the first year of operations include a full-time System Wide Monitoring Program (SWMP) Technician, a part-time Education Specialist, and two seasonal Undergraduate or Graduate Research Assistants. In year two, we anticipate moving the Coastal Training Program Coordinator to a full-time position. Also in year two, we anticipate adding a part-time or full-time Volunteer Coordinator, a part-time or full-time Communications Coordinator, a second part-time Education Specialist, a part-time Coastal Training Program Assistant, and a third seasonal Undergraduate or Graduate Research Assistant.

What follows below is a general description of the staffing roles and is not meant to constitute a fully realized job description or hiring requirements. Rather, the core staff (Reserve Manager, Research Coordinator, Education Coordinator) will be hired following UConn personnel hiring policies and procedures. This process allows for the formation of a search committee representative of the various stakeholders with material interest in the reserve (e.g., DEEP), though the make-up of the search committee and final hiring authority remains with the relevant Vice Provost. Hiring of additional staff will be coordinated by proposed CT NERR core staff following UConn personnel hiring policies and procedures.

4.2.1 Reserve Manager

The Reserve Manager will coordinate and supervise all aspects of the proposed CT NERR operations and management. Duties will include: general administration; funding management (including Reserve System funding as well as other grants or contracts); state, federal, or private reporting requirements; and research, stewardship, training, educational, and volunteer activities, as well as tracking performance metrics for these categories when fully developed. The Reserve Manager will develop coordination mechanisms between DEEP and UConn and be the primary conduit for coordination and collaboration with DEEP and UConn property managers. The Manager will serve as a liaison between federal, state, and local government agencies, the community, and private entities, including advisory committees or groups, to achieve the goals and objectives of the proposed CT NERR. The Manager will also coordinate and collaborate with managers across the Reserve System to achieve Reserve System goals and strength management of the proposed CT NERR. As necessary, these coordination and liaison tasks may be delegated to other Reserve staff. The Reserve Manager will also be the principal point of contact for outside agencies. The Reserve Manager is ultimately responsible for communications (website, signage, mailings, press events) but may designate these responsibilities to qualified proposed CT NERR staff members, partners, or volunteers. The Reserve Manager will be an employee of the proposed CT NERR, a UConn Center, and will report to UConn's Office of the Vice President for Research.

4.2.2 Education Coordinator

The Education Coordinator will oversee the daily operation and implementation of the proposed CT NERR education programs, including on-site and outreach activities. The Education Coordinator will collaborate with other environmental education organizations and individuals, other sectors of the proposed CT NERR, other Education Coordinators across the Reserve System to fulfill educational objectives and to provide science and stewardship information and learning opportunities for students, educators, and citizens. These activities will include formal and informal education for the surrounding community members, educators, and students. The Education Coordinator will lead efforts to establish a volunteer program, with support of the other Coordinators and the Reserve Manager. The Education Coordinator will oversee the education specialists and when appropriate, the Volunteer Liaison. The Education Coordinator will be an employee of the proposed CT NERR, a UConn Center, and will report to the Reserve Manager.

4.2.3 Research Coordinator

The Research Coordinator will oversee the operation and implementation of the proposed CT NERR research and monitoring program, coordinate with site partner research programs, interpret research results, promote the use of the proposed CT NERR by other researchers, and interact with other research institutions and individuals to increase the connectedness of research activities throughout the area. The Research Coordinator will collaborate with site partners and other sector Coordinators of the proposed CT NERR, and other Research Coordinators across the Reserve System to fulfill research and monitoring objectives and to develop and present scientific information in a user-friendly manner. The Research Coordinator will procure necessary authorizations, licenses and permits from required local, state, and federal agencies for research activities conducted by CT NERR staff and will act as a resource to assist other researchers with understanding and complying with the necessary permitting processes for working in the reserve. The Research Coordinator will actively seek external funding from both the Reserve System Science Collaborative and a broad range of other funding sources to support an active research program and support graduate students and research assistants. The Research Coordinator will develop and initially implement the required System Wide Monitoring Program (SWMP) which will help to support and inform research as it is conducted in the proposed CT NERR. The Research Coordinator will be an employee of the proposed CT NERR, a UConn Center, and will report to the Reserve Manager.

4.2.4 Stewardship Coordinator

The Stewardship Coordinator will also be the primary interface between any NERR-related resource-related activities in the proposed CT NERR and the property owner. The role of the Stewardship Coordinator (as well as other NERR staff or volunteers) is neither designed nor intended to assume responsibilities held by DEEP or UConn, nor would they expect DEEP or UConn staff to be responsible for implementing NERR programming or fulfilling NERR needs. Rather, the Stewardship Coordinator and counterparts in the Parks, Wildlife, and Coastal Management programs of DEEP as well as Avery Point, will regularly communicate and coordinate together to plan and implement activities of mutual interest and benefit. Examples of such activities which are typical among other Reserves often include efforts such as habitat restoration, invasive species control, wildlife monitoring, or helping to train and supervise volunteers to assist with activities such as beach cleanups, plantings, trail maintenance / repair, or similar means to help support and improve these special properties. Depending on the project, responsibility may rest with DEEP, the proposed CT NERR, UConn, additional partners, or a combination thereof. When any project falls under the CT NERR for implementation, the Stewardship coordinator will ensure that all activities are appropriate, authorized / licensed / permitted from the proper entities, and coordinated among partners. The Stewardship Coordinator will assist the Research Coordinator in developing the required site inventory. The Stewardship Coordinator may provide GIS expertise for mapping and spatial analysis efforts (if this Coordinator has this skill set). The Stewardship Coordinator will help support efforts of volunteer programs as relevant and will ultimately work with the Education Coordinator to jointly oversee such programs. The Stewardship Coordinator will also coordinate and collaborate with other Stewardship Coordinators across the Reserve System to achieve stewardship

goals. The Stewardship Coordinator will be an employee of the proposed CT NERR, a UConn Center, and will report to the Reserve Manager.

4.2.5 Coastal Training Program (CTP) Coordinator

The Coastal Training Program Coordinator will oversee the implementation of the Coastal Training Program for local decision-makers and resource professionals to support the goals and objectives of the proposed CT NERR. The Coastal Training Program Coordinator will collaborate with other coastal training organizations and individuals, members of the local management community from the local to State levels, other sector Coordinators of the proposed CT NERR, and other CTP Coordinators across the Reserve System to fulfill coastal training objectives and to connect science and stewardship information in a user-friendly manner to local communities. The Coastal Training Program Coordinator will be an employee of the proposed CT NERR, a UConn Center, and will report to the Reserve Manager.

4.2.6 Fiscal Officer

The Fiscal Officer will support the proposed CT NERR through operational activities (payroll, purchasing, office management, fiscal report preparation), grants management, and event planning. The Fiscal Officer will interact with Coordinators and other proposed CT NERR staff and provide support to the Reserve Manager. The Fiscal Officer will be an employee of the proposed CT NERR, a UConn Center, and will report to the Reserve Manager.

4.2.7 System Wide Monitoring Program (SWMP) Technician, Abiotic

The SWMP Technician will be hired as a full-time position within the first year of the establishment of the proposed CT NERR. This position is necessary to support the SWMP program, specifically for the abiotic parameters. The SWMP Technician will maintain and calibrate SWMP equipment, collect samples for water quality and nutrient monitoring, troubleshoot problems, and compile and submit data to the NOAA Centralized Data Management Office, as well as assist with proposed CT NERR research and education programs. The SWMP Technician will be an employee of the proposed CT NERR, a Center at UConn, and will report to the Research Coordinator.

4.2.8 Additional Staff

Once the proposed CT NERR is established and program activities are underway, additional staffing or expertise will enhance the effectiveness of the activities outlined in this management plan. It is anticipated that positions will be filled by a combination of full-time or part-time hires, interns, and strategic partnerships, as well as volunteers. Based on the management plan's goals and objectives, the following positions are currently anticipated within the five-year term of this management plan:

- **Geographic Information Systems (GIS) Technician:** Utilize GIS technology to support proposed CT NERR activities, including map-making, land cover and land use analysis, ground-truthing for research projects, field work, and resource management. This position will be an employee of the proposed CT NERR, a Center at UConn. Depending on roles and responsibilities for the term of hire, may report to the Reserve Manager or any of the Coordinators.
- **System Wide Monitoring Program (SWMP) Technician, Biotic:** As the SWMP program expands, a second technician will be needed to fully support sampling of the biotic parameters. The SWMP Technician will maintain SWMP equipment, collect samples for the biotic monitoring program as well as assist with water quality and nutrient monitoring. This technician will troubleshoot problems and compile and submit data to the Reserve System Centralized Data Management Office, as well as assist with proposed CT NERR research and education programs. This position will be an employee of the proposed CT NERR, a Center at UConn, and reports to the Research Coordinator.
- **Research Assistant:** Analyze data and assist with research projects and monitoring in the proposed CT NERR in support of the primary research questions of the proposed CT NERR. Depending on the current need within the proposed CT NERR and the expertise of the Assistant, in addition to research and monitoring support, the Research Assistant may use GIS technology in support of research and monitoring objectives, may assist with stewardship activities, may support the volunteer program, or may assist with public outreach and educational events. This position may be filled by undergraduate or graduate students as well as by non-student staff or volunteers. This position will be an employee of the proposed CT NERR, a Center at UConn, and reports to the Research Coordinator.
- **Education Specialist:** Design, develop, and deliver educational programs on-site at reserve properties or off-site venues. Under direction of the Education Coordinator, the specialist may be involved with the design of new environmental education programs and interpretive displays. Additional duties include preparation for camps and other educational events, volunteer program support, design and distribution of informational and interpretive fliers and signs, attendance at media events such as Earth Day, and leading tours of the proposed CT NERR properties. This position may be filled by undergraduate or graduate students as well as by non-student staff or volunteers. This position will be an employee of the proposed CT NERR, a Center at UConn, and reports to the Education Coordinator.
- **Volunteer Liaison:** This individual will work with the Friends Organization to identify and expand the volunteer roster and to prepare and execute the volunteer plan to accomplish the objectives. The Friends Group will have a seasoned and experienced Friend to interface with the Volunteer Coordinator. This person will liaise between volunteers and each of the Coordinators to support the volunteer program. Develop the volunteer opportunities and provide training to volunteers, in coordination with the appropriate proposed CT NERR sector staff. Work with Coordinators to update and develop new opportunities, as need and interest arise. Additionally, this Liaison will develop mailing lists and databases to match volunteers with reserve needs,

track volunteer contributions, recruit additional volunteers, and support various volunteer activities. This position will be an employee of the proposed CT NERR, a Center at UConn, with a joint reporting shared between the Stewardship and Education Coordinators, with whom they will most closely work.

- Coastal Training Program Assistant:** Assist the CTP Coordinator with the development and implementation of CTP’s strategic programming for decision-makers, including creating educational and informational materials; updating the CTP website; and maintaining the CTP mailing list and training participant database. This position will be an employee of the proposed CT NERR, a Center at UConn, and reports to the Coastal Training Program Coordinator.
- Communication Specialist:** Manage internal and external communications of the proposed CT NERR. Develop and implement a communication strategy that includes media outreach and social media content creation. Research and write content for the proposed CT NERR website, infographics, blogs, and newsletters. Ensure that the proposed CT NERR produces high-quality and error-free copy. Work with proposed CT NERR staff and partners to brainstorm content ideas. Support and evaluate results of communication campaigns. Build and maintain relationships with key stakeholders. This position will be an employee of the proposed CT NERR, a Center at UConn, and reports to the Reserve Manager.

4.3 Strategic Partnerships

The development of strategic partnerships starts with identification of the reserve’s target audience considered in the context of the proposed CT NERR strategic goals, objectives, and strategies (Figure 4-2). For example, audiences may include the public school systems and other educators, users of the reserve, managers, researchers, and municipalities. Needs of these audiences and further characterization of our target audience will be determined during year one through a market analysis and needs assessment for the Education and Coastal Training programs. We may then better specify the reserve’s niche—its special capabilities that are not offered by other organizations in the area.

Throughout the designation process, the proposed CT NERR has engaged with stakeholders through public comment meetings, with published notices in the Federal Register, and published notices to local media outlets to discuss the site selection decision and

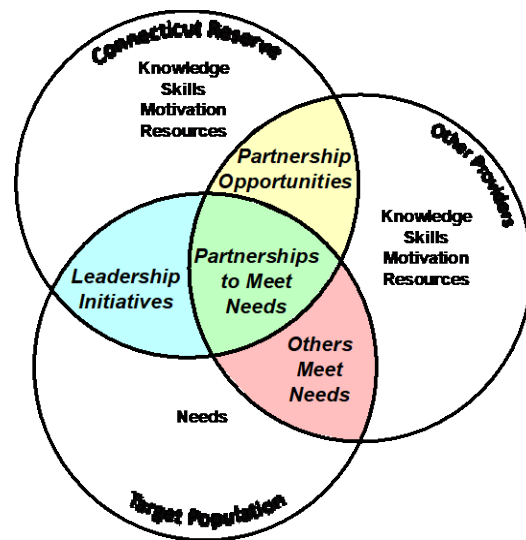


Figure 4-2: Identifying Partnerships. *Understanding the current landscape of needs and services offered by others leads to refinement of the Reserve’s niche and identification of potential Strategic Partnerships.*

scoping of the *Draft Environmental Impact Statement*.

To support development of the *Draft Management Plan*, a series of ten public meetings were held in February and March of 2021, with direct email invitations sent to 901 individuals and forwarded to a variety of additional email lists and media outlets. Each meeting featured a topic overview, perspectives from staff of other reserves and NOAA's Office for Coastal Management, a lively discussion period with questions and answers, and often a brainstorming session. On average each meeting was attended by about 50 people with a high of 124 attendees at the kick-off meeting; roughly 30-40 of these attendees were repeat participants. Relevant public comments were incorporated in the *Draft Management Plan*. Not included here is the process we followed to categorize and prioritize the public comments. *Appendix C: Public Engagement / Meetings* includes a summary of these meetings.

The Connecticut Audubon Society, a key partner in the designation process, received support from Pew Charitable Trusts to engage in outreach in support of the designation process. The Connecticut Audubon Society interviewed over 300 people in over 80 organizations to discover their needs in the context of services and programs typically offered by reserves. These interviews also provided an opportunity to begin the process of identifying potential strategic partners.

Designation Steering Committee members spoke with a subset of potential strategic partners with whom the proposed CT NERR is likely to enter into formal agreements within the first few years of establishment. These included educational organizations, organizations involved with monitoring, and organizations who focus on offering training opportunities. Designation Steering Committee members also met with organizations at UConn, DEEP, and local community-based organizations to develop a process for integrating attention and responsiveness to issues of social diversity, equity, inclusiveness, and environmental justice into the core principles of the proposed CT NERR.

As shown in Figure 4-2, the overlap in capabilities with other providers define partnership participation and opportunities. In some cases, a need may be fulfilled by another organization operating outside the aegis of the reserve.

Rationale for Potential Partnerships: The proposed CT NERR will select strategic partners that complement the strengths of the proposed CT NERR, supporting the delivery of the highest quality services and programs to its constituents. During the development of the *Draft Management Plan*, the designation team advertised widely the desire to speak with interested parties about the reserve and specifically sought out a wide range of contacts. This process, we believe, is a sound structure for the reserve staff to use as they develop their relationships with these potential partners and identify and quantify what partnerships may look like, in support of the various reserve programs. These early conversations were critical to developing a management plan that reflects the current status of the professional and social community. Viewpoints and ideas from these interviews informed all aspects of the management plan.

The first step in evaluating potential strategic partners, already completed, was specifying broad functions, specific activities, and links to programs (Figure 4-3). The next step is to characterize how a potential strategic partner fits within this structure – considering the strengths they bring and how their existing programs and staff might interface with the reserve.

FUNCTIONS	ACTIVITIES	STRATEGIC PROGRAMMING	LEAD
Administration	<ul style="list-style-type: none"> ▪ Staffing ▪ Strategy, Priorities and Targets ▪ Incentives ▪ Financial Planning and Fundraising ▪ Performance Management 	Adaptive, Ecosystem-Based Planning and Management	UConn Reserve Manager
Protecting Places	<ul style="list-style-type: none"> ▪ Stewardship (habitat and species management) ▪ Restoration ▪ Protection (through acquisition) 	<ul style="list-style-type: none"> ▪ Place-based stewardship of estuaries and watersheds ▪ Resiliency to climate change ▪ Land Acquisition/Manipulation and Restoration Plans 	Stewardship Coordinator
Applying Science	<ul style="list-style-type: none"> ▪ Promote scientific understanding of estuaries and watersheds ▪ Develop and apply research, data and tools to the Reserve ▪ Improve water quality and control pollution sources 	<ul style="list-style-type: none"> ▪ Research and Monitoring Program ▪ System Wide Monitoring Program (SWMP) ▪ Science Collaborative Projects 	Research Coordinator
Engaging Communities	<ul style="list-style-type: none"> ▪ Advance environmental appreciation and scientific literacy ▪ Training for science-based decisions ▪ Communications and feedback ▪ Attracting volunteers ▪ Environmental equity and reduction of barriers to access 	<p>NERRS Community Programs</p> <ul style="list-style-type: none"> ▪ Teachers on the Estuary (TOTE) ▪ K-12 Estuarine Education (KEEP) ▪ Data in the Classroom (KEEP) ▪ Coastal Training Program (CTP) <p>CT NERR's Community Programs</p> <ul style="list-style-type: none"> ▪ Teaching Title 1 Students ▪ Informal Education Programs ▪ Volunteers Program ▪ Justice, Equity, Diversity, Inclusion ▪ Communication Plan 	Education Coordinator CTP Coordinator Volunteer Liaison Communication Specialist

Figure 4-3: Supporting Rationale for Developing Strategic Partnerships

Read from left to right, the headers identify the four main functions of the reserve followed by highlights of the activities involved in delivering these functions. The next column lists the NERR programs applied to perform the activities. The column headed "LEAD" identifies the responsible NERR leadership positions for the program areas.

To be considered as a potential strategic partner, an organization should demonstrate an interest in exploring potential partnerships with the proposed CT NERR and other providers, and have the competence and capacity to execute the relevant program area—these can be short-term or longer-term projects or programs. Interest may be ascertained and screened through either direct interviewing or attendance at relevant public meetings or both. Competency should be assessed by the experiences and program offerings indicated on the websites of the organizations and through peer evaluations. While the designation team spoke to some parties that were already very interested in engaging with the proposed CT NERR, with continued advertising and outreach as the reserve moves towards designation, other candidates for strategic partnerships are expected to emerge. In addition, the formal market analysis and needs assessment will cause reserve staff to develop relationships with the active

local environmental community and further refine how best to serve the needs of the audiences of eastern Connecticut.

Partner Selection: The criteria for selecting the organizations to collaborate in the delivery of NERR programs from the list of potential partners will derive from a deeper study of the needs of the target audience, status of current activities (spatially and temporally) in the area, requirements of the Reserve System for program delivery, strengths and weaknesses of the potential partners, and more detailed discussions that will be conducted after the reserve is officially designated. This process is expected to continue over several years. The results of this study will be arranged in a matrix to quantify the comparison between the competencies of the proposed CT NERR with those of the candidate partners. Partners with successful candidacies must complement the CT NERR's competencies and be willing to team with other organizations and to share mutual responsibility for desired results and for bringing or helping to acquire adequate resources for the task. The proposed CT NERR may consider overlap in mission and scope of current activities between the reserve and potential partners, and the potential for partners to enhance and amplify the audiences and the impact of NERR activities and programs. Partners are also expected to practice team behavior and to uphold NOAA's rigorous quality standards for the services delivered to target audiences.

Partnership Management: As indicated in Figure 4-3, partnerships are managed by the appropriate NERR Coordinator under the oversight of the Reserve Manager. In this context, management consists of establishing objectives, strategies, and actions for the partnership; providing incentives for both parties; monitoring performance against target outcomes; and devising corrective actions when there are performance shortfalls. The appropriate Coordinator, Reserve Manager, and partner will establish standards of accountability and evaluation as part of the agreement. The agreement among partners may be structured as a Memorandum of Understanding, a subaward from the proposed CT NERR, a fee-for-services agreement, or any other form of legally binding agreement that is acceptable to all partners.

4.4 Advisory Committees

Within the first year of designation, the Reserve Manager will lead the establishment of a Reserve Advisory Committee (RAC) composed of local community stakeholders dedicated to guiding the policies and management of the reserve.

The Reserve Manager will follow the steps outlined under Objective A2, Strategy 1 (Table 4-3, page 113) for establishment of the RAC; these guidelines are designed to ensure a supportive committee with diverse backgrounds and areas of expertise. Further, the establishment and operation of the RAC will follow any requirements and regulations outlined in the guidelines for establishing the CT NERR as a UConn Center.

Role of Reserve Advisory Committee: This committee will not have direct line authority over the Reserve Manager but will:

- provide feedback and recommendations on site management and implementation strategies;

- provide feedback on research and monitoring activities, educational and training programs, and stewardship activities based on the approved management plan;
- assist in seeking support for reserve programs;
- enable the development and maintenance of partnerships and cooperative efforts with the community; local, state, and federal agencies; and other research and educational institutions;
- represent the interests of users of the reserve and its products; and
- discuss relevant issues with the broader community.

The RAC, in coordination with the Reserve Manager, may create standing or temporary subcommittees as necessary to carry out its roles.

Other Advisory Groups: Additional advisory groups may be established to support the efforts of the proposed CT NERR. These will be established by the Reserve Manager under consultation with the Coordinators and the RAC, and whose purposes should address current or potential needs. These groups may be structured along the formal lines of the RAC or may be established as less formal working groups.

Suggested Membership Categories: Membership on the RAC and potential advisory groups should represent a broad swath of experiences and backgrounds that can help advance the goals and objectives of the reserve. While including representation from groups such as academia, state and local governments, and education and environmental organizations is appropriate, the reserve should strive to think more broadly. Seeking to engage leadership and expertise from sectors such as businesses and industry, chambers of commerce, community groups, faith-based organizations, Tribal Nations, charities, non-profits, etc., can serve to augment and enhance the ability to address reserve needs.

4.5 Friends of the Proposed CT NERR

Across the Reserve System, 75% of the reserves are supported by a synergistic Friends Group. Most of these Friends Groups deliver at least three essential functions that support and amplify the strength of their reserves:

- Substantial financial resources, up to \$500,000 annually, obtained through various community fundraising efforts such as membership, donations, events, and non-research grants.
- A vital volunteer program, some of which provide 14,000 to 18,000 volunteer hours per year that equate to a cost savings of between \$200,000 to \$300,000 (at a rate of \$15 per hour). The volunteers assist their reserves and defray labor costs in the administration and implementation of strategies for research and monitoring, habitat and species stewardship, and resiliency to climate change.

- Additional community engagement through informal education, reduction of barriers for underserved people to access the reserve’s services, and communications.

In consideration of our reserve’s nascent status and need to grow its financial and human resources to fuel its mission, stakeholders are already working to establish a CT NERR Friends Group (Friends Group). There is no shortage of successful friends group models, both locally and within the Reserve System, to guide this endeavor; to date our interested stakeholders have benchmarked successful friends groups in seven reserves and have delved deeply into three of these groups. The Friends Group will also join the National Estuarine Research Reserve Association (NERRA) network of Friends Groups to discover and share best practices, especially in fundraising.

Governance – Following the constructs of a number of successful friends groups, interested stakeholders plan to incorporate the Friends Group as a separate, tax-exempt charity (IRS 501(c)3 designation) that coordinates with the reserve. The charter will be worked out with the proposed CT NERR management as a win-win agreement prior to the Friends Group’s independent legal incorporation (Covey 2020). The win-win thinking that supports this agreement exemplifies creative cooperation and will focus on the following roles and responsibilities: membership, fundraising (donations, events, non-research grants), informal education, and reduction of barriers to access. Additionally, the Friends Group plans to support the volunteer program and Volunteer Liaison and the communication plan and Communication Specialist, working in cooperation with the proposed CT NERR.

Membership – The Friends Group will use communications of action-oriented estuarine programs, success stories and volunteer opportunities to attract environmentally- and socially-conscious citizens to become members. The Friends Group will seek members who mirror the ethnography of the reserve’s communities and represent connections with other groups (e.g., churches, community groups, political groups, financial groups, government agencies, museums, libraries, and environmental and education partners). Specifically, the Friends Group will seek leadership from underrepresented communities, allowing them the opportunity to influence the reserves programs, projects, and recreational opportunities. Additionally, members with fundraising skills or resources will also be sought. The first job of the Friends Group will be to develop a powerful membership recruitment tool that conveys compelling stories and attractive images of the reserve and its benefits to regional communities.

Fiscal Responsibilities – Operating under the rules of its tax-exempt charter, the Friends Group will work with the Reserve Manager and core staff to ensure the fiscal health and stability of the reserve. For its part, the Friends Group will develop effective fundraising strategies and competencies by recruiting highly skilled fundraising volunteers. Fundraising examples include:

- membership fees;
- an annual appeal;
- capital campaigns;
- grant preparation;
- program services; and

- special events (e.g., eco-tours, garden parties, receptions, music festivals, fairs, adventure films, dinners).

Four of the benchmarked NERR friends groups raise over \$500,000 annually to support their respective NERR activities. The key for the proposed CT NERR achieving these levels of funding is to link appeals to specific requests or programs.

Community Engagement: Informal Education – The Friends Group will support the proposed CT NERR education program and coastal training program by building community conservation involvement through informal education: indoor and outdoor learning experiences that connect people to nature for balanced social and ecological outcomes.

The Friends Group will disseminate knowledge (e.g., lecture series by subject experts, final reports of science collaborative projects, emotional stories similar to TED talks recorded on video, docent led and interpreted tours of habitats) to enlighten the community in the purpose, value, and effectiveness of conservation activities.

The Friends Group will leverage the core of volunteers that it will be recruiting and training with the assistance of the Volunteer Liaison and subject matter experts.

Finally, the Friends Group will conduct cultural competency workshops and encounters to educate the reserve’s leadership and staff in how to accommodate different cultures in its quest for social diversity, equity, inclusion and environmental justice.

Community Engagement: Reduce Barriers to Access – The Friends Group will seek to mitigate the barriers that underserved segments of the population must surmount to take advantage of the reserve’s volunteer, education, and training opportunities to help the environment. Following are four planned initiatives the Friends Group will develop and pursue:

- Give residents of underserved communities free access to the reserve’s programs, projects, and recreational activities, in part supported by donor contributions.
- Partner with local transportation districts and provide grants for free transportation for underserved populations (students and adults). Government-supported bus transportation is available from the Estuary Transit District (ETD) and the Southeast Area Transit District (SEAT); they intersect in New London. The Estuary Transit District offers both fixed-route and Dial-a-Ride service; for specific occasions, it operates buses for municipalities. The Southeast Area Transit District is primarily a fixed-route service, although they may be able to provide some dedicated services.
- Support the development of education material that can be delivered either in-person or remotely, working with the Education Coordinator.
- Administer and fund scholarships and internships to encourage participation by underrepresented peoples in conservation science.

4.6 Plans That Support Programs and Their Management

4.6.1 Volunteer Plan

Volunteers can be the life's blood of an organization. For example, three of the benchmarked reserves benefit from between 14,000 and 18,000 hours of volunteered time per year. At a rate of \$15 per hour, this time represents a monetary contribution of between \$200,000 and \$300,000 annually. With support from the Friends Group, the proposed CT NERR expects to support a robust Volunteer Program with volunteers recruited from the reserve's adjacent communities with special attention to social diversity, equity, inclusion, and environmental justice. The Volunteer Program will be designed such that benefits are bi-directional; that is, the proposed CT NERR will benefit from the work and activities performed, and the volunteers will receive meaningful benefits and experience in an environmental management context.

The Education Coordinator will support the initiation and development of the Volunteer Program, expanding efforts and seeking additional funding in cooperation with the Friends Group to eventually support a full-time Volunteer Liaison (see *Section 4.2.8* for a summary of responsibilities). Until a Volunteer Liaison is hired, the Education Coordinator will take on the responsibilities of the Volunteer Liaison as part of their regular duties. During this initial phase of building the program, the development of volunteer activities must be carefully paced to not overwhelm the Education Coordinator; delivery of the core education programming must be the primary job of the Education Coordinator. The Research Coordinator and Stewardship Coordinator will interact with the Volunteer Program, supporting relevant subject-area volunteer opportunities.

4.6.1.1 Planning for Volunteers

In cooperation with the other reserve coordinators and the Friends Group, the Volunteer Liaison will develop job descriptions for each volunteer opportunity. Depending on matches between existing skills and assignments, the Volunteer Liaison will also arrange for training of the volunteers. Examples of volunteer activities range from light duty (e.g., office and administrative assistance, delivering enrichment classes) to medium duty (e.g., cleanup, monitoring ecosystem parameters, docent guiding) to heavy duty (e.g., participation in restoration, invasive species removal, other stewardship activities). Tasks vary in complexity.

4.6.1.2 Recruiting and Organizing Volunteers

The Volunteer Liaison will also be responsible for recruiting volunteers, in cooperation with the Friends Group, by outreach to community-based organizations (some of which maintain resumes of persons interested in volunteering); adult living communities; high schools and colleges; and environmental education, conservation, and outdoor recreation organizations. Younger school children may also be involved with some volunteer activities. Outreach may involve utilizing networks of contacts developed during the reserve's site selection and designation efforts as well as advertising in local publications. The

Volunteer Liaison will maintain a roster and skills matrix of available volunteers having the skills and experience needed by the reserve, paying special attention to recruit young professional and senior (recently retired) volunteers. The Volunteer Liaison will also champion environmental equity projects that seek to improve the experiences of underserved neighborhoods.

From benchmarking of other reserves and stakeholder experiences in the area, we think conservatively that 100 volunteers is an achievable goal to reach after the first five years, followed by an increase to 300 volunteers by the end of ten years. At a rate of 52 hours per volunteer per year (assuming 4-hour shifts per week for a 3-month or 13-week commitment), the time contributed by 100 volunteers is 5,200 hours per year; for 300 volunteers, that is 15,600 hours. At \$15 per hour, these contributions amount to \$78,000 per year by the first five years and \$234,000 per year after ten years.

4.6.1.3 Supervising, Evaluating, and Retaining Volunteers

Besides explicit skill requirements, volunteer’s job descriptions will contain clear performance measures and behavioral expectations. Supervision and evaluation will be carried out by the Liaison or their designee of the team or program to which the volunteer is assigned. If a volunteer needs to change assignments, correct their performance, or undergo more training, these activities will be arranged and supervised by the Volunteer Liaison. The Volunteer Liaison will also document the volunteer time.

An important aspect of a well-functioning and successful volunteer program is establishing the merit of the volunteer activities to the volunteers. While some people will volunteer for a personally-motivated reason, providing tangible benefits beyond the act of service can support a more robust program. Examples of tangible benefits include: discounts at local businesses (a form of partnership with the reserve), continuing education or school credits, lifetime learning certificate programs, NERR-branded merchandise, etc. The reserve staff should poll volunteers to ask what they are looking for in an opportunity and develop a program which supports those needs.

One aspect noted in almost all volunteer programs is the desire to connect—with the reserve staff, with others with similar interests, and with the broader world. Fostering opportunities for volunteers to connect with each other is a critical part of some volunteer experiences. The Liaison will also set the tone for a culture of volunteerism that recognizes the contributions of volunteers and fosters a network of lasting relationships between volunteers. This network will be a powerful volunteer retention mechanism, along with the practice of migrating volunteers between roles to broaden their experiences and to maintain their interest.

4.6.2 Communication Plan

4.6.2.1 Objectives and Target Audiences

In the first few years, the Communication Plan is intended to prime the public’s engagement with the proposed CT NERR with awareness and updates about the reserve’s context, needs, benefits, plans,

events, and success stories, as well as information about how the target audience can help the reserve with contributions of effort, money, and expertise.

The target audience for the proposed CT NERR covers a wide range of community affiliations and interests, including individuals, families, businesses, academics, educators, environmental and conservation organizations, charitable foundations, and municipal, state, and federal agencies. Included in this audience are underserved communities dealing with issues of environmental equity and limited access to the reserve's services.

4.6.2.2 Approach

The Reserve Manager will be responsible for oversight and management of all communications, including all internal and external communications. The Reserve Manager may contract out the development of the proposed CT NERR website and may delegate maintenance of the website to other reserve staff, volunteers, or paid consultants.

The Coordinators of each program will contribute content and may be responsible for updating sections of the website in addition to maintaining social media posts, blogs, and other forms of outreach to the community. All Coordinators may be called upon to develop content and designs for displays, signs, and kiosks. Proposed CT NERR staff will ensure required materials will comply with appropriate federal and state regulations and polices (e.g., section 508 compliance, etc.); these relate to accessibility of material to people with disabilities and should also consider translation of material into languages spoken by the community.

The Friend's Group will play a critical role in supporting the communications plan. The examples of duties represented above are the bare minimum in terms of communication; within the first five years of establishment, the reserve staff and the Friend's Group will work towards development of a robust and lively communication strategy supported by a Communications Specialist (see *Section 4.2.8* for a summary of responsibilities).

4.6.2.3 Key Messages, Tactics, and Costs

The Communication Plan has four principal messages:

- The reserve is real, and it will soon become a major force for good—with updated descriptions of its plans, benefits, and successes—for the natural and human environments of its communities.
- The reserve will create superior understanding of environmental issues; support protections for water quality, federally-designated ESA Critical Habitat (16 U.S.C. § 1532(5); 50 C.F.R. § 424.12), and endangered species; and work to mitigate the impacts of climate change, including sea level rise, on the southeast Connecticut shoreline and estuaries through research, monitoring, education, and outreach.

- The reserve will improve the estuarine literacy of the local communities with formal and informal education and training for youth and adults.
- In return, the reserve needs You! The proposed CT NERR's success requires substantial engagement of the people in its communities to help with financial contributions; volunteer activities for its administration, programs, and projects; and advocacy for both the reserve and public policy for conservation, including environmental equity.

Because of the diversity of the reserve's target audience, the Communication Specialist will employ a variety of media to be effective. The plan employs a multimedia approach that uses a website, blog, social media, direct mail, a newsletter, press releases, library and museum programs, meetings with community leaders and person-to-person interaction. A key dimension of the communications plan will be to advertise widely with chambers of commerce, the tourist and recreation industry, other business associations, environmental and conservation organizations, and the public. Means and outlets for communication include social media posts, website updates, blogs, brochures, mailings, and postings in periodicals (e.g., Estuary Magazine, Wracklines, etc.). A presence at events will inform the general public and recruit volunteers, including attendance at festivals, craft and art fairs, farmers markets, and kiosks at recreation sites. In the communications process, the Communication Specialist will seek and act upon community feedback, particularly hopes, values and concerns about the reserve. In many cases feedback will be solicited through person-to-person discussions and in-person gatherings.

Stakeholders working to establish the Friends Group have identified a willingness to actively participate in and support the communications plan and expect to fund the salary of the Communication Specialist.

4.6.2.4 Timeline and Evaluating Success

Reserve staff will coordinate with the Friends Group to start work on the Communication Plan immediately after the reserve officially opens. To fully implement this communications plan, the reserve is relying on a close association with the Friends Group to provide support for hiring a Communications Specialist. This plan targets a number of milestones to be achieved within the first two years (Table 4-1); the timeline may be adjusted as needed by the Reserve Manager working with the Friends Group and the Reserve Coordinators. Similar activities are expected to occur in years three through five, following the general plan outlined for year two; as with all aspects of this plan, adaptive management approaches will lead to modifications in the communications plan as time progresses.

The Communication Plan will be evaluated in three categories: achievement of intended results, that is, the impact of its four principal messages; efficacy of means for producing these results; and learning applied to strengthening the means.

Table 4-1: Communication Plan Timeline, First Two Years

Milestones are indicated by quarter (Q), where the quarter is indicated in the first column.

Time	Milestone
End 3Q-2022	census of target audience for communications
End 3Q-2022	website design completed and in service (outside contractor, e.g., Firespring, Zero Gravity)
End 4Q-2022	part-time Communication Coordinator hired
	emailing contact list (approximately 1,000 contacts) implemented (e.g., Constant Contact, Mail Chimp)
	social media platform in service (e.g., Facebook, Instagram, Snapchat)
	website's blog up and running with blogging team for developing content
End 1Q-2023	communications content and delivery planned for year (includes social media and four direct mailings)
	website evaluated and optimized
End 2Q-2023	visual art, messages and appeal content ready for incorporation in various media to support fundraising
	this year's communication plan launched
	target audience survey feedback collected and analyzed; remedial actions planned
End 1Q-2024	communication plan efficacy evaluated; root causes of shortfalls found and corrected
	current year's plan formulated and launched

4.7 Administrative Objectives and Actions

The three proposed CT NERR reserve-wide goals are presented in *Section 3.4*. The Administrative objectives support all three goals:

Goal 1: Increase our understanding of the effects of human activities and natural events through collaborative research and monitoring to improve informed decision making and support adaptive management of coastal ecosystems.

Goal 2: Strengthen stewardship, protection, and management of estuaries and their watersheds through place-based approaches to training and education in order to maintain and enhance natural environments.

Goal 3: Advance environmental appreciation and scientific literacy utilizing a place-based approach, to enhance people's ability to make science-based decisions that positively affect estuaries, watersheds, and coastal communities.

Table 4-2: Proposed CT NERR Administrative Objective 1, Including Strategies and Tasks

Objective A1.	
Establish the infrastructure, both physical and personnel, to support proposed CT NERR programs.	
Strategies	Tasks
S1. Recruit and hire core staff as soon as practical: Reserve Manager, Education Coordinator, Research Coordinator, Fiscal Officer.	<p>T1. Request establishment of a hiring committee from UConn.</p> <p>T2. Write and post job announcements, working with UConn Human Resources (HR). Ensure job descriptions have been assessed and corrected for language bias and that the hiring process actively incorporates recruitment of applicants with a broad range of diversity.</p> <p>T3. Working with HR, hiring committee reviews applicants, conducts initial interviews, recommends final slate of candidates for hiring.</p>
S2. Retrofit proposed CT NERR spaces, as needed.	<p>T1. Core team works with UConn Administration and UConn Facilities to retrofit spaces as necessary.</p> <p>T2. Develop signage to indicate the offices of the proposed CT NERR, including development of a logo.</p>
S3. Establish telecommunications.	<p>T1. Develop website and social media program.</p> <p>T2. Reserve Manager takes control of proposed CT NERR’s UConn Webex account (currently overseen by J. Vaudrey).</p> <p>T3. Secure phone lines and make the proposed CT NERR contact information available.</p>
S4. Support awards administration.	<p>T1. Undertake necessary training to support the proposed CT NERR as a Center at UConn.</p> <p>T2. Complete required reports for NOAA and UConn.</p> <p>T3. Develop and manage operations and grants budgets.</p> <p>T4. Support staff and engage in efforts to obtain external funds for programs, resources, and staff.</p> <p>T5. Track match, following UConn and NOAA requirements.</p>

<p>S5. Recruit and hire additional staff as soon as practical.</p>	<p>T1. Follow UConn policies for hiring within the proposed CT NERR Center. Ensure job descriptions have been assessed and corrected for language bias and that the hiring process actively incorporates recruitment of applicants with a broad range of diversity.</p>
<p>S6. Support staff in their roles within the proposed CT NERR.</p>	<p>T1. Maintain open lines of communication through regular group and individual meetings.</p> <p>T2. Working with the Coordinators, develop realistic performance measures for programs and track progress as well as address existing performance measures from Reserve System.</p> <p>T3. Develop metrics and track efforts to support social diversity, equity, inclusiveness, and environmental justice in reserve programs, access to the proposed CT NERR properties, and the proposed CT NERR as an organization.</p> <p>T4. Support the establishment of a volunteer program, working with Coordinators and the Friends Group to assess needs and opportunities.</p>

<p>S7. Coordinate with host organizations (UConn, Avery Point campus, Department of Marine Sciences, DEEP) to maintain facilities and vessels and keep staff certified and in compliance with all requirements.</p>	<p>T1. Work within existing structures to obtain facility maintenance support.</p> <p>T2. Follow UConn requirements for staff training required of all UConn staff and for the training and procedures relevant to operating a lab.</p> <p>T3. Coordinate with the Department of Marine Sciences' Marine and Waterfront Operations Manager to ensure all staff have the required certifications and trainings to operate vessels and engage in dive operations, as appropriate to each staff member's duties.</p> <p>T4. Any staff entering lab spaces (research or teaching) must undergo appropriate training, both from UConn Environmental Health and Safety and in-house orientations on lab-specific procedures.</p> <p>T5. If staff will be working with live animals, the Reserve Manager will insure all appropriate Institutional Animal Care and Use Committee (IACUC) applications, trainings, reports, and protocols are completed; the Reserve Manager may delegate this duty to the appropriate Coordinator.</p> <p>T6. The Reserve Manager will confirm with the appropriate Coordinator that all required permits for research, monitoring, or event hosting have been completed.</p> <p>T7. The Reserve Manager will ensure all staff (as required by UConn) undergo training and background checks that will allow them to work with minors.</p> <p>T8. The Reserve Manager will establish a method to track training compliance and permit applications and reports, utilizing UConn and DEEP tracking mechanisms when they are available.</p>
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Table 4-3: Proposed CT NERR Administrative Objective 2, Including Strategies and Tasks

Objective A2.	
Foster and maintain relationships with University of Connecticut, Connecticut Department of Energy and Environmental Protection, the Friends Group, the Reserve Advisory Committee, and other strategic partners to support the continued success of the proposed CT NERR.	
Strategies	Tasks
S1. Establish the Reserve Advisory Committee (RAC).	<p>T1. Reserve Manager and Coordinators develop a statement of duties for the RAC, executive structure and rules, term of appointment, number of meetings per year, and decide on the range for the target number of members on the RAC.</p> <p>T2. Develop a matrix for recruiting RAC members which includes categories on area of expertise, sector represented, and geographical representation. At least one position should be specifically reserved for leaders from underrepresented or underserved communities. Key organizations to have represented on the RAC are also noted in the matrix.</p> <p>T3. Utilize guidance in the <i>Management Plan</i> and consultation with the Designation Steering Committee and <i>Management Plan</i> Advisory Committee to identify the stakeholders to invite to the RAC, considering the need for diverse representation from the community and representing a wide array of expertise.</p> <p>T4. Vet potential invitees to the RAC and evaluate invitees in terms of the matrix identifying desired composition of the RAC.</p> <p>T5. Reserve Manager invites people to the RAC and provides information relevant to the responsibilities and roles of RAC members.</p> <p>T6. Provide training on board membership roles and responsibilities, cultural competency, implicit bias, and other topical issues related to ensuring diversity, equity, inclusivity and environmental justice throughout the CT NERR program.</p>

<p>S2. Support establishment of subject-area specific advisory groups.</p>	<p>T1. Establish the timeline for establishment of advisory groups and the terms of the advisory groups (short-term or longstanding advisory groups may be needed).</p> <p>T2. Clearly define the purpose of groups, roles and responsibilities of members, and desired outcomes.</p> <p>T3. Ensure that members of advisory groups represent a diverse cross-section of stakeholders while providing the technical expertise to achieve the desired outcome.</p> <p>T4. Include one or more advisory groups related to DEIJ issues specifically. Examples of group identifications could include: Broadening Participation Committee, Environmental Equity and Justice Advisory Group, Mentoring Committee, etc.</p> <p>T5. Provide training on advisory group membership roles and responsibilities, cultural competency, implicit bias, and other topical issues related to ensuring diversity, equity, inclusivity and environmental justice throughout the CT NERR program.</p>
<p>S3. Maintain close contact and coordination with the Friends Group.</p>	<p>T1. Establish a schedule of periodic meetings with the proposed CT NERR Friends Group.</p> <p>T2. Review priorities of the proposed CT NERR and the Friends Group at each meeting.</p>
<p>S4. Evaluate the need for additional meetings which are open to the public or target other groups and partners.</p>	<p>T1. Confirm a meeting schedule or method of updates to UConn.</p> <p>T2. Establish a relationship with UConn Government Relations Office, to support continued funding of the proposed CT NERR.</p> <p>T3. Establish a relationship with UConn’s Office of Diversity and Equity, to continue to address issues of social diversity, equity, inclusiveness, and environmental justice.</p> <p>T4. Actively seek the means to build relationships with indigenous peoples and local communities.</p> <p>T5. Continue to develop and expand the Communications Plan, working with the Friends Group.</p> <p>T6. Develop relationships with people and organizations identified through or that participated in the designation process.</p>

5 Resource Protection Plan

The resource protection plan is a required element of a reserve management plan, per 15 C.F.R. § 921.13. The general provisions provided by 15 C.F.R. § 921.1 state that reserves shall be open to the public to the extent allowed by state and federal law, and multiple uses are allowed to the degree that they are compatible with reserve purpose and use levels prescribed in the management plan. Additionally, the Reserve System regulations note that the management plan shall identify uses requiring a state permit, as well as areas where uses are encouraged or prohibited. (15 C.F.R. § 921.1(c).) Protecting the resources of the reserve serves as the foundation for all programmatic efforts and is central to the success of the reserve. It is important for reserves to protect the ecological unit representative of key lands and waters in each biogeographic region and to maintain it in the face of human and natural stressors that are continually increasing.

This resource protection plan provides a description of the authorities that protect the proposed CT NERR, allowable and unallowable uses per those authorities, uses requiring a permit, and the initial monitoring, surveillance, and enforcement strategies that will be employed to protect resources in the proposed CT NERR. The authorities detailed in the management plan are the existing authorities that are in place to protect the proposed CT NERR. Designating the proposed CT NERR does not add new regulations or restrictions on uses or activities within the proposed CT NERR. The currently existing regulations are enforced within the capabilities of the federal, state, and local enforcement authorities as assisted by a supportive community. Supporting those efforts and building close working relationships with enforcement entities and the community to help protect the resources will be essential to meet the protection goals and objectives of the proposed CT NERR.

5.1 Federal, State, and Local Management and Statutory Authorities

The information presented below summarizes relevant regulatory oversight that corresponds to the area and interests of the proposed CT NERR. It is not intended to serve to provide specific or comprehensive guidance. For additional information, please consult with the listed organization(s).

5.1.1 Federal Management and Statutory Authorities

NOAA Fisheries - National Marine Fisheries Service (NOAA NMFS):

- Regulates take of threatened and endangered species (CFR Title 50, Chapter II, Subchapter C, Part 222 – General Endangered and Threatened Marine Species): <https://www.ecfr.gov/cgi-bin/text-idx?SID=2916760137f149277cfb5acc440b6ac0&mc=true&node=pt50.10.222&rgn=div5>

- Regulates take of marine mammals. (CFR Title 50, Chapter II, Subchapter C, Part 216 - Marine Mammals): <https://www.ecfr.gov/cgi-bin/text-idx?SID=941fa8e1d0d4fe99b0e41f5efc46ce2b&mc=true&node=pt50.10.216&rgn=div5>

U.S. Fish and Wildlife Service (USFWS):

- Regulates take of federally threatened and endangered species (CFR Title 50, Chapter I, Subpart B, Part 17 – Endangered and Threatened Wildlife and Plants): https://www.ecfr.gov/cgi-bin/text-idx?SID=247d2168f4009d5bf34483957bba9896&mc=true&tpl=/ecfrbrowse/Title50/50cfr17_main_02.tpl
- Regulates the take of migratory birds (CFR Title 50, Chapter I, Subpart B, Part 21 – Migratory Bird Permits): <https://www.ecfr.gov/cgi-bin/retrieveECFR?gp=&SID=247d2168f4009d5bf34483957bba9896&mc=true&n=pt50.9.21&r=PART&ty=HTML>

U.S. Environmental Protection Agency (USEPA): governs the discharges into the waters of the United States through Section 404 of the Clean Water Act 33 U.S.C. § 1344): <https://www.epa.gov/cwa-404/overview-clean-water-act-section-404>. Section 404 is jointly implemented by USEPA and the U.S. Army Corps of Engineers (USACE) (see *U.S. Army Corps of Engineers (USACE)* section below).

- USEPA also shares permitting and enforcement authority with DEEP, who administer the Section 401 Water Quality Certification Program in Connecticut. (See *Section 5.1.2—State Management and Statutory Authorities.*)
- Pursuant to Section 312(f)(3) of the Federal Clean Water Act as amended, USEPA approved No Discharge Areas for all of Connecticut's coastal waters from the Rhode Island state boundary in the Pawcatuck River to the New York State Boundary in the Byram River and extending from shore out to the New York state boundary. In these waters, which include the proposed CT NERR, the discharge of any sewage from any vessel is prohibited. <https://www.epa.gov/vessels-marinas-and-ports/vessel-sewage-discharges-statutes-regulations-and-related-laws-and>.

U.S. Army Corps of Engineers (USACE): Regulates impacts to wetlands, navigable waterways, discharge of fill material into waterbodies and wetlands.

- Section 10 of the Rivers and Harbors Act of 1899 - requires approval prior to the accomplishment of any work in, over, or under navigable waters of the United States, or which affects the course, location, condition, or capacity of such waters: <https://www.epa.gov/cwa-404/section-10-rivers-and-harbors-appropriation-act-1899>

The USACE also serves as the federal coordinator for aquaculture and solicits a review and comments on the application from all other pertinent federal agencies (e.g. USEPA, USFWS, NOAA). These agencies review applications with respect to their regulatory authorities. In this role the USACE works in coordination with the Connecticut Department of Agriculture Bureau of Aquaculture (DA/BA) and DEEP Coastal Zone Management to review and authorize the placement of aquaculture gear or structures.

U.S. Coast Guard (USCG): The U.S. Coast Guard authorizes certain marine events within Sector Long Island Sound Captain of the Port (COTP) Zone, outlined in 33 CFR 3.05-35: <https://www.govinfo.gov/app/details/CFR-2013-title33-vol1/CFR-2013-title33-vol1-sec3-05-35>

5.1.2 State Management and Statutory Authorities

Public Trust Doctrine: Under the common law public trust doctrine, coastal states as sovereigns hold the submerged lands and waters waterward of the mean high-water line in trust for the public. In addition to ownership, the public trust doctrine provides that, subject to applicable regulations and permits, the general public may freely use these lands and waters for traditional public trust uses such as fishing, shellfishing, boating, sunbathing, or simply walking along the beach. <https://portal.ct.gov/DEEP/Coastal-Resources/Public-Trust-Fact-Sheet>

Connecticut Siting Council (CSC): Regulates the siting of land-based and offshore infrastructure facilities, including electric power facilities and transmission lines, hazardous waste facilities, and telecommunications towers and other technology via Connecticut General Statutes (C.G.S.) § 16-50k. https://www.cga.ct.gov/current/pub/chap_277a.htm#sec_16-50k

Connecticut Department of Agriculture Bureau of Aquaculture (DA/BA): The DA/BA is the lead state agency for aquaculture development in Connecticut, and the director serve as the state aquaculture coordinator. This role is the liaison for all aquaculture activity and interacts with other local state and federal regulatory authorities that involve authorization of the use of space and the placement of aquaculture gear or structures.

- The DA/BA has exclusive State authority for granting or denying aquaculture permits pursuant to C.G.S. § 22-11h. https://www.cga.ct.gov/current/pub/chap_422.htm#sec_22-11h
- The DA/BA licenses aquaculture producers of seaweed through C.G.S. § 22-11j. https://www.cga.ct.gov/current/pub/chap_422.htm#sec_22-11j
- The C.G.S. § 26-194 contains the authority for DA/BA Shellfish Leasing Program and establishes procedures and regulations for leasing. https://www.cga.ct.gov/CURRENT/PUB/chap_491.htm#sec_26-194

Connecticut Department of Energy and Environmental Protection (DEEP): exercises its authority in the following ways:

- *Emergency Authorizations:* DEEP may issue an emergency authorization for an activity regulated under several specified programs pursuant to C.G.S. § 22a-6k. https://www.cga.ct.gov/current/pub/chap_439.htm#sec_22a-6k. Additionally, C.G.S. § 22a-363d (https://www.cga.ct.gov/current/pub/chap_446i.htm#sec_22a-363d) grants emergency authority for activities regulated by the Structures, Dredging, and Fill Statutes (C.G.S. §§ 22a-359 to 22a-363f, inclusive) https://www.cga.ct.gov/current/pub/chap_446i.htm#sec_22a-359.

- *Temporary Authorizations*: DEEP may issue a temporary authorization for any activity for which the Commissioner has authority to issue a general permit, pursuant to C.G.S. § 22a-6k(b) https://www.cga.ct.gov/current/pub/chap_439.htm#sec_22a-6k. This includes coastal general permits under C.G.S. § 22a-361 https://www.cga.ct.gov/current/pub/chap_446i.htm#sec_22a-361.
- *Coastal Zone Management (CZM)*: DEEP regulates virtually all activities within the tidal, coastal or navigable waters of Connecticut through the state CZM coastal permitting program:
 - Structures, Dredging and Fill Statutes (C.G.S. §§ 22a-359 to 22a-363f, inclusive). https://www.cga.ct.gov/current/pub/chap_446i.htm#sec_22a-359
 - Tidal Wetlands Act (C.G.S. §§ 22a-28 to 22a-35, inclusive). https://www.cga.ct.gov/current/pub/chap_440.htm
 - Connecticut Coastal Management Act (C.G.S. §§ 22a-90 to 22a-112, inclusive), pursuant to C.G.S. § 22a-98. https://www.cga.ct.gov/current/pub/chap_444.htm
- *Wastewater Discharge Permitting*: DEEP regulates discharges to state waters pursuant to:
 - C.G.S. §§ 22a-416 through 22a-438, inclusive. https://www.cga.ct.gov/current/pub/chap_446k.htm
 - R.C.S.A. §§ 22a-430-1 through 22a-430-7, inclusive. https://eregulations.ct.gov/eRegsPortal/Browse/R.C.S.A./Title_22aSubtitle_22a-430
- *Dredged material and dewatering effluent*: DEEP regulates the placement of dredged material (which may be part of beneficial reuse efforts for potential restoration efforts) and associated dewatering measures in accordance with federal, state, and local requirements, including:
 - Water Pollution Control: C.G.S. §§ 22a-416 through 22a-527 (inclusive). https://www.cga.ct.gov/current/pub/chap_446k.htm
 - Hazardous Waste: C.G.S. §§ 22a-114 through 22a-134s (inclusive). https://www.cga.ct.gov/current/pub/chap_445.htm
 - Solid Waste: C.G.S. §§ 22a-207 through 22a-256ee (inclusive). https://www.cga.ct.gov/current/pub/chap_446d.htm

Although there are no approved locations to accept the placement of dredged material in an aquatic setting within the proposed CT NERR, the upland placement of appropriate material that may be part of reviewed and approved beneficial reuse efforts for potential habitat restoration could include upland properties.

- *401 Water Quality Certificates*: Section 401 of the Clean Water Act (CWA 33 U.S.C. § 1314) regulates any applicant for a federal license or permit seeking to conduct an activity that may result in any discharge into the navigable waters, including all wetlands, watercourses, and

natural and man-made ponds. <https://www.epa.gov/cwa-401/statutory-and-regulatory-requirements-cwa-section-401-certification>. Applicants must obtain certification from DEEP that the discharge is consistent with the Federal Clean Water Act and the Connecticut Water Quality Standards. <https://portal.ct.gov/DEEP/Water/Water-Quality/Water-Quality-Standards-and-Classification>.

- *State Endangered Species Act*: C.G.S. §§ 26-303 through 26-316 (inclusive) provides the statutory authority for DEEP to conserve, protect, restore, and enhance any endangered or threatened species and essential habitat. https://www.cga.ct.gov/current/pub/chap_495.htm
- *Scientific Collectors Permit*: C.G.S. § 26-60 establishes that DEEP may grant a permit to collect wildlife for scientific and educational purposes only. Additionally, a permit may be granted to collect plants from state lands for scientific and educational purposes only. https://www.cga.ct.gov/current/pub/chap_490.htm#sec_26-60
- *Boating*: The DEEP Boating division regulates boating and boating safety under the following subtitles of R.C.S.A. Title 15 https://eregulations.ct.gov/eRegsPortal/Browse/R.C.S.A./Title_15/
 - §§ 15-121-A1 to 15-121-D2c
 - § 15-133b-1
 - § 15-133c-1
 - §§ 15-140e-1 to 15-140e-4
 - §§ 15-140f-1 to 15-140f-5
 - §§ 15-140j-1 to 15-140j-3
 - § 15-140v-1
- *Fisheries and Game*: DEEP regulates activities related to fisheries and game in the areas of the CT NERR according to the following subtitles of R.C.S.A. Title 26 https://eregulations.ct.gov/eRegsPortal/Browse/R.C.S.A./Title_26/
 - §§ 26-16-1 to 26-16-3a: Public Use of State Facilities and Waters
 - § 26-40d-1: Taking, transfer and possession of threatened or endangered fish species
 - §§ 26-48a-3 to 26-48a-4: Hunting and Trapping (migratory birds, trout, salmon)
 - §§ 26-66-1 to 26-66-15: Hunting and Trapping
 - § 26-108-1: Inland waters and Marine districts
 - §§ 26-112-1 to 26-112-48: Sport fishing in the inland districts
 - § 26-114-1: Prohibited Acts (Fishing)

- §§ 26-142a-1- to 26-142a-16: Commercial Fishing in the Inland and Marine Districts
- §§ 26-157c-1 to 26-157c-4: Taking of Lobsters
- §§ 26-157c-1 to 26-157c-426-159a-1 to 26-159a-29: Sport Fishing in the Marine District
- §§ 26-157c-1 to 26-157c-426-306-1 to 26-306-7: Endangered and Threatened Species, and Species of Special Concern
- *State Parks*: DEEP regulates State Parks pursuant to R.C.S.A. § 23-4-1
https://eregulations.ct.gov/eRegsPortal/Browse/R.C.S.A.?id=Title_23Subtitle_23-4Section_23-4-1&content=parks/
- *Natural Area Preserves*: DEEP regulates NAPs pursuant to R.C.S.A. § 23-5c-1
https://eregulations.ct.gov/eRegsPortal/Browse/R.C.S.A.?id=Title_23Subtitle_23-5cSection_23-5c-1&content=natural%20area%20preserve/
- *Environmental Conservation (EnCon) Police*: DEEP oversees its own internal policing unit whose duties include:
 - Enforcing state fish and game laws and regulations.
 - Patrolling all waters within the state and Long Island Sound and enforcing state boating laws and regulations. Officers also investigate boating accidents that occur on Connecticut waters.
 - Enforcing state laws and regulations pertaining to the commercial harvesting of fish and shellfish. As Deputy Special Agents of NOAA Fisheries, they may also enforce Federal Codes concerning the commercial harvesting of marine fish and shellfish.
 - Serving as the primary police agency within State Parks and forests.

EnCon Officers are not limited to state lands and waters; they also assist and act as back up for state and municipal police and are the primary response units to assist the United States Coast Guard.

Department of Economic and Community Development - State Historic Preservation Office (SHPO):

- R.C.S.A. § 10-384 address State Archaeological Preserves.
https://eregulations.ct.gov/eRegsPortal/Browse/R.C.S.A./Title_10Subtitle_10-384_HTML/
- Pursuant to R.C.S.A. § 10-386
[\(https://eregulations.ct.gov/eRegsPortal/Browse/R.C.S.A./Title_10Subtitle_10-386/\)](https://eregulations.ct.gov/eRegsPortal/Browse/R.C.S.A./Title_10Subtitle_10-386/), no person may conduct an archaeological investigation on state lands or on a State Archaeological Preserve without a permit from SHPO. Further, if the proposed investigation includes ground disturbing activities on property managed by DEEP, the applicant must obtain a Special Use Permit from the DEEP Land Acquisition and Management Unit. <https://portal.ct.gov/DEEP/State-Parks/Special-Use-License>

Department of Emergency Services and Public Protection - Connecticut State Police (CSP): Incorporated as a division within the Department of Emergency Services and Public Protection (DESPP), the CSP provides major crime, emergency services, cause and origin investigations, and traffic and truck enforcement to the entire state. Two of the 11 CSP Troops (Troops F and Troop G) provide law enforcement services to communities containing and bordering the proposed CT NERR.

State or local planning efforts: It is important to note that there are numerous examples of planning documents that may have a connection to the proposed CT NERR, either in geographic overlap or in topical intent (such as ensuring land and wildlife protection, habitat diversity, promoting access, guiding open space acquisition, etc.) Examples include in-progress plans for NAPs, the Connecticut Wildlife and Forest Action Plans, the Connecticut Green Plan. However, since these do not replace statutory or regulatory authority, nor do they address the activities identified within Chapter 9: Resource Manipulation – which fundamentally apply to offshore areas of the Reserve - they are a required component of this chapter. A plan that does bear including is the Long Island Sound Blue Plan. C.G.S. § 25-157t called for a marine spatial plan to help guide potential future uses of Long Island Sound's waters and submerged lands (e.g., infrastructure related efforts, aquaculture, etc.) in Connecticut state waters seaward of the 10 feet depth contour relative to the North American Vertical Datum of 1988 (NAVD88). The primary purpose of the Blue Plan is to better enable regulatory authorities and those with an interest in possible projects to employ a transparent, science-based decision-making process that preserves Long Island Sound's ecosystems and resources and protects traditional uses, while maximizing their compatibility and minimizing. Approved in May of 2021, the policies are enforceable pursuant to C.G.S. § 25-157t(h) and shall be considered in the review of applications under the applicable regulatory programs for DEEP, Connecticut Siting Council, DA/BA, and municipal shellfish commissions. https://www.cga.ct.gov/current/pub/chap_483.htm#sec_25-157t
<https://portal.ct.gov/DEEP/Coastal-Resources/LIS-Blue-Plan/Long-Island-Sound-Blue-Plan-Home>.

5.1.3 Local Management and Statutory Authorities

Municipal Shellfish Commissions: Pursuant to C.G.S. § 26-257a, municipal shellfish commissions manage shellfish resources, shellfisheries and aquaculture in town waters. Although they do not have legal authority to directly permit aquaculture structures, they play a role in the review process for potential social and use conflicts, as well as potential effects on protected habitats and/or species caused by aquaculture activity. They also provide authorization to use space within their municipal waters through leases or license co-management. https://www.cga.ct.gov/current/pub/chap_492.htm#sec_26-257a

Harbor Management Commissions/Harbor Masters: Pursuant to C.G.S. §§ 22a-113k through 22a-113t (inclusive), municipal harbor management commissions manage and monitor local developments that affect navigation and maritime uses, although they do not have direct regulatory authority. In municipalities with approved harbor management plans, the state-appointed Harbor Masters supervise the allocation of moorings, respond to abandoned vessels, and carry out their other duties in accordance with the harbor management plan. https://www.cga.ct.gov/current/pub/chap_444a.htm

Local Police: The communities that contain upland properties of the proposed CT NERR, the Town of Old Lyme and the Town of Groton (which also includes the subdivision of the City of Groton), have local police departments that provide law enforcement and emergency services. The Town of Lyme does not have its own local police force but relies on support from the Connecticut State Police. While there are other communities that border offshore areas of the Reserve, these units are the primary means of law enforcement.

5.2 Allowable and Unallowable Uses

This section describes, by major land or water component, the current allowable and unallowable uses in the proposed CT NERR. The allowable or unallowable uses are identified based on the existing specific rules and regulations of federal, state, and local regulatory agencies, including whether permits or licenses are required for the land use or activity. Designating the proposed CT NERR does not add new regulations on uses or activities within the boundaries. However, it is possible that certain future activities may be proposed which may conflict with the purpose of the proposed CT NERR and its programs. Should that occur, the reserve may seek to limit or prevent such activities through any existing rules, regulations, or policies afforded to any other similarly affected party. Current and future uses will be discussed and evaluated as the different proposed CT NERR programs develop and priorities are identified for implementing actions compatible with the proposed CT NERR program and the intent of this management plan. Updated descriptions of compatible uses will be incorporated into future iterations of the management plan.

Natural Area Preserves (NAP): NAPs are areas designated under C.G.S. § 23-5a-5i. The proposed CT NERR contains three NAPs: Lord Cove NAP (formerly Lord Cove Wildlife Management Area) and Roger Tory Peterson NAP (formerly Great Island Wildlife Management Area) in the lower Connecticut River and the NAP component of the Bluff Point property in Groton (which also shares the designation of Coastal Reserve and State Park). The current regulations on management of NAPs are in R.C.S.A. § 23-5c-1. Use of NAPs is allowed only to the extent that it will not permanently degrade the protected resources and is subject to the terms of the management plan. Approved trails, if any, are for pedestrian traffic only (no ATVs, bikes, or vehicles). Except at Bluff Point NAP, public hunting for waterfowl is allowed. The regulations state that management plans for NAPs shall be developed. At the time of the proposed CT NERR *Final Management Plan*, management plans for Lord Cove, Roger Tory Peterson, and Bluff Point NAPs are in various stages of the drafting and review processes. Under R.C.S.A. § 23-5c-1(6), if no plan is in place, then allowable existing activities that do not degrade the resource within a preserve shall continue unless the DEEP Commissioner finds that an activity is adversely affecting protected resources. Deleterious or illegal activities are not permitted. The wetland habitats on these properties are managed through the maintenance of water control structures, invasive plant control, pothole creation in marshes, open water marsh management, and the installation of nest structures. Routine maintenance responsibilities can include boundary and sign posting and the repair and maintenance of parking lots, gates, interior road systems, and wildlife viewing areas. DEEP Wildlife Division is the principal management entity for Lord Cove, Roger Tory Peterson and Bluff Point NAPs.

Wildlife Management Areas (WMA): Connecticut's wildlife resources are managed to maintain stable, healthy populations of wildlife, including endangered and threatened species, in numbers compatible with both habitats, carrying capacity, and existing land use practices. To support a diversity of wildlife, habitats are managed in state forests and WMAs. Wildlife Management Areas are areas of land and water having unique or outstanding wildlife qualities that are managed primarily for the conservation and enhancement of fish and wildlife and to provide opportunities for fish- and wildlife-based recreation. The current regulations on the use of WMAs are in the R.C.S.A. § 26-16-3a, and sources of funding may also play a factor in acceptable uses. While no WMAs are included in the proposed CT NERR, a number of WMAs are mentioned in *Section 8.17.1* as possibilities for future land acquisition. DEEP Wildlife Division is the principal management entity for WMAs.

DEEP Marine District Headquarters: Located at 333 Ferry Road in Old Lyme, DEEP Marine District Headquarters supports DEEP staff from the Engineering and Field Support Services Division, Boating, Marine Fisheries, and Marine District Environmental Conservation units within DEEP. The property includes a pedestrian boardwalk with informational signage and an observation platform accessible to the public for wildlife observation. Other allowable activities include fishing and crabbing. DEEP Engineering and Field Support Services Division is responsible for the operation and maintenance of this facility.

UConn Avery Point Campus: The outdoor areas of the Avery Point Campus are open for public access and visitation by the general public. Common areas of buildings are open to receive members of the public engaged in university programming, events, classes, and general business; however, certain laboratory and office spaces are restricted, with authorization required for entry.

Pine Island: Pine Island is accessible for general use per UConn policy. This island is a State Archaeological Preserve; pursuant to R.C.S.A. § 10-384-4 "No person without a permit shall excavate, damage or otherwise alter or deface the archaeological integrity or sacred importance of a designated state archaeological preserve. Activities which continue existing uses and do not involve further ground disturbance are not deemed to destroy, alter, disturb or impair such sites." Public hunting is not allowed on Pine Island.

Connecticut State Parks: A complete list of regulations governing activities at Haley Farm State Park and Bluff Point State Park are found in R.C.S.A. §§ 23-4-1 through 23-4-35 (inclusive). DEEP State Parks Division is the principal managing entity for Bluff Point and Haley Farm.

Bluff Point State Park, Bluff Point Coastal Reserve: Bluff Point was designated a "Coastal Reserve" by a special act of the Connecticut legislature in 1975 to establish the area "for the purpose of preserving its native ecological associations, unique faunal and floral characteristics, geological features and scenic qualities in a condition of undisturbed integrity." Activities currently allowed include hiking, mountain biking, saltwater fishing, and shellfishing (which requires a permit from the Town of Groton). A car top / carry-in boat launch is also available and handicap parking is available. Pets are permitted year-round, but dogs and horses are not allowed on the beach from April 1 to September 1. Because of its Coastal Reserve designation, access to the bluff at the southern end is by foot or non-motorized vehicle only (DEEP 2021a). Because of its designation as a Coastal Reserve, R.C.S.A. § 23-4-4 deals specifically with

Bluff Point. R.C.S.A. §§ 23-4-1 through 23-4-3 and R.C.S.A. § 23-4-5 (inclusive), to the extent they do not conflict with R.C.S.A. § 23-4-4, shall also be applicable to the Bluff Point Coastal Reserve. (Note: Uses of the Bluff Point NAP unit are described in the section above titled “*Connecticut Natural Area Preserves*”.)

Because of the isolation of the Bluff Point peninsula white-tailed deer populations were a problem in the past. Their numbers became so great that vegetation was heavily impacted, and starvation of deer became common. By 1995, DEP determined to reduce the population and a series of controlled hunts were used to reduce the herd to the estimated carrying capacity of the area. A public hunt in 1996 and DEEP deer removal efforts after 1996 have successfully reduced the overabundant deer population from 222 deer per square mile to 20 deer per square mile between 1996 and 2001. No action was implemented in January 2002 or 2003. In January 2004, the deer management plan was modified to incorporate a new authority (C.G.S. § 26-3) to increase the efficiency of deer removal activities at Bluff Point. Currently, deer are removed at night by DEEP staff to maintain the deer herd at 20 deer per square mile. Beyond current deer removal efforts by DEEP staff, no hunting is allowed in the Bluff Point complex.

Haley Farm State Park: The Park has been preserved as open space and is used for passive recreational purposes. A series of trails are found in the Park, including a 0.8-mile broad trail which winds its way through the scenic old shoreline farm and supports both biking and hiking / jogging. The nearby Bluff Point complex can be reached from Haley Farm State Park via a bridge over the railroad tracks that separates the two properties. Handicap access to both parking and trails are supported and leashed pets are allowed (DEEP 2021h). Public hunting is not allowed in Haley Farm State Park, nor is camping.

Habitat Restoration activities in any upland areas (including within tidal wetlands) are allowable with the review and approval from DEEP LWRD and the USACE.

State Waters and Submerged Lands: Given the substantial offshore area of the proposed CT NERR, it is not surprising to find there are numerous and overlapping uses. Uses which generally fall within the categories of nearshore construction / structures, dredging, and utility infrastructure - while allowable with proper review and licensing - are covered in the Resource Manipulation Plan (*Chapter 9*) and occur outside of core areas within designated buffers of the proposed CT NERR. (Refer to *Section 2.1.4* for a description of core and buffer areas.)

Uses that are not allowed in CT regardless of NERR designation as core or buffer area include any activities that do not receive required authorization or approval through the appropriate federal, state, or local statutes or regulations; or violate federal, state, or local laws. Sewage discharges from vessels into the coastal waters of Connecticut (which include the boundaries of the proposed CT NERR) are also not allowed.

Other allowable uses, which may occur in both core and buffer areas are described below.

Commercial and Recreational Vessel Use: As shown in Figure 5-1, high density vessel transit corridors (areas where vessel transit counts are greater than the average for all Long Island Sound based on analyses of 2017 Vessel Automated Information System (AIS) data (Fontenault 2018)) emanate from the

Connecticut River and Thames River areas. The Connecticut River corridor is typically characterized by recreational vessels. The Thames River corridor supports both recreational and commercial traffic including regular ferries to several ports in both New York and Rhode Island, Coast Guard vessels from the New London Coast Guard Station, and vessels moving to and from the Naval Submarine Base New London, located just north of, but outside the proposed boundaries. A smaller transit corridor primarily supporting recreational boating and commercial fishing boats also intersects the far eastern side of the site originating from the Mystic River in neighboring Stonington.

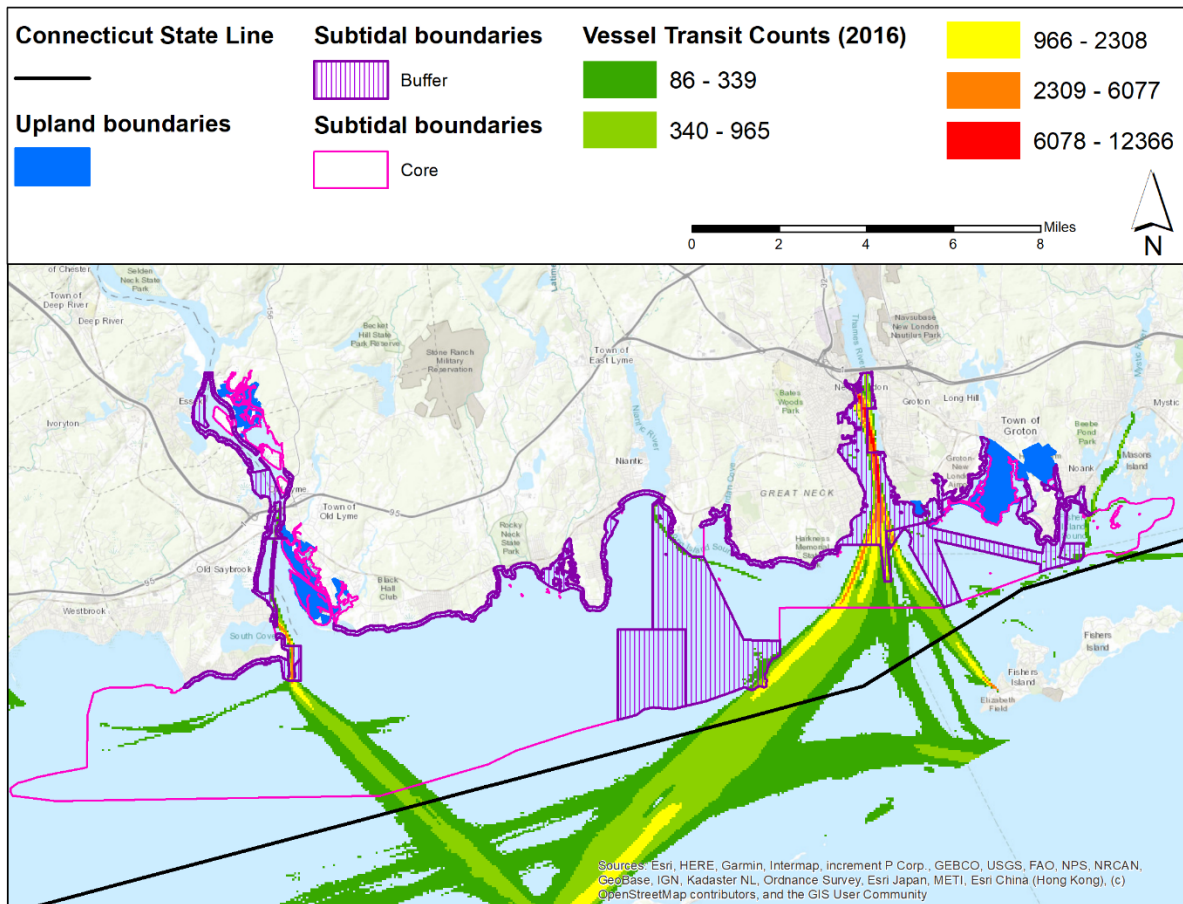


Figure 5-1: Offshore uses - Vessel Density

A depiction of areas high density vessel traffic within the offshore boundary of the proposed CT NERR using data from the Long Island Sound Blue Plan (DEEP 2019b).

In addition to these more well-travelled routes, the entire off-shore boundary is within an area of eastern Long Island Sound and Fishers Island Sound significant for general recreational boating interests (Longley 2013). These interests (see Figure 5-2) represent both ad-hoc use areas as well as dedicated areas and lanes for organized boat / yacht races (Longley-Wood 2015).

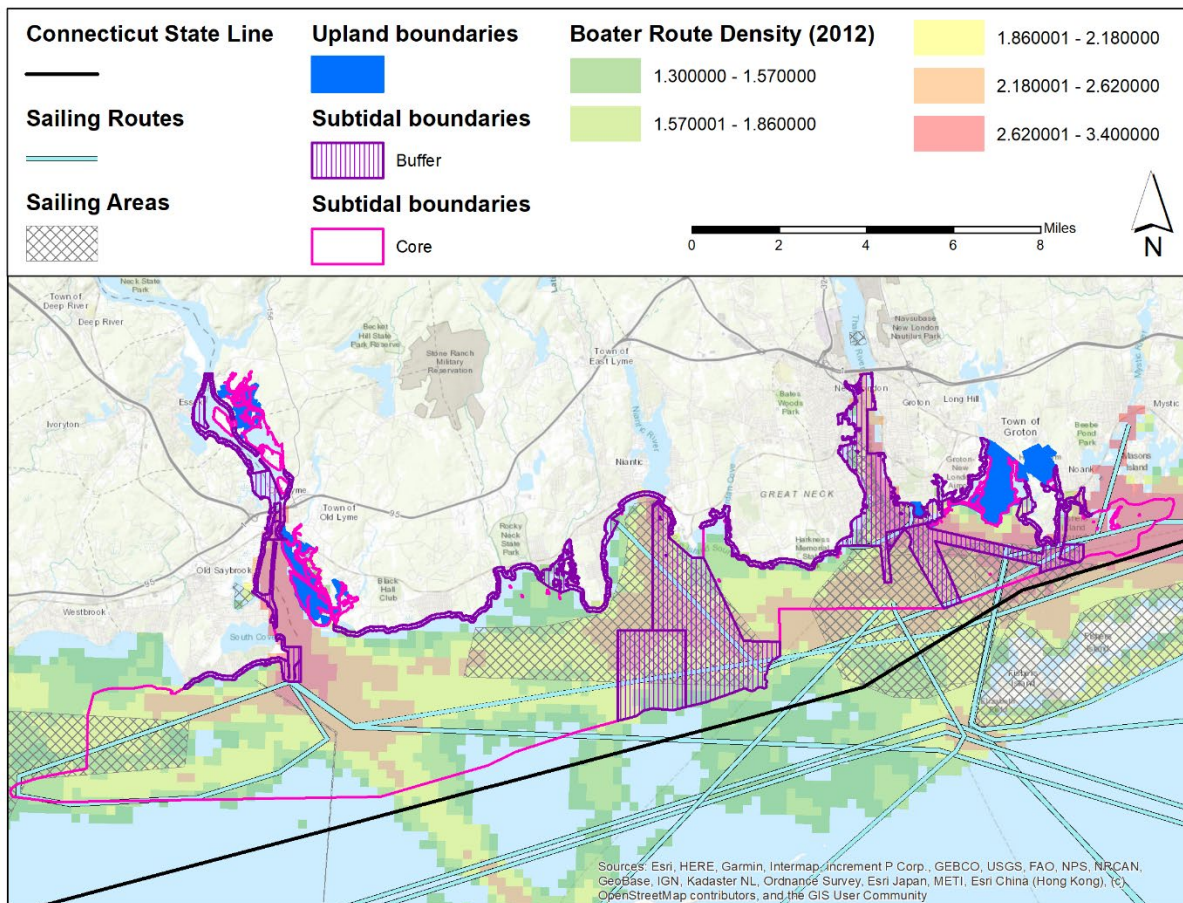


Figure 5-2: Offshore Areas - Boating

A depiction of areas with general boating and sailing race interests within the offshore boundary of the proposed CT NERR using data from the Long Island Sound Blue Plan (DEEP 2019b).

Commercial and Recreational Fishing: Fisheries—recreational, commercial, and aquaculture—are important historic uses within the offshore area of the proposed CT NERR which should remain active.

Like recreational boating activity, the interests of recreational fishing are extensive and can be considered to span the entire offshore area (Figure 5-3). The most popular target fish species for Connecticut’s recreational fishers are striped bass (*Morone saxatilis*), scup (*Stenotomus chrysops*), bluefin tuna (*Thunnus thynnus*), summer flounder (*Paralichthys dentatus*), and tautog (*Tautoga onitis*); black sea bass (*Centropristis striata*) were not available on the list of species included in the 2012 Recreational Boater survey that explored aspects of recreational fishing, but are also a likely target species (Starbuck et al. 2012).

Recreational shellfishing in approved areas and following established guidelines for daily limits and manual harvesting is a traditional activity that many residents engage in, supporting personal and family consumption.

Commercial fishing encompasses two broad types of fishing activity: (1) that which occurs in Long Island Sound and Fishers Island Sound, harvesting the resources of The Sounds, and (2) that which has a home-base in Long Island Sound and Fishers Island Sound, but vessels leave The Sounds to harvest resources elsewhere.

During the creation of the Long Island Sound Blue Plan, Blue Plan authors analyzed the NOAA Fisheries landing data coupled with the fishing effort served through the Northeast Ocean Data Portal based on the Automatic Identification System (AIS), arriving at the conclusion that commercial fishing from these larger vessels with AIS transponders was a minor impact in Long Island Sound. While it is known that commercial fishing vessels currently transit through eastern Long Island Sound on their way to and from port, there appears to be little to no commercial fishing from these vessels within Long Island Sound (Long Island Sound Inventory and Science Subcommittee of the Blue Plan Advisory Committee 2019).

While ships which carry AIS transponders may not be actively fishing in Long Island Sound, a local fleet which are not required to use the AIS system are active in Long Island Sound and Fishers Island Sound. Commercial fisheries active locally include twelve species of fish and crab. In 2016, the date of the last NOAA Fisheries Economics Report, Connecticut posted \$387 million in sales from the seafood industry, \$83 million in income, and \$137 million in value added (NOAA Fisheries 2018). In contrast, Connecticut's recreational fishing industry posted \$430 million in sales, \$186 million in income, and \$292 million in values added (from the same report). Key species for commercial fishing in Connecticut in descending order of economic revenue in 2016 included sea scallop, squid, American lobster, whelks and conch, silver hake, summer flounder, scup, goosefish, other flounder, and red hake.

*Aquaculture*⁷: Shellfish aquaculture (typically, eastern oysters and northern quahog) is a longstanding and central component of the economy, culture, and ecosystems of Long Island Sound and Fishers Island Sound (Figure 5-3). Evidence suggests that shellfish harvesting is a pre-colonial activity and records exist for oyster farms dating to the early half of the 19th century. Since 2007, oyster harvest in Connecticut has ranged from approximately 133,000 to approximately 351,000 bags per year with an annual economic value of just under eighteen million dollars. In contrast, Long Island Sound and Fishers Island Sound seaweed farming (sugar kelp and other species) is a relatively new but growing sector. Taken together, commercial shellfish aquaculture (all locally harvested species) and commercial seaweed aquaculture represent a multi-million-dollar segment of the local economy that employs hundreds of individuals. Beyond the economic and cultural importance, shellfish and kelp provide benthic habitat structures that support diverse communities of organisms and filter pollutants and sediments, improving water quality (Long Island Sound Inventory and Science Subcommittee of the Blue Plan Advisory Committee 2019).

⁷ There are sometimes questions on whether aquaculture in general is considered a resource manipulation or would constitute a use which may (or may not) be allowable in core areas depending on the nature of the activity and the means of state control. After discussions with Reserve System leadership and local aquaculture experts from DA/BA and Connecticut Sea Grant regarding the type of aquaculture conducted in Connecticut, relative to other examples within other NERRs, shellfish and seaweed aquaculture in Connecticut's designated lease or gear areas is best addressed in this plan as an allowable use.

Commercial aquaculture activities follow two primary types, those using bottom culture (molluscan shellfish only) and those using gear or facility use. Bottom culture involves hand, tong or mechanical cultivation and harvest (i.e., use of a shellfish dredge) of shellfish, and may include planting of cultch, transplanting, and culling. Aquaculture gear and land-based facilities are used for the propagation of molluscan shellfish and seaweed. Gear includes bags, cages, long lines, predator nets, and upwellers. Land-based facilities include hatcheries and research laboratories.

Connecticut's traditional oyster culture method involves harvesting small seed oysters from natural beds and then planting those shellfish on private cultivation beds called leases or license areas. From time to time, the oysters are culled and sorted by size and then replanted before they are finally harvested by dredge when they approach three inches (the state legal minimum harvest size). As with any farming activity, the practice involves occasional sea floor disturbance, but local studies conducted by NOAA's Milford Aquaculture Laboratory have demonstrated that the disturbance resulting from this activity is short-term and returns to baseline within weeks (Goldberg et al. 2014; Mercaldo-Allen et al. 2017; Meseck et al. 2014). It is important to note that harvest does not involve stripping the bottom. Farmers collect only harvest size product, and replant both shell and undersized shellfish. Also, they do not harvest intertidal and shallow subtidal areas as those are inaccessible with their work vessels. The unharvested shellfish naturally reproduce and recruit to intertidal and shallow subtidal areas that and therefore continue to build habitat in adjacent areas. Within the area of the proposed CT NERR, the primary gear type used are depuration cages which are deployed for short time periods (typically, two to four weeks). These cages are deployed from a boat and marked with a buoy; they are not deployed in a fixed location, but returned to randomly chosen locations within the lease

Shellfish and seaweed aquaculture activities are actively managed at both the state and local levels to ensure the economic benefits do not outweigh any ecological impacts. In 1881, a line was established, (the Commissioner's Line), that divides the waters of the state into northern and southern sections. All beds south of this line are state beds and most beds north of this line are town beds (Figure 5-3).

The DA/BA controls all licensing and regulations north and south of the Commissioner's line. Their responsibilities include leasing submerged state lands to shellfish producers, classifying shellfishing waters, monitoring water quality, identifying sources of pollution and seeking corrective actions, and the licensing of all commercial shellfish operations and research or educational activities (Figure 5-3). The DA/BA has exclusive state authority for granting or denying aquaculture permits pursuant to C.G.S. § 22-11h, except for matters concerning discharges from marine aquaculture operations, water diversions, and placement of floating or submerged aquaculture structures in coastal waters that require other coastal permits. Aquaculture-related water discharges and in-water structures are regulated cooperatively at the State and federal levels with DEEP LWRD and the USACE New England District. The DA/BA is also authorized to grant licenses for seaweed production, although any in-water structures such as long-lines, buoys, platforms, etc., also require the appropriate authorizations from the DEEP LWRD coastal permitting program (DEEP 2019b).

Connecticut's municipal shellfish commissions are responsible for managing shellfish resources, shellfisheries and aquaculture in town waters which lie landward of the Commissioners Line. Town beds are leased, owned, or managed through the local shellfish commission. If projects are proposed in

municipal waters, the local shellfish commission is consulted. Each shellfish commission is required to develop a comprehensive management plan that includes a process for leasing commercial shellfish grounds and providing local review of applications for placement of aquaculture structures in town waters. Although these local decision makers do not have legal authority to directly permit aquaculture structures, the shellfish commissions play an important role in the review process for potential social and use conflicts, as well as potential effects on protected habitats or species caused by aquaculture activity (DEEP 2019b).

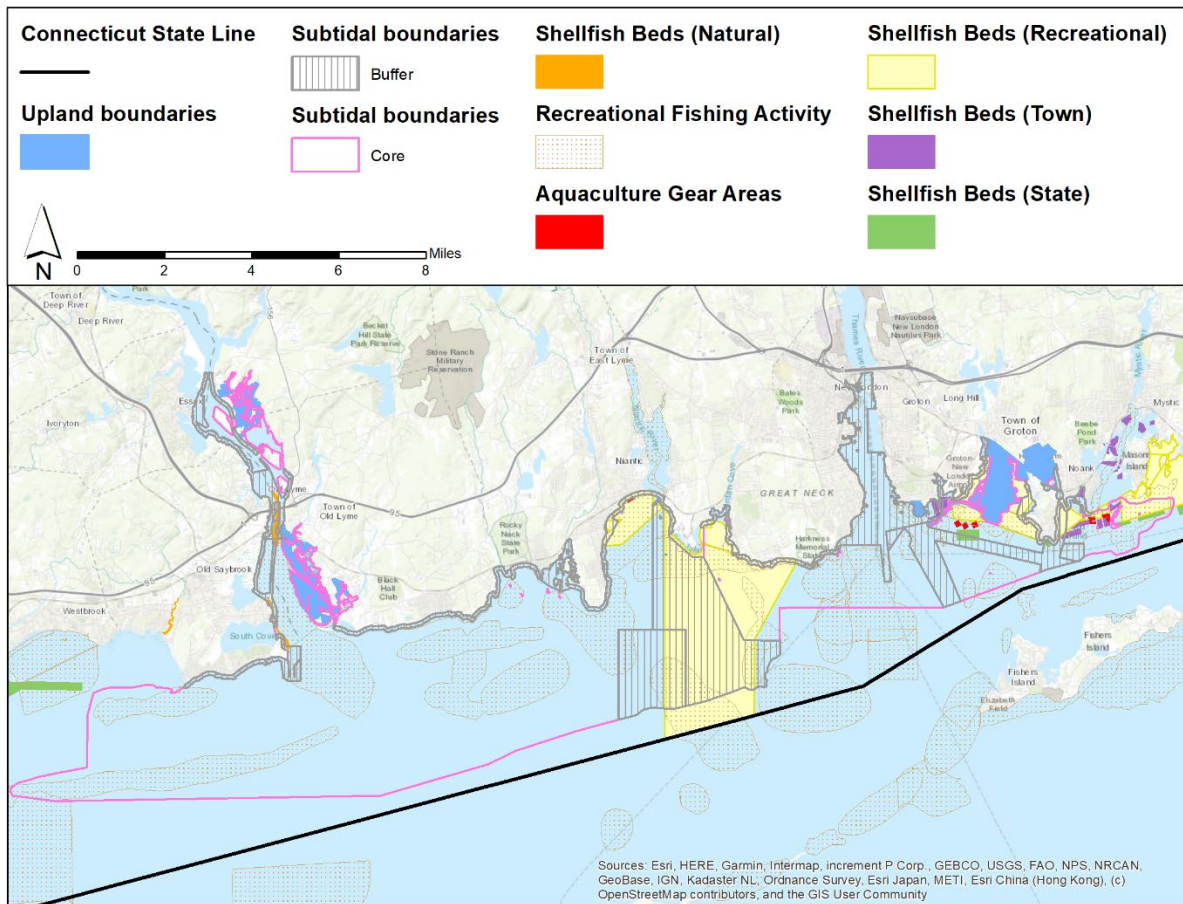


Figure 5-3: Offshore Areas - Fishing & Aquaculture

A depiction of areas used for recreational and aquaculture interests within the offshore boundary of the proposed CT NERR using data from the Long Island Sound Blue Plan (DEEP 2019b). “Shellfish Beds (Town)” and “Shellfish Beds (State)” are leases for aquaculture activity (grow-out, harvest) granted by the states or towns with a subset of these leases approved for deployment of aquaculture gear. “Shellfish Beds (Natural)” are naturally occurring shellfish beds, not seeded nor maintained by aquaculture operations.

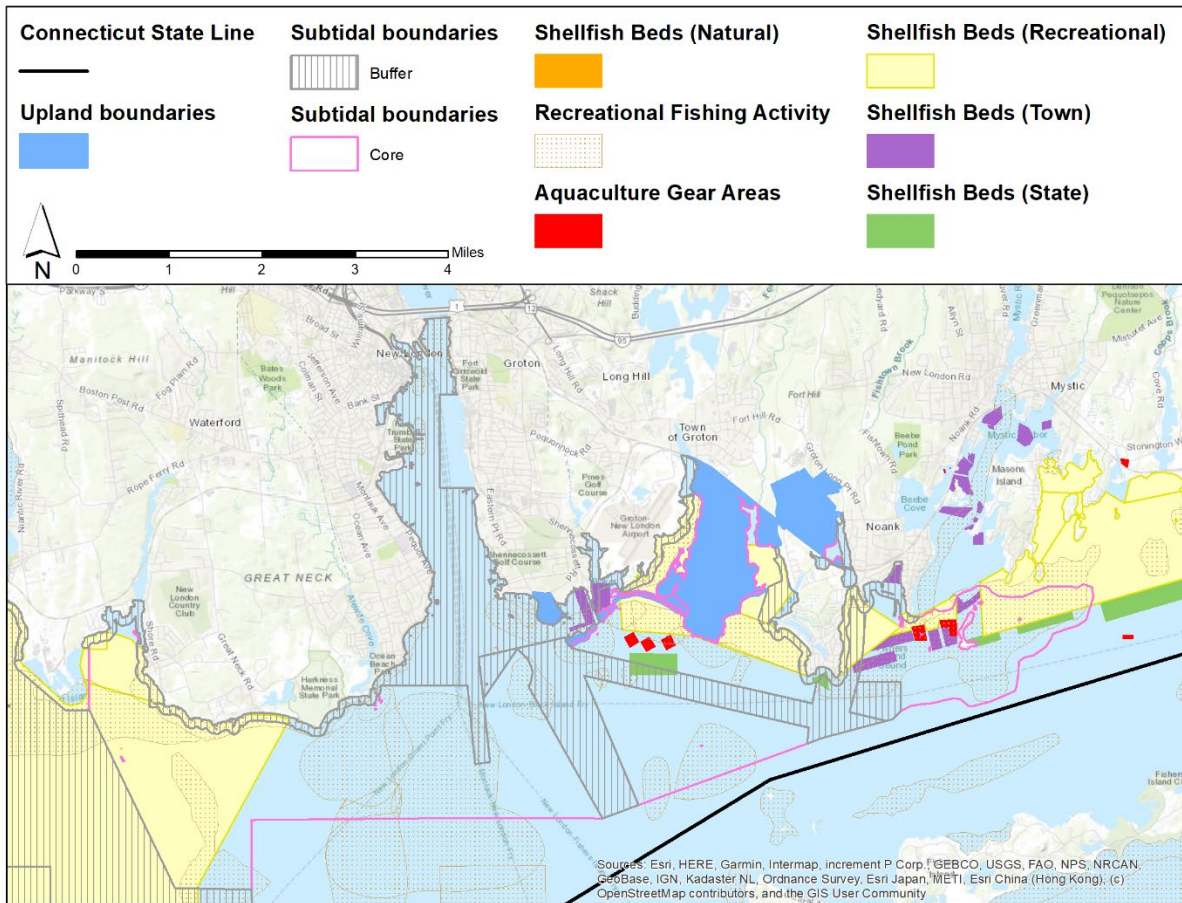


Figure 5-4: Offshore Areas - Fishing & Aquaculture (Eastern Area of Proposed CT NERR)

A zoomed-in depiction of areas used for recreational and aquaculture interests within the eastern portion of offshore boundary of the proposed CT NERR using data from the Long Island Sound Blue Plan (DEEP 2019b). “Shellfish Beds (Town)” and “Shellfish Beds (State)” are leases for aquaculture activity (grow-out, harvest) granted by the states or towns with a subset of these leases approved for deployment of aquaculture gear. “Shellfish Beds (Natural)” are naturally occurring shellfish beds, not seeded nor maintained by aquaculture operations.

The aquaculture application and resulting review process are in place to ensure that aquaculture activity is compatible to the extent possible with existing human uses of Long Island Sound and that the final configuration will have minimal adverse impacts to navigation, protected marine species, and essential fish habitat (Getchis et al. 2019). Policies are in place that restrict non-native species and that require a license, and impose restrictions, for use and transport of native species. If a proposed aquaculture project will result in unacceptable adverse effects to navigable waters or aquatic resources, permit authorization will be denied by local, state, or federal officials. Authorization from one agency does not indicate full authorization of the project. Authorization by federal, state, and town officials (if applicable) is required prior to the applicant conducting aquaculture activities in the State of Connecticut.

Table 5-1: Synthesis of Common Uses Expected in the Proposed CT NERR

A summary of common / expected uses by areas within the proposed CT NERR based on pre-existing authorities. Note that uses requiring a permit need approval from the proper combination of local, state, or federal entities based on the specific activity. This is not intended to provide an exhaustive list, nor to indicate approval to conduct any actions without consultations with the proper authorities. Entry definitions:

Yes = Allowed; No = Not allowed

(1) License / Permit required

(1a) Within proposed CT NERR Buffer Areas Only; License / Permit Required

(2) License / Permit required, in approved areas

(3) some activities limited to certain areas / trails

(4) walking only

(5) in parking lots only

(6) waterfowl only

	Subtidal water	Pine Island	Bluff Point State Park	Bluff Point Coastal Reserve / NAP	Haley Farm State Park	Lord Cove NAP	Roger Tory Peterson NAP	DEEP Marine HQ	UConn Avery Point
Dredging	Yes (1a)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Upland placement of dredged material	n/a	Yes(1)	Yes(1)	Yes(1)	Yes(1)	Yes(1)	Yes(1)	Yes(1)	Yes(1)
Aquatic Placement of dredged material	No	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Dredging / placement requires state and federal licenses/permits – consult landowner/DEEP. Upland placement within these areas only likely when considered as part of permitted habitat restoration/protection activities and not as a general course of action.									
Major Facilities (building) Development	n/a	No	No	No	No	No	No	No	Yes (1)
Facility development requires state and local licenses/permits – consult landowner.									
Conduct research / deploy equipment	Yes (1)	Yes (1)	Yes (1)	Yes (1)	Yes (1)	Yes (1)	Yes (1)	Yes (1)	Yes (1)
Research / equipment deployment requires state licenses – consult landowner/DEEP.									
Scientific Collection / sampling	Yes (1)	Yes (1)	Yes (1)	Yes (1)	Yes (1)	Yes (1)	Yes (1)	Yes (1)	Yes (1)
Scientific collection /sampling requires state licenses – consult landowner/DEEP.									
Commercial Vessel operation	Yes (1)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Commercial vessel operation requires proper licensing.									

	Subtidal water	Pine Island	Bluff Point State Park	Bluff Point Coastal Reserve / NAP	Haley Farm State Park	Lord Cove NAP	Roger Tory Peterson NAP	DEEP Marine HQ	UConn Avery Point
Recreational boating	Yes (1)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Recreational boating requires state licensing-consult DEEP.									
Recreational Fishing	Yes (1)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Recreational fishing requires state licensing-contact DEEP.									
Commercial Fishing	Yes (1)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Commercial fishing requires proper licensing.									
Commercial Aquaculture (shellfish / kelp)	Yes (2)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Commercial aquaculture in approved areas requires state licenses/permits. Consult DEEP, DA/BA									
Recreational shellfishing	Yes (2)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Recreational shellfishing in approved areas requires town/municipal licenses/permits.									
Motorized vehicles (e.g., cars, trucks, ATVs, motorcycles)	n/a	n/a	Yes (5)	No	Yes (5)	No	No	Yes	Yes
Passive Recreation (e.g., hiking, biking, wildlife watching, etc.)	n/a	Yes	Yes (3)	Yes (3)	Yes (3)	Yes (4)	Yes (4)	Yes	Yes
Public Hunting	Yes (6)	No	No	No	No	Yes (6)	Yes (6)	No	No
In-water coastal structures, water dependent uses, submerged utility infrastructure	Yes (1a)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
These activities require state licenses – consult DEEP.									

In the interest of public safety it should be noted that public hunting, shooting, or carrying of loaded firearms within 250 feet of any building occupied by people or domestic animals or used for storage of flammable material when waterfowl hunting in tidal areas from land shooting positions or from floating

blinds anchored adjacent to land or from rock positions, is prohibited, unless written permission for lesser distances is obtained from the owner and carried. Landowners, their spouses, and lineal descendants are exempt from this restriction, providing any building involved is their own.

5.3 Surveillance and Enforcement

The proposed CT NERR has no law enforcement jurisdiction and relies on the authorities of the federal, state, and local law enforcement organizations (described above) to enforce regulations including but not limited to public safety, building, traffic, littering, dumping, hunting, fishing, boating, commercial use of public lands, research, and take of certain species. Some of these activities may require local, state, or federal permits or approvals. Use of all lands in the proposed CT NERR will require the permission of the landowners or their agents and be subject to conditions imposed by the landowner or their agents. The proposed CT NERR does not create any new permitting requirements; existing permitting requirements would still apply within the proposed CT NERR.

Violations of permits and conditions will be subject to the sanctions and penalties provided by the issuing authorities (local, state, and federal). The Reserve Manager will be the overall liaison with the local, state, and federal law enforcement authorities. All proposed CT NERR staff, site partners, and employees will be made aware of the rules and regulations regarding allowable uses within the proposed CT NERR and will be observant for any violations or enforcement problems in the area. If observed, violations will be reported to the Reserve Manager who will contact proper authorities. The Research Coordinator will be responsible for tracking research activities and will be aware of any research permit requirements (town, state, and federal) to provide guidance and assistance to researchers.

The community members and strategic partners that are often present in the proposed CT NERR, participating in education and research programs or enjoying recreational opportunities, have a role to play in protecting the proposed CT NERR as well. They are often the eyes and ears that see and hear activities that are not allowed or could damage resources and that should be stopped or investigated. The community is therefore encouraged to look out for potential problems, and to contact the Reserve Manager and law enforcement authorities to report suspected rule violations or harmful actions.

5.4 Resource Protection Challenges

Maintaining adequate control of reserve resources can be challenging. External stressors that may affect or degrade resources in the proposed CT NERR include discharges of contaminants from the surrounding urban area, erosion, degradation of the watershed and streams caused by invasive plants and animals, loss of biodiversity, introduction of new harmful invasive species or diseases, unsustainable commercial and public recreational uses, overfishing, and changing climatic conditions.

Based upon community input and preliminary research, the major resource protection challenges facing the proposed CT NERR in the next 5 years are:

- Degradation of water quality from land-based nutrients, erosion, and pollutants.
- Introduction and spread of invasive plant and animal species (both aquatic and terrestrial).
- Piping plover and other shorebird protection.
- Osprey and Bald Eagle protection.
- Loss of ecosystem resilience and services provided, manifested by:
 - aquatic and terrestrial species shifts and potential losses;
 - changes in food web predation / prey;
 - tidal marsh loss or conversion;
 - habitat connectivity;
 - coastal erosion; and
 - instability or loss of submerged aquatic vegetation.
- Damage or destruction of natural resources (e.g., plants / vegetation, nesting / roosting sites), cultural resources (e.g., historic or archaeological sites), and facility-related items (e.g., buildings, signs, displays, walkways).
- Illegal or unauthorized activities and other incompatible human uses (e.g., access, illegal take or poaching of wildlife, trail creation and use, use of unapproved motorized vehicles, biking in unapproved areas).

Some of these challenges can be compounded by capacity-related issues relating to law enforcement as well as the large geographic area covered by the reserve. As such it will be critical to engage proposed CT NERR staff to help address and mitigate challenges through vigilance and targeted education and stewardship.

6 Public Access Plan

The public access plan is a required element of a reserve management plan, per 15 C.F.R. § 921.13. A public access plan maximize long-term public use and enjoyment of the water and shoreline while minimizing damage to the resources.

Adequate land and water access are critical to facilitating and conducting research and monitoring in the proposed CT NERR. But more broadly, public access is an important part of achieving the proposed CT NERR's vision of a *resilient, healthy Long Island Sound estuary and watershed where human and natural*

communities thrive. Public access allows for recreational and educational opportunities that promote the proposed CT NERR and increase visitor appreciation and understanding of natural resources. Public use of the proposed CT NERR can provide opportunities to develop new relationships and strengthen existing connections with local communities and to promote awareness and stewardship of coastal resources. The need to ensure and improve appropriate access to these important land and water areas for communities and groups that historically may not as readily have visited or enjoyed them was a critical point underscored during much of the stakeholder engagement process and is part of this plan.

6.1 Current Public Access

Public access to the proposed CT NERR properties will be determined by and consistent with the public access policies of DEEP and UConn that have title to or management responsibility for the lands and waters. Specific policies regarding access for education, stewardship, research, and monitoring activities will be determined through ongoing coordination with the proposed CT NERR staff, DEEP, and UConn. Access to public lands and subtidal waters for existing forms of active and passive recreation, gathering, and—when and where consistent with existing state laws and policies—other activities for commercial and economic benefit (e.g., aquaculture, commercial fishing, etc.) will not be impeded by the proposed CT NERR designation. It is worth noting that in the case of several upland properties, certain types of physical access can have regulatory limitations. Here, access should be thought of broadly and in this sense the proposed CT NERR can offer opportunities to responsibly allow audiences to experience these special places in person or by leveraging tools and technology to deliver experiences remotely.

Current public access to both the upland properties and subtidal areas is described below. Common uses for land areas are summarized in Table 6-1 and water areas in Table 6-2. Allowable uses are more fully referenced and cited in the *Chapter 5—Resource Protection Plan* (see Table 5-1, page 131).

Table 6-1: Summary of Common Public Uses for Proposed CT NERR Upland Areas

Information taken from the Connecticut Coastal Public Access Guide (DEEP 2021f). Note that Pine Island is not included in this table simply because it is not included within the guide. However, general access is allowed per UConn policy and activities must be consistent with its designation as a state archaeological preserve. The information included here is intended as a summary overview; the Connecticut Coastal Public Access Guide pages for these sites provides greater detail on the uses, resources, parking considerations, etc. See <https://portal.ct.gov/DEEP/Coastal-Resources/Coastal-Access>

	BLUFF POINT COMPLEX	HALEY FARM STATE PARK	LORD COVE NAP	DEEP MARINE DISTRICT HEADQUARTER S	ROGER TORY PETERSON NAP	UCONN AVERY POINT
Fee	NO	NO	NO	NO	NO	NO
Picnicking	NO	NO	NO	YES	NO	YES
Bird / Wildlife Viewing	YES	YES	YES	YES	YES	NO
Supervised Swimming	NO	NO	NO	NO	NO	NO

	BLUFF POINT COMPLEX	HALEY FARM STATE PARK	LORD COVE NAP	DEEP MARINE DISTRICT HEADQUARTERS	ROGER TORY PETERSON NAP	UCONN AVERY POINT
Unsupervised Swimming	YES	NO	NO	NO	NO	NO
Scuba	NO	NO	NO	NO	NO	NO
Recreational Fishing	YES	NO	YES	YES	YES	YES
Recreational Shellfishing	YES ^b	NO	NO	NO	NO	NO
Crabbing	YES	NO	NO	YES	YES	NO
Hunting	NO	NO	YES ^a	NO	YES ^a	NO
Camping	NO	NO	NO	NO	NO	NO
RV Camping	NO	NO	NO	NO	NO	NO
Restrooms	YES	YES	NO	YES	NO	NO
Car Top Boat Access	YES	NO	YES	NO	NO	NO
Boat Launch Ramp	NO	NO	NO	NO	NO	NO
Trails	YES ^c	YES ^{c,d}	NO	NO	NO	NO
Boardwalk / Walkway	NO	NO	NO	YES	NO	YES
Access Pier	NO	NO	NO	YES	NO	NO
Food Concession	NO	NO	NO	NO	NO	NO
Handicapped Access	YES	YES	NO	YES	NO	YES
Signs Present	YES	NO	NO	YES	NO	NO
Parking	Parking Lot	Parking Lot	On Street	Parking Lot	Parking Lot	Parking Lot

^a Waterfowl hunting
^b Permit required for shellfishing; issued by the Town of Groton.
^c Hiking, jogging, and mountain biking on authorized trails. Motorized vehicles are not allowed.
^d Bike trail is wheelchair accessible

Table 6-2: Summary of Common Public Uses of Proposed CT NERR Waters

USE	PROPOSED CT NERR WATERS (RIVERS, EMBAYMENTS, LONG ISLAND SOUND)
Commercial Fishing	Yes, subject to existing state/federal licensing and regulation as necessary.
Commercial Aquaculture (Shellfish / Kelp-seaweed)	Yes, subject to existing state and local licensing and regulation as necessary.
Recreational Boating	Yes, subject to existing state licensing and regulation as necessary.
Vessel Mooring/Anchoring	Yes, in approved areas.
Diving / Snorkeling / Swimming	Yes.
Other Commercial Activities (e.g., dredging for commerce/navigation needs, utility installations, etc.)	Yes, subject to existing state/federal licensing and regulation as necessary.
Maritime Vessel Traffic	Yes.

Lord Cove NAP: Access is primarily via small boat from the Connecticut River into Lord Cove or via a small car-top launching area at Ely's Ferry Landing, located at the terminal end of Ely's Ferry Road in the town of Lyme. This area, located at the northern part of Lord Cove provides no facilities and is limited to on-street parking. There is no fee associated with this site.

Roger Tory Peterson NAP: Direct access to the marshes and tributaries of this property are via small boat from either the Connecticut River or nearby state-owned boat launches, the Lieutenant River Boat Launch on the Lieutenant River at CT Route 156 / Shore Road, and the Great Island State Boat Launch at the end of Smith Neck Road. Both are in Old Lyme, and just to the east of the NAP properties. At just over 0.5 miles from the northern properties of the NAP, the Lieutenant River access site provides car-top access, a parking lot, and sanitary facilities. Further south, and less than 500 feet from the NAP, the Great Island access site provides on-site parking, a boat ramp for trailered or car-top launching, sanitary facilities, and is handicapped accessible. There are no fees associated with either launch site.

DEEP Marine District Headquarters: Located at 333 Ferry Rd., in Old Lyme, this facility provides limited parking, but several amenities. A public gazebo and seasonal sanitary facilities are available, as is a boardwalk over 1000 feet long that runs south under the railroad bridge and just into the mouth of the Lieutenant River and the northern part of Roger Tory Peterson NAP. The boardwalk supports fishing and crabbing, contains several informative displays on the local wildlife and environmental setting, and ends with a raised observation deck that affords a view of the entire NAP.

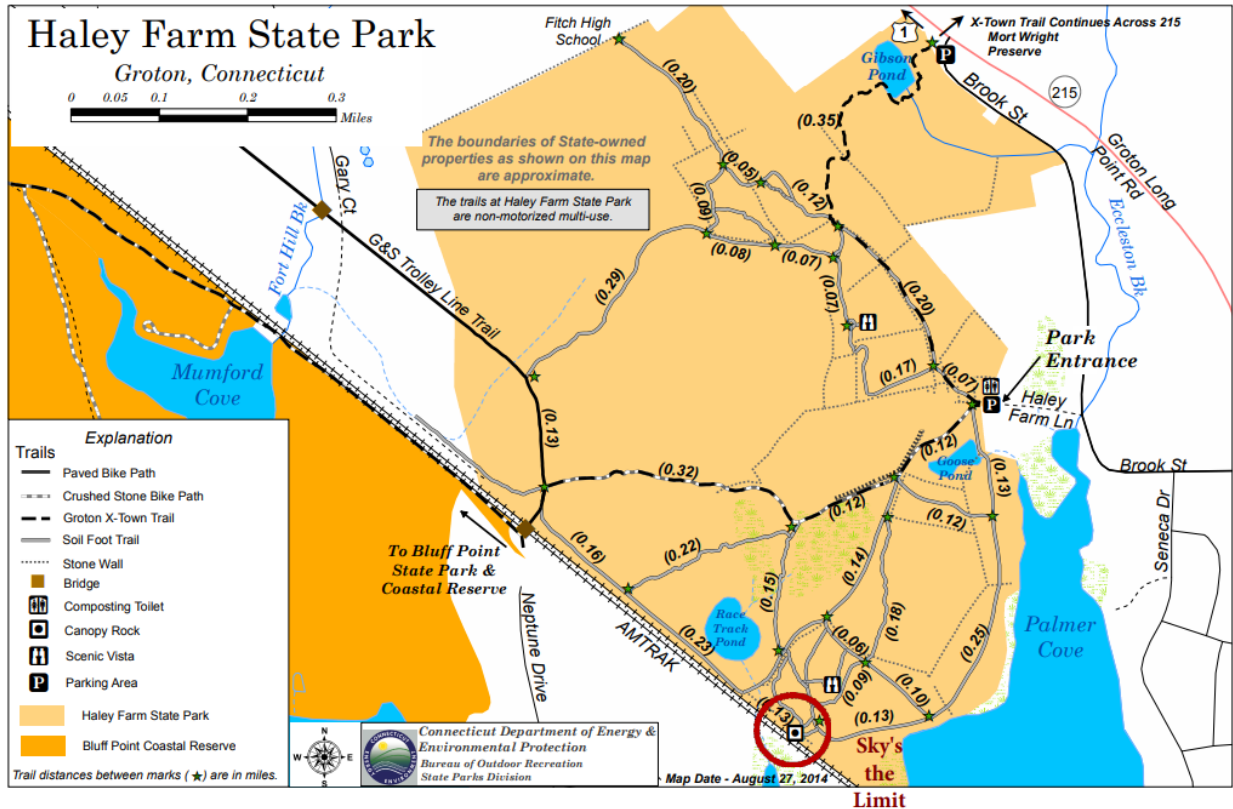


Figure 6-1: Trails and Amenities - Haley Farm State Park

A map showing the components of Haley Farm State Park along with trails and other amenities offered (DEEP 2021i).

Haley Farm State Park: Roadway access to the property is from Haley Farm Lane, off Brook Street, accessed from the Noank section of Groton. A parking lot and seasonal sanitary facilities are available. The site can be accessed by small boat from Palmer Cove which is open to Long Island Sound, though the Cove is quite shallow. The State Park is handicap accessible and is open from 8 a.m. to sunset without a fee. Figure 6-1 provides a site map.

Bluff Point State Park, Bluff Point Coastal Reserve, Bluff Point NAP: Roadway access to the park is at the end of Depot Road in Groton, through the underpass of the railway line. The State Park offers a parking lot, seasonal sanitary facilities, and a car-top boat launch. The property is accessible by boat from Long Island Sound, Poquonnock River, and Mumford Cove, with a number of state-owned launches nearby (Table 6-3). The State Park and CR is handicap accessible, and no fees are charged. Figure 6-2 provides a site map.

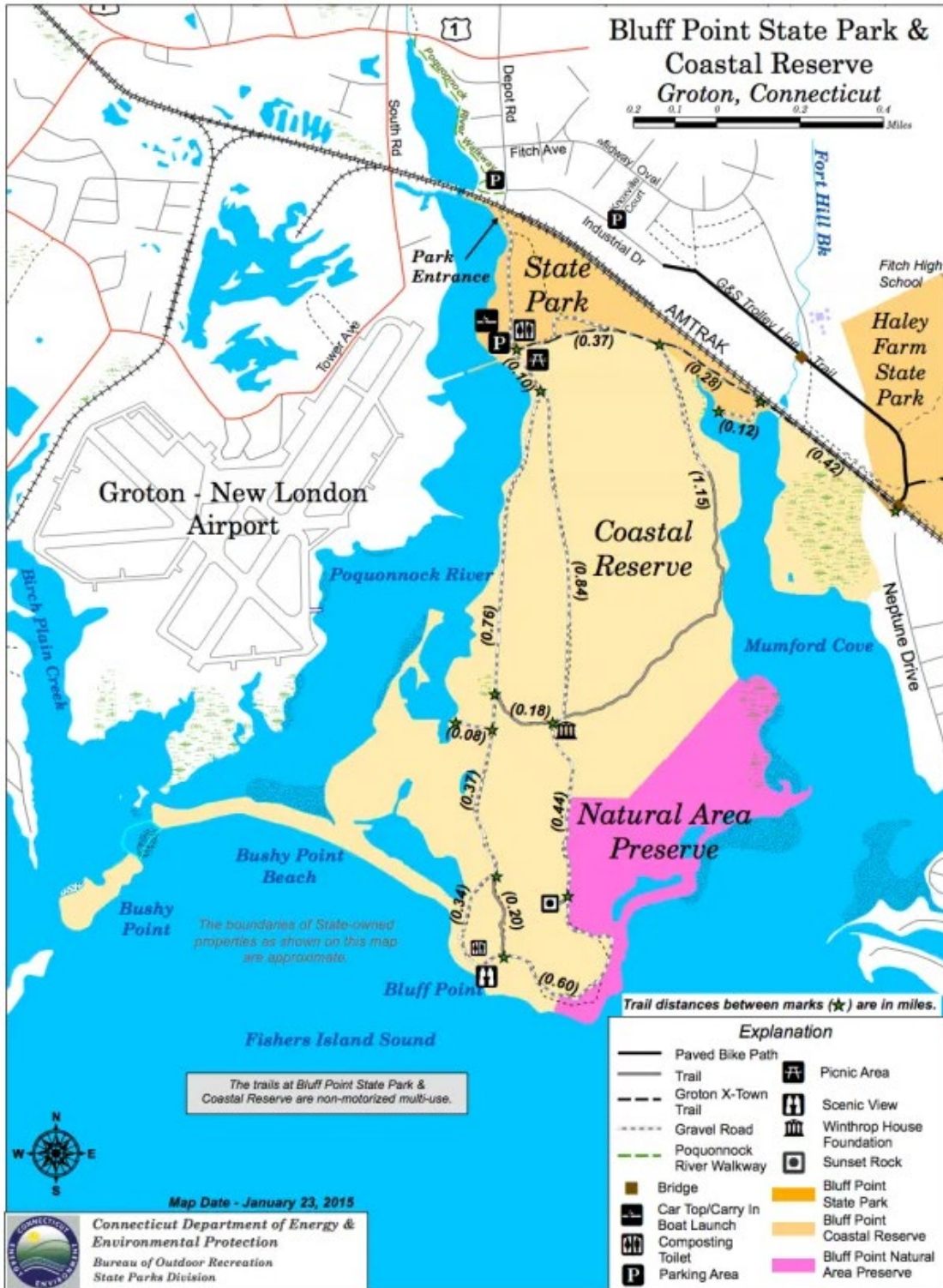


Figure 6-2: Trails and Amenities - Bluff Point Properties

A map showing the components of the Bluff Point property (State Park, Natural Area Preserve, and Coastal Reserve) along with trails and other amenities offered (DEEP 2021b).

Subtidal Area (including rivers, embayments, Long Island Sound, and Fishers Island Sound): Table 6-3 lists the five state-owned public boat launches that provide direct access to the waters included within the proposed CT NERR and identifies key features of each launch. A full listing of features, along with applicable boating use regulations, can be found at the DEEP Boating Access website (DEEP 2021c).

Table 6-3: State Owned Boat Launches in the Proposed CT NERR Waters

	TYPE	SEASON	SANITARY	PARKING	ADA ACCESSIBLE
Baldwin Bridge (Old Saybrook)	Trailer and car-top / carry in; also includes fishing pier	Year round	Seasonal	Paved, 75 spaces	Yes
Dock Road (Waterford)	Trailer	Year round	Year-round	Gravel, 45 spaces	No
Thames River (New London)	Trailer	Year round	seasonal	Paved, 50 spaces	Yes
Kenneth Streeter / Thames River (Groton)	Trailer	Year round	Seasonal	Paved / dirt, 25 spaces	Yes
Bayberry Lane (Groton)	Trailer	Year round	Seasonal	Paved, 37 spaces	Yes

Given the significant size of the subtidal area of the proposed CT NERR, there are multiple locations providing public access. These are identified in Table 6-4, however the details for each are not included. Instead, the reader is directed to the Connecticut Coastal Access Guide (<https://portal.ct.gov/DEEP/Coastal-Resources/Coastal-Access>) that can more thoroughly describe each and the amenities offered (DEEP 2021d).

Table 6-4: Additional Locations of Public Access to Proposed CT NERR Waters

SITE NAME	TOWN
Crescent Beach Public Walkway	East Lyme
Hole-in-the-Wall Beach	East Lyme
McCook Point Park and Beach	East Lyme
Niantic Bay Boardwalk	East Lyme
Railroad Beach	East Lyme
Rocky Neck State Park	East Lyme
Connecticut River Museum	Essex
Essex Town Dock	Essex
Birch Plain Creek Park	Groton
Calf Pasture Overlook	Groton
Eastern Point Beach	Groton
Esker Point Park	Groton

SITE NAME	TOWN
Fort Street Landing	Groton
Garbo Lobster	Groton
City Pier and Waterfront Park	New London
Fort Trumbull Riverwalk / State Park	New London
Greens Harbor Beach	New London
Ocean Beach Park	New London
Pfizer Global Development Facility	New London
Baldwin Bridge Scenic Overlook	Old Lyme
Old Lyme Ferry Road Launch Site and Dock	Old Lyme
Pilgrim Landing	Old Lyme
Fort Saybrook	Old Saybrook
Saybrook Point	Old Saybrook
Harkness Memorial State Park	Waterford

6.2 Public Access Challenges

While the areas designated for the proposed CT NERR provide access to the public and a variety of use opportunities, there are always challenges to address. The primary challenges known or anticipated during the first five years, along with methods to address them, are as follows:

Use Conflicts: NAP properties by their nature are not designed for public use and recreation in the same way as a State Park; access and use are controlled to primarily ensure their habitats can support wildlife needs and limit the possibilities for damage or disturbance to resources. In addition, these areas also allow certain types of hunting, governed by DEEP policies and regulations. It should be noted that mountain biking within Bluff Point, while currently allowed, has resulted in negative impacts to resources and in some cases, scientific study areas when improperly exercised. Similarly, unleashed dogs have also resulted in negative impacts to coastal areas necessary for wildlife.

It is not likely the proposed CT NERR could - or should - be expected to resolve all potential use conflicts; however, the proposed CT NERR can assist in mitigating and lessening use conflicts for reserve activities through advanced planning, coordination, and communication among partners and reserve staff. Further, it can also investigate ways to help address other existing or potential conflicts through inclusion in education, outreach, and stewardship activities – for example developing and delivering educational material on the importance of proper biking practices or pet control on site or in the community to user groups. In doing so, the best practices of stewardship and education consistent with existing land management policies should be employed.

Parking: While the State Parks, DEEP Marine District Headquarters, and UConn Avery Point campus (as well as state-managed boat launch areas adjacent to reserve waters) all offer parking options, the size, location, and management practices can present challenges. Notable examples include the process of procuring parking authorization at UConn Avery Point and the fact that the parking area at Bluff Point

State Park is constrained by both the railway overpass as well as increased seawater inundation resulting from both storms and tidal cycles.

Like use conflicts, the proposed CT NERR cannot fix all the problems surrounding parking, but it can be part of potential solutions through planning and coordination with partners. The Reserve Manager, in coordination with UConn Avery Point campus administration, can coordinate on-campus access needs to ensure, when necessary, adequate access to parking is available and the process is communicated and explained to visitors. While the issues at Bluff Point are more complex, it is possible the proposed CT NERR and Friends Group may be able to provide resources (either through cooperative funding or other means) to study or implement potential improvements with DEEP.

Access to underserved communities and groups: As part of the social diversity, equity, inclusion and environmental justice conversations that permeated the management plan stakeholder discussions, the proposed CT NERR should help address limitations for certain groups, facilitating access and enjoyment of the resources provided by the reserve. First and foremost, improving access requires a better understanding of the barriers in place. As part of the broader inclusion efforts, reserve staff will reach out to and engage with community members and leaders to hear the problems and issues at hand. Based on this, specific strategies can then be developed to respond to this challenge and address any issues. It is reasonable to assume that general efforts will revolve around:

- Education and outreach: through active community engagement or passive use of signage, social media, or similar avenues, promote awareness of existing opportunities for public access (See Education Objective E2.S3.).
- Meeting needs / filling voids: if access to transportation is limited or necessary equipment (fishing gear, boats / kayaks, etc.) is lacking, proposed CT NERR staff will work collaboratively with partners, the Friends Group, and volunteers to see what arrangements or innovative solutions can help reduce or eliminate barriers.
- Soliciting input and feedback: to help ensure that future opportunities to enhance public access are not lost by virtue of lack of awareness, the proposed CT NERR will regularly work with both partners and community members and stakeholders to identify areas of needs and to take the appropriate steps to address them.

6.3 Public Access Opportunities and the Visitor Experience

The land and water areas of the proposed CT NERR provide many opportunities for the public to visit these special places, engage in recreation, and learn. It is reasonable to assume that designation of the proposed CT NERR may eventually lead to increased interest in visitation beyond participation in activities developed through the education, research, or training programs. This should be seen as a positive result, but carefully addressed with partnering organizations to ensure this does not lead to unmanageable conflicts. Strategies the staff of the proposed NERR should investigate should include the following:

- The proposed CT NERR, through its communication plan, and other appropriate programming, should seek to inform the public on best practices to enjoy and use these areas and to mitigate incompatible uses and use conflicts creatively, appropriately, and responsibly.
- Additionally, scheduling regular or semi-regular planned events such as open houses or guided tours led by proposed CT NERR staff or volunteers are opportunities for providing visitor experiences coupled with education on conservation and stewardship messaging consistent with the proposed CT NERR *Final Management Plan* as well as the overall access policies of DEEP and UConn. (See Education Objective E2)
- Leveraging an active Friends Group and volunteers that, when properly trained, can assist DEEP and UConn to ensure these places are appropriately provided high standards of care.
- Monitor and track attendance and use the data to develop an appropriately designed and implementable visitor plan.

7 Facility Development and Improvement Plan

A reserve’s facilities provide functional space for reserve work and programming, as well as serve as a place for public interaction. When facilities are developed, they should be planned as sustainable facilities. The proposed CT NERR is responsible for providing the facilities necessary to fulfill the reserve’s mission and support its research, education, training, and natural resource stewardship programs.

7.1 Purpose of Facilities and Construction Philosophies

The proposed CT NERR will rely on existing facilities during the term of this first 5-year management plan, using both the space made available to the proposed CT NERR by UConn (Avery Point campus) as well as the space available through potential collaborations with strategic partners. The space currently available at UConn Avery Point includes rooms dedicated to the proposed CT NERR (offices, labs, work spaces) and rooms which are available to all UConn members through existing reservation procedures (classrooms, meeting spaces, boats, etc.). DEEP will also make space available at their Marine Headquarters facility, on an as-needed basis. Options for space utilization at CT DEEP include storage space, temporary works space, and meeting space made available through existing reservation procedures. Both of these facilities are close to or adjacent to natural uplands and submerged areas included in the proposed CT NERR area (Figures 7-1 and 7-3).

The general philosophy for reserve facilities is to provide services and local experts to manage the activities of the proposed NERR and serve as a center for regional excellence in education, training, and research opportunities. During the first 5 years post designation, the reserve will re-purpose existing facilities on the Avery Point campus and at the DEEP Marine District Headquarters facility. Re-purposing

existing space and facilities reduces environmental impacts associated with new construction, addresses sustainability, and efficiently leverages the infrastructure and existing expertise at UConn and DEEP. This philosophy extends to the outdoor areas of both locations including the short shoreline trail that borders the Avery Point campus and boardwalk that extends from DEEP Marine District Headquarters south along the Connecticut River.

During the first five years following designation and establishment of the reserve, staff will work with UConn, DEEP, the Reserve Advisory Committee (see *Section 4.4*), and the Friends Group (see *Section 4.5*) to evaluate the need for and feasibility of a new facility, likely to be located on the Avery Point campus. This building could expand the space available to reserve staff and centralize all reserve activities within a new building shared with the Avery Point campus. In 2016, the University of Connecticut adopted a new Sustainable Design and Construction Policy, stating that the University of Connecticut shall plan, design, construct, renovate and maintain sustainable, energy and water-efficient buildings (UConn 2021b). All new construction projects at UConn estimated at greater than \$5 million must pursue at least a LEED Gold rating.



Figure 7-1: Overview of the UConn Avery Point Campus and Surroundings

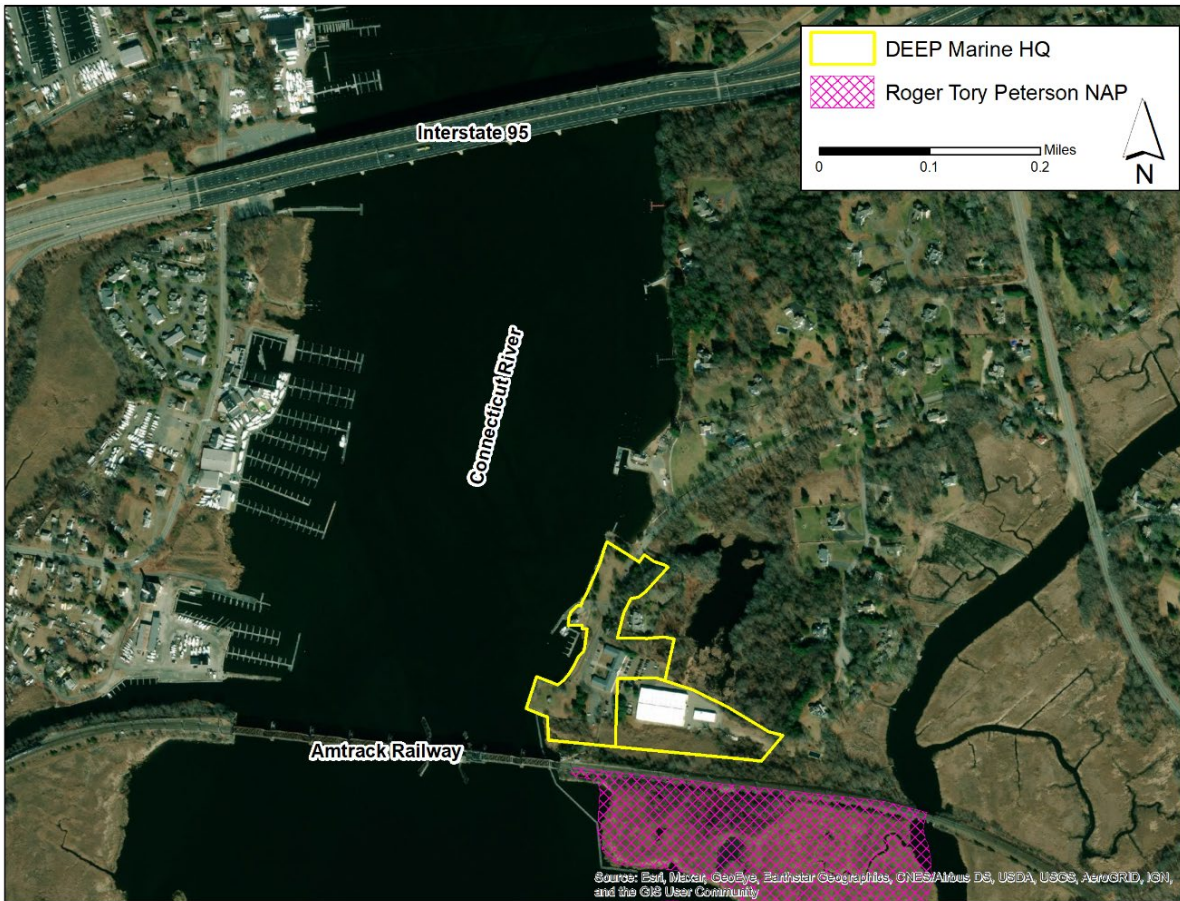


Figure 7-2: DEEP Marine District Headquarters and Surroundings

7.2 Description of Current Facilities

The University of Connecticut Avery Point campus and DEEP Marine District Headquarters have identified space that will support the proposed CT NERR. Additionally, future agreements with strategic partners will provide space for educational programming. Agreements with strategic partners will be developed after the market analysis and needs assessment are completed during year one. The current facilities are sufficient to support the needs of the education program but expanding the capabilities by working with potential strategic partners is critical to developing a robust education program.

Figure 7-3 provides the locations of buildings and facilities on the UConn Avery Point campus, located at 1084 Shennecossett Road, Groton. Building designations (acronyms) used in Figure 7-3 are provided with each item in the following lists, to identify locations on campus.

Existing facilities on the UConn Avery point campus dedicated to the proposed CT NERR include:

- Staff office space, including dedicated offices and desk / flex space in two separate locations—a suite in the Lowell P. Weicker Jr. Building (LWB, Figure 7-3) and two spaces in the Community and Professional Building (CPB, Figure 7-3) – 2,260 square feet total
- Welcome area / waiting area, outside reserve suite (LWB) – 170 square feet
- SWMP equipment workspace / lab (LWB) – 1,400 square feet, shared space
- Field equipment workspace / flex space (LWB) – 500 square feet
- Research laboratory with fume hood (CPB) – 265 square feet
- Storage space, multiple (LWB) – 403 square feet
- Outside storage space (LWB) – 500 square feet
- Temporary offices for short-term visitors, < 2weeks (LWB) – 200 square feet

Additional facilities available to the proposed CT NERR; including common use spaces and those available through reservation procedures include:

- Kitchenette / Break Room (LWB) – 150 square feet
 - Dining service and event catering are available at Mort's (DIN), <https://averypoint.uconn.edu/student-life/dining-services/>
- Restrooms (all buildings) – approximately 350 square feet per room; two sets include shower facilities
- Machine and Electronics Shops (LWB) – 800 square feet, available under supervision and by approval, may be fee-based depending on project (UConn 2021a)
<https://marinesciences.uconn.edu/mstc/machine-shop/>;
<https://marinesciences.uconn.edu/mstc/electronics-shop/>
- Classrooms in LWB and the Academic Building (ACD) – 1,200 square feet per room, multiple; reservation required
- Teaching Labs (LWB, ACD) – 1,500 square feet, multiple; reservation required
- Auditorium (AUD) – seats 320; reservation required
- Meeting Rooms (LWB, ACD) – assorted sizes, seat 6 to 40; reservation required

- Small and Large Research Vessels (Marine Operations-MO) – skiffs to larger vessels; reservation required, fee-based use (UConn 2021a) <https://marinesciences.uconn.edu/vesselops/>
- Diving Support (MO) – participation dependent on certifications, reservation required, fee-based use (UConn 2021a) <https://marinesciences.uconn.edu/divingprogram/>
- The John S. Rankin Laboratory (RL), seawater facility (UConn 2021a) – by request and may require a formal agreement, may entail fee-based use depending on project (UConn 2021a) <https://marinesciences.uconn.edu/rankinlaboratory/>
- Analytical Instrument Lab (LWB) – by request to the Head of the Department of Marine Sciences, may entail fee-based use in addition to user-supplied consumables (UConn 2021a) <https://marinesciences.uconn.edu/mstc/analytical-lab/>
- UConn has several analytical and research services across all campuses that are available to staff and faculty through a range of agreements, from collegial partnerships to fee-for-services. The options span all fields—from art and history to science and engineering—and are too numerous to list.

The DEEP Marine District Headquarters (Figures 7-2 and Figure 7-4), located at 333 Ferry Rd., in Old Lyme, is the primary offices for the DEEP Boating Division, Marine Fisheries Division, and the Marine District Environmental Conservation Police. Located directly adjacent to the Connecticut River and the Roger Tory Peterson NAP, this facility can provide support for the proposed CT NERR through:

- A limited amount of public parking.
- Access to a public outdoor gazebo and seasonal sanitary facilities.
- Access to an approximately 1000 feet long public boardwalk and observation platform that runs south of the property under the railroad bridge to the mouth of the Lieutenant River and the northern part of Roger Tory Peterson NAP that supports wildlife viewing and fishing / crabbing. The boardwalk also contains informational signage / displays.
- Access to temporary docking facilities for appropriately sized research vessels.
- Access to storage for proposed CT NERR equipment such as scientific instruments, sampling, gear, small watercraft (e.g., kayaks, canoes), etc.
- Access to configurable meeting space (approximately 3200 square feet) that can be reserved for intermittent programming such as educational programs and training programs.

The amount of space available to the proposed CT NERR and the policies and procedures required to access any materials stored on site at this facility will be more directly addressed between DEEP and reserve staff when the specific nature of the equipment needs are more well-defined. In addition, it may be possible during the first five years of this plan to discuss whether any working space may be available within the Marine Headquarters office for proposed CT NERR staff to use. It is currently anticipated that space may be available on a limited or seasonal basis. However, any final determinations will require

more discussion between DEEP and the proposed CT NERR when a greater understanding of the respective needs and availability is clearer. Such discussions will follow established DEEP procedures and processes for space requests.

CAMPUS MAP

UConn
AVERY POINT

1084 Shennecossett Road
 Groton, CT 06340

860.405.9000
averypoint.uconn.edu

MAP LEGEND

ACD	Academic Building.....	D3
ATH	Athletic Center (gym & Pool).....	B3
AUD	Auditorium (2nd floor).....	D3
BH	Branford House & Welcome Center.....	E4
CPB	Community & Professional Building.....	C4
CS	Campus Store.....	D3
DIN	Campus Dining.....	D3
FOB	Facilities Operations Buildings.....	B3
LAP	Laboratory for Astrophysics.....	D4

LD	Loading Dock.....	E5
LH	Lighthouse.....	F4
LIB	Library.....	E3
LWB	Lowell P. Weicker Jr. Building.....	D4
MO	Marine Operations.....	D5
PO	Project Oceanology.....	D5
PS	Police Station.....	C3
RL	John S. Rankin Laboratory.....	E4
SC	Student Center.....	D3
WS	Waterfront Sailing Shed.....	A1
P	Visitor Parking Areas	
EV	Electric Vehicle Parking	



Figure 7-3: The UConn Avery Point Campus

The Lowell P. Weicker Jr. Building (LWB), initial home of the proposed CT NERR, is located on the east side of campus, nearest the docks.



Figure 7-4: DEEP Marine District Headquarters

A closer look at DEEP Marine District Headquarters, showing the docks, buildings, and parking. Part of the boardwalk is visible along the river, running beneath the railway line.

7.3 Facility Challenges and Gaps

As the proposed CT NERR grows during its first five years of operation, the existing facilities outlined above will likely prove to be inadequate to meet anticipated growing program needs, especially beyond the five year mark. Items like dedicated office space, additional storage, expanded laboratory and educational facilities, and increased community meeting space may be needed in the future.

A list of typical facilities needed to support the basic requirements of reserves is used by many new reserves for planning purposes (University of Wisconsin-Extension 2010). This list is based on a 2004 inventory and assessment of existing reserves (an updated audit is planned by OCM, but not yet available). The standard reserve facilities configuration in Table 7-1 identifies the common facilities and average square footage at existing reserves and provides a basis for new reserves, such as the proposed

CT NERR, to plan for long-term facility needs. The proposed CT NERR will use this information while conducting the long-term facilities assessment planned to occur within the first five years following designation. As presented in the previous section, the space currently dedicated to the proposed CT NERR is approximately 30% of the amount found in a standard reserve.

Table 7-1: Standard Reserve Facilities Configuration

The University of Wisconsin – Extension developed the following table based on an audit of typical reserve configurations conducted in 2004 (University of Wisconsin-Extension 2010). The area dedicated to each use is shown by category in square feet (ft²).

ADMINISTRATION AND SUPPORT	RESEARCH	EDUCATION
Offices and meeting space 2,925 ft ²	Office 789 ft ²	Offices 640 ft ²
Kitchen 376 ft ²	GIS Operations 177 ft ²	Exhibits and Reception 2,061 ft ²
Storage 1,206 ft ²	Laboratory 2,453 ft ²	Classroom 1,321 ft ²
Restroom 584 ft ²	Inside Storage 428 ft ²	Storage 253 ft ²
Maintenance 2,159 ft ²	Outside Storage 1,317 ft ²	Library 306 ft ²
Dorms 1,846 ft ²		Auditorium 1,116 ft ²
Other 2,321 ft ²	Other 1,350 ft ²	Other 1,193 ft ²

A facilities challenge for the proposed CT NERR is a lack of dedicated office and lab space to support expansion of the staff as programs grow. The lack of dorms on campus, even a few rooms, is also a challenge; the Avery Point campus does not currently have on-campus housing, thus support typically available for overnight guests is not available, though food service is available throughout much of the year and for much of the day at the on-campus dining facility, Mort’s. A new building on campus could meet these needs.

Another facilities challenge is the lack of structures available at the upland reserve properties which could be used to facilitate educational, stewardship, or training programs. Many sites are State Parks or NAPs. Whereas some State Parks often host permanent structures or in some cases in Connecticut, nature centers, the Bluff Point State Park (a small parcel of the Bluff Point complex) and Haley Farm State Park do not, and are unlikely candidates for permanent facilities due to their designated uses by DEEP. These sites do have sanitary facilities and some trails which are handicapped accessible. The NAPs (including the rest of Bluff Point and the sites along the Connecticut River) are even less likely than State Parks to host any type of permanent or temporary facility as a result of their existing or in- process management plans. Moving forward, it may be possible to consider whether or not any form of low-impact multi-use space suitable to support both reserve programming as well as general public access (e.g., an open-air picnic pavilion or similar, an observation platform / walkway, etc.) may be feasible at either State Park property. However, consideration of need and appropriateness of use would require more deliberate thought between the proposed CT NERR and DEEP.

Table 7-2: Existing Nature Centers and Other Centers of Attraction

Many nature centers, sciences centers, aquaria, and cultural museums exist within Connecticut, and many of them address the natural and cultural history of Connecticut’s coastline and waters. This list includes only those that are close to the water or within the watershed of the proposed CT NERR. When annual attendance was available, it was included.

NATURE CENTERS, SCIENCE CENTERS, AQUARIA, AND CULTURAL MUSEUMS
Nature Centers, Science Centers, Aquaria, and Cultural Museums within a 15-minute drive of a Reserve Upland Property
Mystic Aquarium (Mystic, in Stonington) – 720,000 guests / year (2015) ⁸ ; with 100,000 students / year
Mystic Seaport Museum (Mystic) – 248,547 guests / year (2019) ⁹
Mashantucket-Pequot Museum (Mashantucket, in Ledyard) – 37,000 guests / year (2019) ¹⁰
Children’s Museum of Southeastern Connecticut (Niantic) – 35,000 guests / year (2019) ¹¹
Bushy Hill Nature Center (Ivoryton, in Essex)
Connecticut River Museum (Essex)
Denison Pequotsepos Nature Center (Mystic, in Stonington)
Rocky Neck State Park Nature Center (East Lyme)
Roger Tory Peterson Estuary Center (Old Lyme)
Nature Centers, Science Centers, and Aquaria Further Afield:
Middlesex County
Oak Lodge Nature Center at Chatfield Hollow State Park (Killingworth)
Platt Nature Center (Killingworth)
Northern Counties, in the watershed: Hartford County & Tolland County & Windham County
Dinosaur State Park (Rocky Hill)
Connecticut Science Center, Hartford
Connecticut State Museum of Natural History (Storrs, UConn)
Goodwin Forest Conservation Education Center (Hampton)
New Haven County
Ansonia Nature and Recreation Center (Ansonia)
Barnard Nature Center at West River Memorial Park (New Haven)
Connecticut Audubon Society Coastal Center at Milford (Milford)
Henry Hamel Environmental Center (Seymour)
Kellogg Environmental Center (Derby)
Meigs Point Nature Center at Hammonasset Beach State Park (Madison)
Riverbound Farm (Cheshire)
Shoreline Outdoor Education Center (North Guilford)
Fairfield County
Brookfield Nature Center (Brookfield)
Bruce Museum’s Seaside Center (Greenwich)
Connecticut Audubon Society Birdcraft Museum and Sanctuary (Fairfield)
Darien Nature Center (Darien)
Earthplace (Westport)
Sherwood Island State Park Nature Center (Westport)

⁸ (Mystic Aquarium 2020)

⁹ (Mystic Seaport Museum 2020)

¹⁰ (Hallenbeck 2019)

¹¹ (Niantic Children’s Museum 2021)

NATURE CENTERS, SCIENCE CENTERS, AQUARIA, AND CULTURAL MUSEUMS
Soundwaters (Stamford)
Stamford Museum & Nature Center (Stamford)
The Maritime Aquarium (Norwalk) – 500,000 visitors / year (2019) ¹²
Trumbull Nature & Arts Center (Trumbull)
Webb Mountain Discovery Zone (Monroe)
Woodcock Nature Center (Wilton)

Currently, there are no ideal locations within the proposed CT NERR for a nature center or large visitor center that is open to the public for drop-in visits. Avery Point campus could consider during facility planning, a small welcome center for groups visiting the reserve for planned education, training, and research opportunities, but a traditional nature center is likely not a good fit on the campus for the following reasons: (1) whereas the campus does include shoreline access via a shoreline trail along the edge of campus, this relatively short trail is not what one expects to find at a nature center, (2) as a college campus, the main goal is the education of college students and attempts to draw large audiences of tourists to campus are inconsistent with the mission of the campus, and (3) the Avery Point campus is not adjacent to or in the natural uplands of the reserve properties, thus visitors will not have a true place-based experience.

Another consideration for a nature center has to do with the current market. Southeastern Connecticut is home to many nature centers, cultural centers, aquaria, and museums (Table 7-2). Considering only those organizations within a 15-minute drive of a reserve property (nine) and those which reported annual visitor attendance (four), existing operations draw over one million forty thousand visitors annually. Considering only nature centers and science centers in coastal counties of Connecticut or within the Connecticut portion of the Connecticut River or Thames River watersheds, there are an additional 26 facilities in operation. Given the density and success of existing facilities that serve the public as nature-based and science-based attractions coupled with the challenges of establishing a tourist attraction on a college campus, partnering with these organizations to advertise and interpret the reserve is likely a better path forward. A number of these organizations have already expressed interest in partnering with the proposed CT NERR; a key task in the first five years following designation will be building upon this interest to develop a communication plan that educates people about these natural places.

7.4 Planned Facilities

The site partners (UConn and DEEP) of the proposed CT NERR currently have facilities that will be available upon designation for reserve program needs, but additional facilities may be needed within the 5 to 10 year time period post-designation. During the first 5 years of operation, the proposed CT NERR will install the necessary SWMP infrastructure as well as evaluate needs for future facilities and pursue solutions as feasible to enhance or develop facilities during the first 5-year term; the reserve also

¹² (The Maritime Aquarium 2021)

will develop a prioritized list of facility needs for the long term. As funds become available, facility development will proceed based on this list of priorities. All facilities will comply with federal, state, and local codes and regulations. In addition, any new facilities will be designed and constructed using sustainable building principles and in a manner that minimizes environmental impacts to the extent feasible. As noted earlier, the University of Connecticut adopted a Sustainable Design and Construction Policy, stating that the University of Connecticut shall plan, design, construct, renovate and maintain sustainable, energy and water-efficient buildings (UConn 2021b). All new construction projects at UConn estimated at greater than \$5 million must pursue at least a LEED Gold rating. Similar design principles apply for DEEP facilities. For example, solar energy is utilized at DEEP Marine District Headquarters, as evidenced by the collector in the front of the administration building; all lighting throughout the complex was upgraded to meet more current energy conservation requirements; and planning for the addition of solar arrays to the large boat storage building roof to be funded through the Green Bank initiative.

The proposed CT NERR staff, the RAC, and the Friends Group will identify future facility needs through a planning process. An analysis of the long-term future facilities needs will be explored during the second half of the first 5 years after designation. The analysis will identify facility needs which may include: a small welcome center, office space, laboratories, classrooms, and equipment storage, which may be necessary for the continued successful operation and future growth of the reserve. The analysis will also determine the extent to which the existing facilities at the Avery Point campus meet the proposed CT NERR's needs, as well as other typical construction considerations (cost, location, etc.). Options that could be used to address facility needs include renovating existing buildings or constructing new facilities on the Avery Point campus property. Development or expansion of new facilities will depend on agreed upon priorities and availability of funding and receipt of all required permits and approvals.

7.5 Climate / Non-Climate Stressors

As the proposed CT NERR staff and the RAC identify future facility needs through the planning process described above, they will include consideration of climate and non-climate stressors that may affect facilities. The types of stressors typically considered include climate change, environmental impacts, social impacts, and feasibility. In 2010, NOAA developed a framework for considering climate change impacts in planning and decision making for coastal investments in restoration, facilities development, and land acquisition. The climate stressors pertinent to reserve facility development planning should include changes in relative sea levels, changes in storm intensity, and changes in precipitation patterns. The non-climate stressors should include other natural hazards (tsunami, flood, fire, rockfall, and erosion), considerations of environmental impacts, ability to meet program needs, and sustainability of use including lifespan. Consideration of these stressors will be incorporated into the planning process described above.

The proposed CT NERR staff and the RAC's planning process will use the facilities planning tools developed for the Reserve System including the guide for "Planning for Sustainable Facilities" (NOAA OCM 2013). This tool has guidance on incorporating climate change impacts and green or sustainable

building practices that are environmentally responsible and resource efficient throughout a building's life-cycle, from siting to deconstruction. The planning process will also follow guidelines established by UConn as part of the Sustainable Design and Construction Policy (UConn 2021b).

8 Land Acquisition Plan

Estuaries and their associated habitats offer numerous and diverse benefits to society and natural systems. Some of these benefits include storm buffers to protect property from hurricanes, nurseries for commercially important marine species, and areas to enjoy for recreation and aesthetics. However, human development has significantly eliminated or degraded the habitats that provide those societal services.

To address the current and future protection of the Reserve's key habitats, NOAA supports acquisition of lands within or surrounding Reserve boundaries through the Coastal Zone Management Act of 1972, as amended (CZMA), which authorizes the Reserve System Land Acquisition and Construction Program under Section 315, and Coastal Resource Improvement Program authorized under Section 306A. Each of these programs provides an opportunity to conserve coastal habitats and increase public access to the coast. The CZMA also authorizes the Coastal and Estuarine Land Conservation Program (CELCP) under 307A, which may present additional opportunities if funded in the future.

8.1 Description of Potential Acquisition Areas

As a newly designated reserve with a number of properties encompassing a substantial estuarine area, the proposed CT NERR does not plan to acquire additional areas during the term of this initial five-year management plan beyond what will be incorporated into the reserve upon designation. Properties adjacent to the proposed CT NERR or in areas nearby that expand the boundaries beyond the current footprint moving further north into the Connecticut River were evaluated as alternatives in *Section 4.2* of the *Final Environmental Impact Statement* and are possible candidates for future land acquisition or incorporation under current ownership for the proposed CT NERR. They are:

- The Nature Conservancy (TNC) parcels in the lower Connecticut River area (Great Island, Griswold Point, Ragged Rock Creek, and Lord Cove). These do not include any properties in the same area that are identified by TNC as conservation easements.
- Essex Land Trust parcels in Great Meadows, Essex which include a combination of parcels owned in fee and with conservation easements to the U.S. National Resource Conservation Service (NRCS).

- Essex Land Trust parcels on Thatchbed Island in Essex which include a combination of parcels owned in fee and with conservation easements to the U.S. National Resource Conservation Service (NRCS).¹³
- The DEEP-owned properties of Machimoodus State Park, and the Nott Island, Thatchbed Marsh, Ferry Point, and Ragged Rock Creek Wildlife Management Areas.
- In a general sense, additional areas that include local or regional land trusts that are adjacent to current boundaries of the proposed CT NERR may also be areas that future management plans consider.

In addition, there were other suggestions that, while not part of the formal suite of alternatives included in the *Draft/Final Environmental Impact Statement*, may be considered for future inclusion. They can be found in *Section 4.3* of the *Final Environmental Impact Statement* and are summarized as follows:

- all / additional Ramsar-designated wetlands along the Connecticut River, that cover an area roughly bounded by the mouth of the Connecticut River to Middletown as described in the Ramsar nomination report for Connecticut.
(<https://rsis.ramsar.org/RISapp/files/RISrep/US710RIS.pdf>)
- the Silvio Conte US Fish and Wildlife property in Old Lyme,
- the Connecticut Audubon Society property in East Haddam, just south of Machimoodus State Park, and
- Rocky Neck State Park in East Lyme.

While several TNC properties with conservation easements in the lower Connecticut River were suggested as part of the *Draft Environmental Impact Statement* process, at the request of TNC these were removed from consideration and therefore may not represent viable options to consider in the future.

The options and priorities for acquisition are evaluated every five years as the management plan is revisited and renewed. Thus sites that were not considered during the site selection process or during the development of the Final EIS are not precluded from inclusion in future iterations of the management plan. For example, inclusion of the Eagle Landing State Park, which provides public access to the Connecticut River, was suggested during the Draft Environmental Impact Statement/Draft Management Plan public comment period which closed on October 18, 2021.

¹³ There are three parcels making up Thatchbed Island associated with the Essex Land Trust through the Essex property records system. All three contain an NRCS conservation easement that spans parts of them; one parcel additionally contains the 2 units of Thatchbed Island Wildlife Management Areas.

8.2 Priority Areas Acquisition Strategy

When preparing the 2027–2032 management plan, the proposed CT NERR will follow current NOAA Reserve System program guidance on developing a more robust land acquisition plan, including providing detailed descriptions of the criteria used to prioritize areas, the prioritization process used, and any additional factors that influenced the selection of areas. In addition, state-based resources—notably the Connecticut Green Plan (<https://portal.ct.gov/DEEP/Open-Space/The-Green-Plan>)—will also be consulted and used in future acquisition strategies. Although NOAA’s CELCP program is currently inactive, Connecticut’s 2015 CELCP Plan may provide helpful guidance.

(<https://coast.noaa.gov/data/czm/landconservation/media/celcpplanctfinal.pdf>) What follows are general strategic parameters that can serve as a foundation to be built upon.

8.2.1 Tract Acquisition Strategy

Parcels considered should be under adequate state or local government control and chosen such that the appropriate uses would be consistent with the goals and objectives of the proposed CT NERR. For lands that may not already be under adequate state or local control, the process to consider which properties to acquire will need to be investigated among involved parties, followed by an examination of uses that would be consistent with proposed CT NERR goals and objectives. The level of restoration needs and existing resource manipulation activities within the potential properties and the results from ecosystem-based management assessments will also be considered when evaluating potential acquisition areas.

8.2.2 Climate and Non-climate Stressors

Acquisition planning typically involves assessing anthropogenic and natural stressors to help inform other aspects of prioritization and selection of lands for acquisition such as those described in *Section 8.2.1*. Types of stressors typically considered include the level of on-site development, threat of adjacent or proximal development, invasive species, pollution / contaminant presence and levels, and land zoning. Climate-related stressors are often not commonly factored into these processes, though the practice is gaining traction (in fact the proposed CT NERR site selection process included climate impact considerations to both resources and facilities). In 2010, NOAA developed a framework for considering climate change impacts in planning and decision making for coastal investments in restoration, facilities development, and land acquisition. That framework states that new or updated acquisition plans that are part of reserve management plans must integrate climate considerations. The climate stressors pertinent to land acquisition for the proposed CT NERR are the same as identified in *Section 2.4* and include changes in relative sea levels, changes in storm intensity, and changes in precipitation patterns.

8.2.3 Tract Ecological and Programmatic Values

Any parcels identified for possible future inclusion in the proposed CT NERR are likely to have many ecological and programmatic values. These additions would therefore likely provide a more complete upland and estuary system to research and monitor. Additionally, their value to support place-based education and training would also need to be well understood so that any acquisitions could provide as much value to the proposed CT NERR as possible.

8.2.4 Methods for Establishing State Control

According to the Reserve System Federal Regulations, a reserve must establish adequate state control over new areas acquired for inclusion in the reserve boundary. The various approaches to achieve state control can include entering a management agreement for the site, regulation, fee simple acquisition or less-than-fee simple property interest (conservation easement), through property acquisition, or donation, or a combination of these approaches.

8.2.5 Fair Market Value Estimates

For land acquisitions where the primary target is state or local government lands, it is not anticipated that the properties would be purchased; rather, negotiations are anticipated to provide them voluntarily by the state or local government entity, or in an exchange for comparable lands or arrangements. Therefore, fair market value estimates would not be needed.

If a land trade, actual sale, or other ownership transfer does require fair market value estimates, these will be developed as part of the investigation of the property.

8.2.6 Estimated Acquisition Timeline

As described in *Section 8.1*, during this five-year management plan, the proposed CT NERR will not seek to acquire additional property. Therefore, no timeline is provided.

9 Resource Manipulation Plan

As used within the NERRS, the term "resource manipulation" describes certain human activities that significantly modify the natural condition such as agriculture; recreation; development and operation of research and public use facilities; and infrastructure improvements such as harbors, roads, and utilities. It is important to note that not all human activities are considered resource manipulation. In some cases these manipulative activities may also provide important ecosystem services to the natural systems. When occurring within proposed CT NERR boundaries, these manipulation activities should be

compatible with the reserve's overall vision and mission (*Section 3.1*), coexist with reserve goals and objectives (*Section 3.4*), and comply with the NERR regulations at 15 CFR § 921.1(d).

Section 5.2 identifies allowable and unallowable uses occurring with the proposed CT NERR as they relate to both specific upland properties and the offshore area. In the offshore area the following uses can best fall within the category of resource manipulations. The sections below describe these existing resource manipulation activities, provides justification for the continuation of these activities, and addresses what the proposed CT NERR will do to manage or address any impacts.

9.1 Current and Potential Resource Manipulations

9.1.1 Longstanding, Pre-Existing uses regulated under CT Coastal Zone Management

As Long Island Sound is a waterbody with a long history of use, it should not be surprising that there are many varied longstanding and pre-existing activities that occur within the boundary of the proposed CT NERR.

To ensure a balance between the needs of human uses and balancing coastal resources, DEEP's Land and Water Resources Division (LWRD) regulates all activities conducted in tidal wetlands and in tidal, coastal, or navigable waters in Connecticut under the Structures, Dredging and Fill statutes, C.G.S. §§ 22a-359 - 22a-363h, inclusive, and the Tidal Wetlands statutes, C.G.S. §§22a-28 - 22a-35, inclusive. Depending on the nature of the activity, a state Water Quality Certificate may also be necessary. Certificates are issued by DEEP in accordance with Section 401 of the federal Clean Water Act and the Connecticut Water Quality Standards and are generally incorporated in any corresponding DEEP authorizations.

LWRD's major objectives in regulating activities are to avoid or minimize navigational conflicts, encroachments into the state's public trust area, and adverse impacts on coastal resources and uses, consistent with Connecticut's Coastal Management Act (CCMA), C.G.S. §§ 22a-90 - 22a-112, inclusive. Proposed activities are reviewed to determine their potential effect on coastal resources and uses. Factors for consideration include the effect of the project on:

- the preservation of natural habitats and living marine resources;
- shoreline erosion and coastal flooding;
- water quality and pollution control;
- the use and development of all adjoining lands;
- coastal and inland navigation;
- use of the state's public trust land and water; and,

- the rights and interests of all persons concerned with the proposed activity.

Table 9-1 provides a summary of the most common categories of activities, a description of what they are or how they are regulated, and what types of impacts may be associated with them.¹⁴

Table 9-1: Offshore Resource Manipulations

Coastal Activity	Description	Generally expected impacts
Dock / Ramps / Floats / Pilings	Structures that provide access to and use of waterbodies. Design should prevent shading of tidal wetland grasses and intertidal flats, avoid areas of submerged aquatic vegetation, minimize encroachment into public trust lands, and allow continued navigation and public access along the shore. A generally acceptable dock design in most settings includes a fixed pier extending to mean low water with a ramp and a 10' x 10' float.	Localized disturbances to the benthic and aquatic environments during construction and repair activities.
Boat Moorings	Boat moorings (anchored or clothesline-rigged, or an unattached small float) support private recreational use but must not be located in federal navigation channels or anchorages. Moorings must not be installed in tidal wetlands or over submerged aquatic vegetation. Moorings authorized by a Harbor Master are eligible for General Permit, otherwise they must be approved by LWRD.	Localized disturbances to the benthic environment during installation

¹⁴ The content of Table 9-1 is taken from <https://portal.ct.gov/DEEP/Coastal-Resources/Coastal-Permitting/Overview-of-the-Connecticut-Coastal-Permit-Program>, and summarized as necessary for the proposed CT NERR offshore boundary area.

Coastal Activity	Description	Generally expected impacts
Swim Floats	Swim floats may only be used for swimming and associated recreation, may not exceed 200 square feet in area, and must be seasonally removed. They must not be located over submerged vegetation and must not interfere with navigation or public access along the shore.	Localized disturbances to the benthic environment during installation and removal.
Personal Watercraft Floats	Floats used for personal watercraft must not be located over submerged aquatic vegetation.	Localized disturbances to the benthic environment during installation
Bulkheads / Revetments / Seawalls	Typically shore-parallel structures; Existing structures that have been authorized and maintained in functional condition may generally be repaired. New construction may only be authorized when all criteria for permissible structural solutions as specified in C.G.S. § 22a-92(b)(2)(J) have been met.	These structures often perpetuate or exacerbate the erosion of local as well as adjacent shoreline.
Goins / Jetties	Typically shore-perpendicular structures; Groins and jetties that have been authorized and maintained in functional condition may generally be repaired when they are designed to minimize resource impacts. New construction may only be authorized when all criteria for permissible structural solutions as specified in C.G.S. § 22a-92(b)(2)(J) have been met.	May have impacts to local and nearby shoreline sediment transport and deposition; can influence / alter natural circulation patterns and contribute to loss of intertidal and subtidal habitat.

Coastal Activity	Description	Generally expected impacts
Utility infrastructure	Submarine cables and pipelines must be sited to minimize impacts on intertidal and subtidal resources, including shellfish beds and submerged aquatic vegetation, and must not interfere with navigation and public access.	Localized disturbances to the immediate benthic areas during installation or repair activities.
Dredging*	Maintenance dredging of marina basins and navigation channels may be authorized if dredging has been previously authorized by DEEP. Such maintenance dredging must not encroach into previously undisturbed subtidal habitat and is subject to seasonal restrictions. New dredging is strongly discouraged; dredging of tidal wetlands and intertidal flats is not allowed.	Localized disturbances to the benthic environment. Drifting sediment can impair reproductive success during periods of shellfish and finfish spawning.
<p>* The aquatic placement within Long Island Sound of sediments removed during dredging is permissible pursuant to authorization through federal and state statutes and regulations; however, there are no sites within the proposed CT NERR boundaries that are currently authorized to receive dredged sediments. As such, they are not addressed in this section. The proposed boundary does include portions of two discontinued (historic) disposal site which were, but are not presently, used for aquatic placement.</p>		

While the overall offshore area where activities such as these may potentially occur is theoretically rather large, for practical purposes they are found:

1. Within an approximately 450-foot buffer extended from the shoreline (or more when needed to contain a particular structure or activity). This would capture virtually any nearshore activity involving, docks, piers, groins, jetties, seawalls, bulkheads, revetments, floats, ramps, and pilings as well as common areas for maintenance dredging.
2. Within navigation channels and turning basins as depicted on Nautical Charts, or in anchorages depicted on Nautical charts where the depth range is less than approximately 30 feet. This would capture potential areas that may require moorings or could require future maintenance dredging.

3. Within any other areas that involve or are known to be involved with past dredging activities not already addressed by items 1 & 2.
4. Within areas depicted as submerged cable or pipeline areas on Nautical Charts, which would cover any future maintenance needs or the scenarios of co-located new installations.
5. Within areas that, based on reasonable knowledge or expectations, may likely entertain or possibly eventually contain new cable or pipeline infrastructure installations.
6. Within any areas that may not necessarily fall within the above categories but may have those areas nearby along with concentrations of water-dependent uses. This would capture the lower Thames River from the Gold Star Bridge / Interstate 95 to the vicinity of the river mouth.

As resource manipulations that are examples of longstanding, pre-existing uses, there are justifiable reasons for these to continue.

First, many address fundamental rights that enable private property owners and water-dependent uses appropriate access and use of the waters of Long Island Sound and the associated bays, harbors, coves, and rivers that adjoin it. Water-dependent uses are defined in the Connecticut Coastal Management Act as recreational, commercial, and industrial uses and facilities which require direct access to, or location in, marine or tidal waters. (Some examples of water-dependent uses are marinas, boatyards, marine transportation facilities.)

Secondly, dredging related activities are necessary to ensure both navigation safety for recreational and commercial marine interests and to support the continued viability of water-dependent uses such as marinas and similar entities. According to the *Environmental Impact Statement* process (USEPA 2021b) for the December 2016 USEPA Final Rule (81 FR 87820) that designated the Eastern Long Island Sound Disposal Site (ELDS) located nearby (but not within) the proposed CT NERR boundary, dredging needs for the Connecticut, Rhode Island, and New York are anticipated to amount to 20 million cubic yards over a 30-year planning horizon. As Long Island Sound represents the receiving body for freshwater flows at the terminal end of many watersheds—some of which are significantly extensive and can extend northward through other New England states—addressing the volume of sediment entering and deposited in state waters is critically important to the many water-dependent uses that require maritime safety, navigation, infrastructure, and commerce (Long Island Sound Inventory and Science Subcommittee of the Blue Plan Advisory Committee 2019).

Lastly, Long Island Sound has offshore infrastructure installation such as cables and pipelines that are needed to address energy and telecommunication needs within areas of the state as well as from areas outside of the state. With interest in delivering potential renewable energy from windfarm lease areas located outside of Connecticut waters through state waters for connection to the New England energy grid, the use of existing infrastructure corridors and likely land-based connections in the vicinity of suitable coastal energy facilities must be considered as a justifiable need.

Therefore, the proposed CT NERR will address these resource manipulations in the following ways. It will:

- continue to rely on the existing regulatory structures that govern the review and proper authorizations of activities that occur within its boundaries.
- based on the areas described by items 1-6 listed above, establish offshore buffer areas pursuant to 15 C.F.R. § 921.11 as part of its overall boundary to contain resource manipulations.
- regularly coordinate with federal, state, and local entities such as USEPA, USACE, DEEP LWRD, DA/BA, Connecticut Sea Grant, and municipal shellfish commissions to ensure an understanding of current and proposed manipulation activities within the reserve boundary.
- participate in regular and ad-hoc meetings or workgroups in coordination with organizations with expertise and relationships in manipulation activities to learn about local and regional practices and to share relevant information (research, best management practices, etc.) from the local, regional, and NERRS perspectives.

By proceeding as such, the proposed CT NERR will ensure that activities related these resource manipulations, while significant within the context of submerged resources but nonetheless vital to Connecticut, will be consistent with the overall mission and vision of the proposed CT NERR:

Proposed CT NERR Vision:

A resilient, healthy Long Island Sound estuary and watershed where human and natural communities thrive.

Proposed CT NERR Mission:

To collaboratively integrate science with conservation, learning, recreation, and economic viability using ecologically diverse sites in southeastern Connecticut

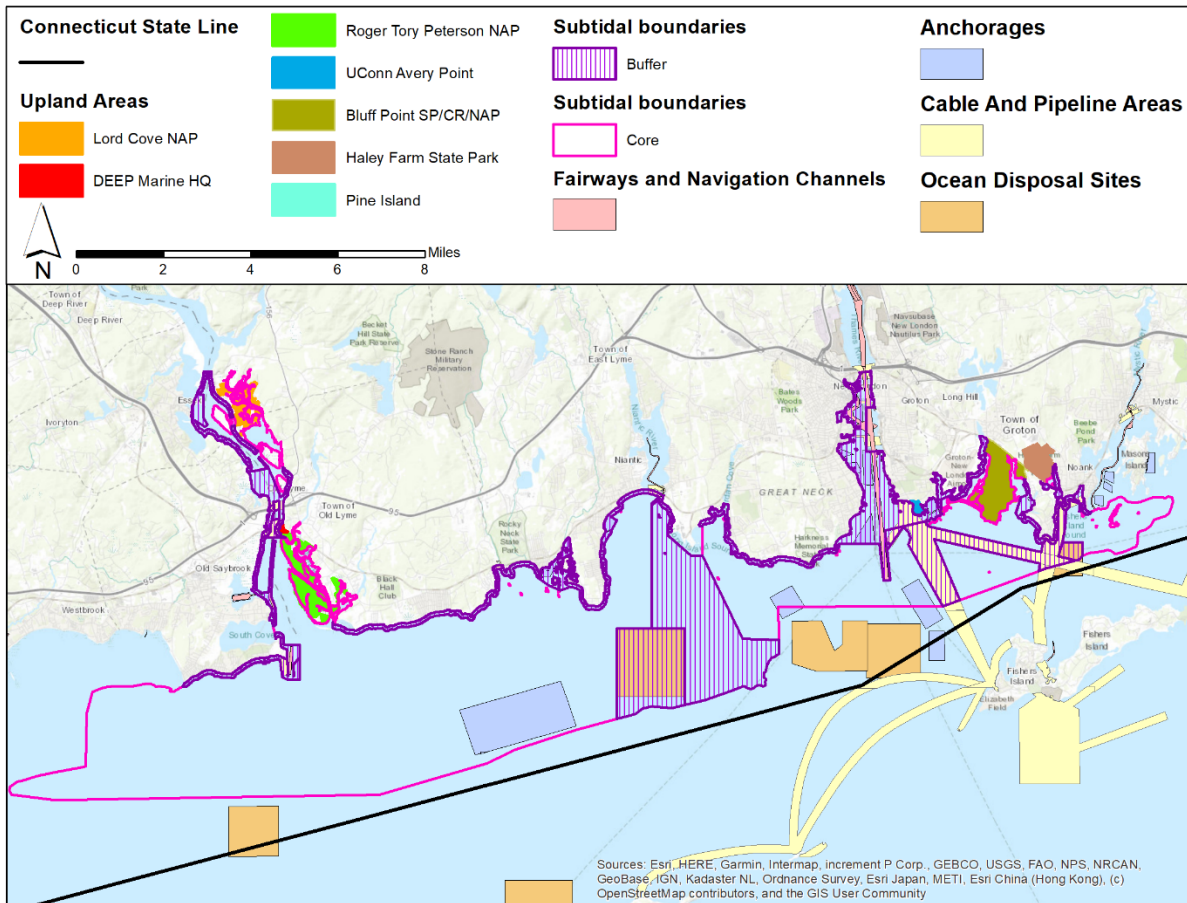


Figure 9-1: Offshore Resource Manipulations and Core / Buffer areas

Locations of resource manipulation activities in the offshore area of the proposed CT NERR, as provided by the Long Island Sound Blue Plan (DEEP 2019b), along with areas defined as core and buffer.

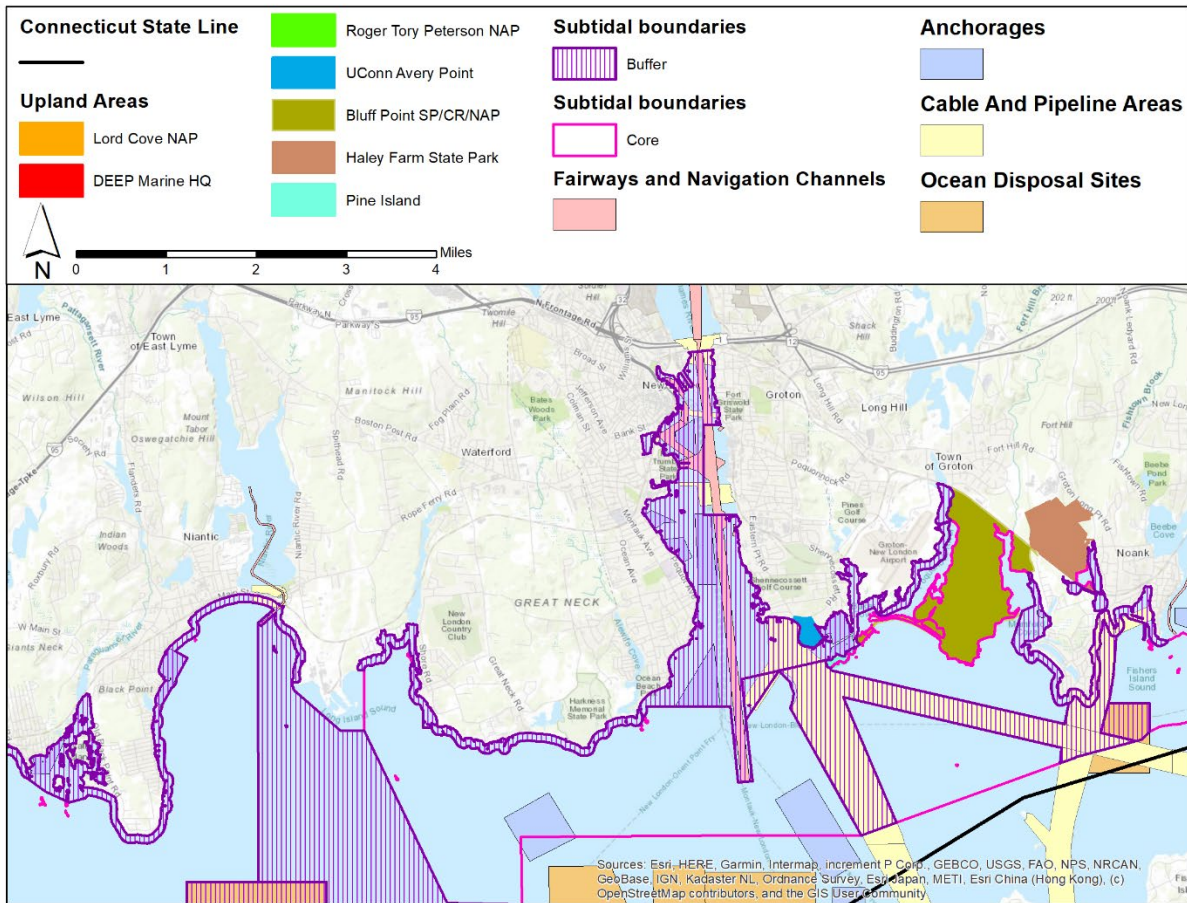


Figure 9-2: Offshore Resource Manipulations and Core / Buffer Areas—Eastern Area Close Up
 A zoomed-in look at the eastern areas of the proposed CT NERR displayed in Figure 9-1, to provide a closer look at offshore areas where examples of resource manipulations are used to designate offshore buffer areas.

10 Resource Restoration Plan

Habitat restoration at the proposed CT NERR should seek to improve the ecological integrity and biogeographical representative character of the reserve, provide habitat for a diverse range of species, and improve the knowledge base of the science and practice of habitat restoration.

10.1 Priority Restoration Areas / Descriptions

The current areas of the proposed CT NERR have a long history of active management and restoration activities (Dreyer and Niering 2001). As a result, they do not require extensive restoration efforts to

ensure a functioning, healthy ecosystem that can immediately support anticipated reserve needs surrounding research, education, and training. To be clear, this is not to say that these areas are devoid of any restoration needs now or in the future—particularly in the face of threats that rising sea levels may have on coastal marshes that may require a blend of traditional and new / novel techniques, or threats posed by invasive species. With past experience as a guide, below is a list of restoration activities and locations that may host future efforts during the first five years, should the need arise. (NOTE: area maps depicting the exact location and extent of these may not exist so general descriptions of locations within the properties are provided instead).

- Invasive species (*Phragmites australis*) control – mulching and herbicide within Lord Cove NAP, Roger Tory Peterson NAP, and the western portion of the Bluff Point complex.
- Various tidal marsh restoration efforts at Roger Tory Peterson NAP to improve hydrology (e.g., excavations, ditch plugging / filling) and similar smaller scale efforts on the western side of the Bluff Point complex.
- Tidal marsh restoration and eelgrass restoration in Mumford Cove, on the eastern side of Bluff Point.
- Although not specifically occurring within the reserve, Connecticut is active in the restoration of riverine connectivity, particularly via dam removal and the installation of fish passages. The impacts of these activities, both positive and negative, have impacts for downstream waters and watersheds, and thus are worth noting here as areas for the reserve staff to be aware of and involved with, where appropriate.

While the above may not necessarily require active implementation efforts during the first five years, addressing the spread of the aquatic freshwater invasive hydrilla (*Hydrilla verticillata*) will be a point of emphasis as areas of the lower Connecticut River are seeing instances of negative impacts to both the river's ecology and use.

Additionally, several emerging areas of restoration activities should be noted such as the application of various living shoreline techniques, thin layer placement to elevate marsh surfaces, changes to historic strategies of routine marsh ditch cleaning, and shellfish restoration. These types of activities are included within the context of the program area objectives and tasks found in Chapter 11. Federal, state, and local partners are beginning to either evaluate or implement these improvements via initial steps, and the proposed CT NERR will need to play a role as these efforts mature and evolve in Connecticut, most notably through the research and monitoring program and in collaboration with reserve stewardship.

10.2 Priority Restoration Planning

Any restoration efforts the reserve may seek to address will need to be carefully considered both internally among reserve staff and externally among partners. DEEP—as the owner and overall land manager of the state parks, NAPs, and wildlife management areas within the reserve—will need to be

closely involved in any project planning or prioritization to ensure the proposed needs and strategies are desired and appropriate where these properties are concerned. However, restoration considerations do not relate to just DEEP involvement as there are other groups and organizations that are part of restoration-related efforts within Connecticut. Nor are they limited to “on the ground” efforts. The proposed CT NERR, therefore, will establish the following steps:

Vulnerability Assessment: During the initial five year management planning window the proposed CT NERR staff will conduct a vulnerability assessment to help guide conservation and restoration priorities.

Integration with communities of practice: Identify and participate in restoration-related working groups and organizations to help advance the needs of ecosystem-based restoration efforts, including:

- Long Island Sound Study Habitat Restoration Workgroup
- Shellfish Restoration Workgroup
- Invasive Species Workgroups (both terrestrial and aquatic)
- UConn-CIRCA

While the above list represents potential avenues in which the proposed CT NERR can help plan for and advance restoration, it is not intended to be exhaustive. When and where possible, the proposed CT NERR should seek to reach out to other relevant groups as needed to help understand the causes of habitat threats and stressors and advance restoration needs for the reserve. (See Research Objective R2.S5.). Engagement with reserve advisory committees as described in previous sections should be a key part of this work.

Land Management Collaboration: Regularly coordinate through the Stewardship Coordinator or designees of the Reserve Manager with appropriate DEEP points of contact within the Coastal Management, Parks, Fisheries, and Wildlife Divisions to identify possible restoration needs and actions as they apply to reserve land and water areas. To the extent that any plans proceed towards implementation with the reserve as the lead entity, all regulatory requirements at the local, state, and federal levels will need to be addressed and complied with.

Adding knowledge: Through the efforts of the research and monitoring program, implement the tasks identified under objective R2, strategy S5, and , consider restoration concepts within the broader context of ecosystem resilience and integrate and share other reserve research and education efforts with local partners. Further, leverage the capacity for the proposed CT NERR to become a restoration reference site for the restoration community of practice in the region.

11 Reserve System Program Foundations

As introduced in *Section 3.4*, the unique goals and objectives developed for the proposed CT NERR are applicable and responsive to the needs of our local stakeholders and consistent with the three strategic

goals established in the *2017-2022 National Estuarine Research Reserve System Strategic Plan* (NOAA OCM 2017). Further, the objectives were developed to address the unique needs and challenges faced by the proposed CT NERR while simultaneously considering the capacity and ability of the proposed CT NERR to reach our objectives and meet our goals. The goals for the proposed CT NERR are:

Goal 1: Increase our understanding of the effects of human activities and natural events through collaborative research and monitoring to improve informed decision making and support adaptive management of coastal ecosystems.

Goal 2: Strengthen stewardship, protection, and management of estuaries and their watersheds through place-based approaches to training and education in order to maintain and enhance natural environments.

Goal 3: Advance environmental appreciation and scientific literacy utilizing a place-based approach, to enhance people’s ability to make science-based decisions that positively affect estuaries, watersheds, and coastal communities

Geographic Scope: The proposed CT NERR is centered around the lower reaches of two of the largest watersheds draining into the tidal waters of Long Island Sound: the Connecticut River watershed and the Thames River watershed. The upland and intertidal areas have a variety of habitat types including the last remaining significant piece of undeveloped land along the Connecticut coastline (Bluff Point complex), and what is believed to be the largest expanse of tidal marshes that are adjacent to undeveloped upland habitat anywhere along the U.S. east coast from New York City to Maine. The subtidal areas are substantial and span a rich diversity of human uses and opportunities for connection to the estuary.

The Connecticut River is the longest river and the largest watershed in New England, providing approximately 75% of all fresh water entering Long Island Sound (Latimer et al. 2014). The Connecticut River will connect the proposed CT NERR with New England communities stretching from Connecticut, through Massachusetts, Vermont, and New Hampshire, all the way to the Canadian border. This watershed connection brings potential opportunities for the proposed CT NERR to collaborate with a well-established network of upstream organizations. The Connecticut River is also unusual because, despite its length and geographic importance, the river mouth is relatively undeveloped, with expanses of tidal marshes instead of a large port city.

The Thames River, in contrast, is highly urbanized and industrialized at its mouth, where it forms the boundary between the cities of Groton and New London. The Thames River supports critical economic and national security infrastructure, including General Dynamics Electric Boat facility, Dow Chemical Company, Pfizer Inc., the Naval Submarine Base New London, and the United States Coast Guard Academy. The Port of New London is an important deepwater port and may be poised for a renaissance

as a base of operations for offshore wind projects in development off the coasts of Connecticut, Massachusetts, Rhode Island, New York, and New Jersey.

The proposed CT NERR also includes a substantial part of eastern Long Island Sound and western Fishers Island Sound, which include various hardbottom (reefs, gravelly areas, bedrock, and rock / boulder features), large areas of softbottom (mud, silts, and sand), and submerged aquatic vegetation beds. These span depths from very shallow (just below the surface) to very deep (over 100 feet). As with the upland areas, the subtidal zone supports many different habitats with a vast range of ecological diversity and functions. Recently, an active program of sea-floor mapping (including acoustic imagery collection and ecological, geological, and physical oceanographic data collection and analyses) is well-poised to support areas of research and education.

Partners and Collaborators: Several organizations have been involved with the process of designating the proposed CT NERR—participating in public meetings, attending presentations / talks, offering input on the *Draft Environmental Impact Statement* and on the *Draft Management Plan*, and participating in interviews to start the process of identifying overlap between reserve programs and existing program offerings. The list included in *Appendix F: Exploring Collaboration for the Proposed CT NERR* represents a small subset of organizations that have actively engaged with the proposed CT NERR during the designation process. It is not intended to capture all the organizations that attended the public meetings, which included representatives from educational organizations; the management community; the research community; advocacy organizations; restoration practitioners; and a thriving network of local land conservancies, conservation commissions, environmental and outdoor organizations, and conservation districts. Rather, it represents an initial look at how groups within the landscape demonstrate connections to reserve program areas and can serve as a basis for the forthcoming market analyses and needs assessments. As a matter of common practice, the proposed CT NERR staff will explore opportunities with these organizations moving forward and will explore partnerships and potential synergies with other organizations and stakeholder groups that have not yet engaged with the proposed CT NERR.

11.1 Research and Monitoring Program

The proposed CT NERR couples research with monitoring efforts to inform changes and to advise adaptive management strategies amidst climate and human development stressors. The proposed CT NERR research plan is driven by the national NERR primary objective of “*research within the Reserve System to support sound decisions by coastal resource managers and landowners*” (NOAA OCM 2017).

11.1.1 Reserve System Research and Monitoring Program

Reserves are created to provide a stable platform for long-term research on estuarine conditions and relevant coastal management issues. The System-Wide Monitoring Program (SWMP) delivers standardized measurements of short-term variability and long-term changes in water quality and biological systems, and maps land use and land cover characteristics across all reserves. The effort is

focused on three ecosystem characteristics: abiotic characteristics (water temperature, salinity and quality, and weather); biotic characteristics (habitat types and species); and watershed and land use characteristics (land cover and elevation changes). Reserve-generated data meet federal geographical data standards and are available via the Reserve System's Centralized Data Management Office. Reserves also serve as sentinel sites for observing how coastal habitats respond to changing water levels. This program is guided by the Reserves' System-Wide Monitoring Program Plan, the Reserve Habitat Mapping and Change Plan, and Sentinel Sites Guidance.

The Reserve System also supports applied research through its Science Collaborative program and the Margaret A. Davidson Graduate Fellowship program. The Science Collaborative funds competitive research projects that engage end-users in the project design and address system-wide Reserve System research and management needs. The goal of the Davidson Fellowship is to build the next generation of leaders in estuarine science and coastal management. The fellowship provides opportunities for graduate students to conduct research within a reserve under the guidance of a mentor who also supports their professional development.

The Reserve System Strategic Plan outlines research objectives to maintain and expand biophysical and socioeconomic monitoring to track environmental change, increase the use of collaborative research to address decision-maker needs, and ensure that scientific, education, and management audiences can use the data, research results, and tools developed by the system.

11.1.2 Context - Research and Monitoring Program

Geographic Scope: The proposed CT NERR offers excellent opportunities for long-term research. Taken as a whole, the site contains a mosaic of upland, transitional, and subtidal habitats situated proximal to a variety of coastal uses including developed waterfronts at the mouth of the Connecticut River and Thames River, significant recreational and commercial boating and fishing, and shellfishing and aquaculture. The offshore areas of Long Island Sound have supported long-term research and monitoring efforts for physical oceanography, water quality, benthic habitats, and fisheries assessments. This combination of resources and uses is reflected in a broad examination of research activities found in both the peer-reviewed and non-peer-reviewed literature conducted to support the NERR site selection process. This meta-analysis identified close to 200 papers or projects on topics ranging from tidal wetland restoration, vegetative assessments, species predation patterns, population dynamics, invasive species identification and control, climate change, water quality impacts, nutrient loading effects, and other topics.

The location of the UConn Avery Point campus, with world-class facilities and resources, in close proximity to core areas of the reserve is extremely valuable. As such, there are multiple opportunities for important research regarding estuary habitat dynamics, long-term ecosystem monitoring and trend analyses, as well as emergent areas including climate change, aquaculture best practices, etc. Results from these investigations will help address and inform key coastal management issues. Designation of a reserve in Connecticut creates valuable opportunities for comparative research with other nearby

estuary systems both within the Reserve System (e.g., Narragansett Bay, Hudson River) and outside of the system (e.g., numerous scientific and citizen science groups working in other areas of the Connecticut coast). The existing research institutions, organizations, research efforts, institutional collaborations, and partnerships offer a tremendous opportunity to further leverage resources, partnerships, and expertise in a synergistic manner.

Priority Audiences: The results of the research and monitoring program will find a broad audience, ranging from scientists, coastal managers, and coastal restoration engineers who will utilize the data and take advantage of information provided in peer-reviewed papers and reports, to the general public who will be informed by engaging outreach materials. The GIS output will be served in a fashion that will allow users to engage with maps, similar to the Aquaculture Mapping Atlas (UConn CLEAR et al. 2018) or the Blue Plan Viewer (CTECO 2021). The Research Coordinator will interface with the Stewardship Coordinator to develop signage and other outreach material for visitors to the reserve.

Priority Issues: The priority issues for research and monitoring include the coastal management issues identified in *Section 3.2* (page 85) and the evaluation of impacts of and resilience to the threats and stressors identified in *Section 2.4* (page 76).

11.1.3 Capacity - Research and Monitoring Program

A number of research-intensive departments and an assortment of monitoring programs may be involved in the proposed CT NERR partnerships. Several potential partner organizations were identified as part of the engagement process and included in *Appendix C: Public Engagement / Meetings*.

Facilities and Infrastructure

The proposed CT NERR, as a UConn Center, has access to many excellent facilities to support research and monitoring. These were largely covered in Chapter 7 (page 143), the Facility Development and Improvement Plan. In addition, DEEP provides facilities at Marine District Headquarters and local partner organizations may also be able to provide additional support in terms of access to boats and field-based infrastructure.

Monitoring Partnerships

Figure 11-1 illustrates the regions currently monitored by the following organizations. The reserve will coordinate station selection for SWMP and data collection and distribution with these groups.

- United States Geological Survey (USGS) – lower Connecticut River, in proposed CT NERR
- Save the Sound, oversees the Unified Water Study, local partners monitoring within or near the reserve boundaries include:
 - Connecticut River Conservancy – lower Connecticut River, in proposed CT NERR
 - Save the River-Save the Hills – Niantic River, adjacent to proposed CT NERR

- Northeast Science and Sailing (NESS) – Alewife Cove and Stonington Harbor, adjacent to proposed CT NERR
- Clean Up Sound and Harbors (CUSH) – Mystic River, adjacent to proposed CT NERR
- Dominion Millstone Environmental Laboratory – Long Island Sound and Niantic Bay, in proposed CT NERR; and Niantic River, Jordan Cove, adjacent to proposed CT NERR
- Project Oceanology – lower Thames River, lower Connecticut River, Long Island Sound, in proposed CT NERR
- LISICOS / NERACOOS – Long Island Sound, lower Thames River, in proposed CT NERR
- DEEP - Long Island Sound, lower Thames River, lower Connecticut River, in proposed CT NERR

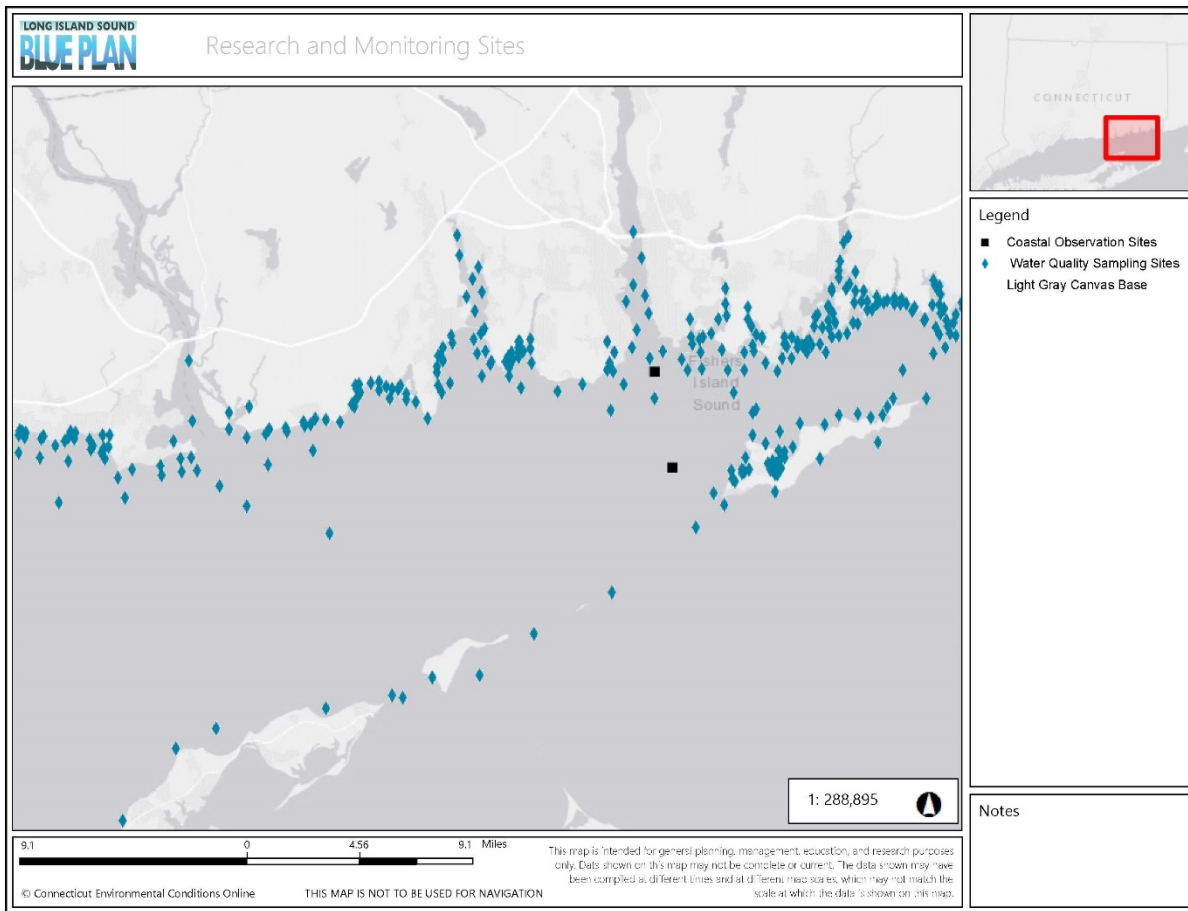


Figure 11-1: Existing Monitoring Locations in the Proposed CT NERR Area

Locations of monitoring conducted on a regular basis by other organizations. Meteorological stations typically collect data multiple times per hour and may include information on wind, light, precipitation, humidity, pressure, and temperature. Buoy data typically include abiotic water quality parameters (temperature, salinity, dissolved oxygen, pressure, pH, turbidity) collected at multiple depths and multiple times per hour. Point data are shown for stations which are monitored at regular intervals (monthly, twice monthly, weekly, etc.) for the May to October period or year-round. These stations typically have data on abiotic water quality parameters but may also include data on nutrients and biotic characteristics (bacteria, plankton, nekton, seaweed).

11.1.4 Delivery - Research and Monitoring Program

All research activities of the proposed CT NERR will be shared on the local website and shared with the national Reserve System. The proposed CT NERR will host an annual meeting that will update stakeholders of each year's activities and the following year's targets. These will be open to national NERR stakeholders and program managers for both inspiring ideas and welcoming feedback.

Education: Research associated with students and NGOs will be listed publicly with associated references to publications and presentations in which the proposed CT NERR has been acknowledged.

Monitoring: Data gathered through monitoring efforts will be shared following appropriate quality control / assurance and posted in a database retrievable through both the local website and through national data sharing via the NERR Centralized Data Management Office (<https://cdmo.baruch.sc.edu/>) Live data will be shared through the website with graphical interfaces.

Research: All projects and presentations associated with proposed CT NERR will be archived on the website and promoted regularly at national, state, and local meetings to inform stakeholders.

11.1.5 Needs and Opportunities - Research and Monitoring Program

During our public meetings to seek input on the direction of the proposed CT NERR, participants identified the following research needs:

- **Coastal Restoration:** The CT NERR will establish itself as a site for which restoration practices can be tested and applied broadly to other coastal areas. This will be done through integrating research and applied research components and prioritizing restoration research. A specific need was identified for applied research and demonstration projects into sea level rise impacts on natural and built infrastructure and the role techniques such as living shorelines or thin-layer placement in marshes may play in mitigating these climate-related impacts.
- **Signage:** To establish a research culture in the region, the proposed CT NERR will ensure that a campaign of signage aimed to inform the public is established in the sites. These may include a NERR research trail—a self-guided tour through reserve properties including signage and opportunities to engage in Citizen Science (e.g., photo stations, an app that integrates some observations over time, etc.)—that will present relevant topics to individuals as they encounter the reserve. Designated signage trails will include target age groups.
- **Creating a Public Dialogue:** proposed CT NERR will generate regular updates in various appropriate media outlets (e.g., local and state newspapers, proposed CT NERR web site, social media platforms) to ensure public awareness of ongoing research and to open a dialogue of future research questions. Reserve staff will consider hosting a lecture series for the public, coordinating with the other Coordinators to achieve maximum interest in a series.

These ideas were the initial basis for the research and monitoring objectives developed for the management plan. Designation of the proposed CT NERR is viewed by the site partners as an opportunity to provide a framework to enhance coordination for the various ongoing as well as future research and monitoring needs in Connecticut.

Local scientific expertise and existing research facilities, not just at UConn, but also those at the site partners' locations, will be available to support and grow the proposed CT NERR research program. Over the next five years, the proposed CT NERR's Research Coordinator will provide the program support to begin a comprehensive and integrated research and monitoring program at the proposed CT NERR to meet the following research and monitoring program goals, objectives, and strategies.

At a broader level, research within the Reserve System is focused on how environmental factors (including nutrient loading, invasive species, climate change, hydrology, and storms) impact coastal ecosystems. This research, coupled with monitoring data, provides a strong, science-based foundation for addressing coastal management challenges. Environmental observation and monitoring have been important components of the system’s research program from its inception and are primary mechanisms for assessing the environmental impacts of climate change and other stressors on coastal resources. A primary objective of research within the Reserve System has been to support sound decisions by coastal resource managers and landowners.

Like starting the reserve monitoring program, research begins with the fundamental questions to be answered by the reserve, for example:

Climate Change: How are the dominant physical, ecological, and socio-demographic attributes that characterize reserves and their targeted watersheds affected by climate change?

Water Quality: What is the status of water quality in reserves? What are the natural and anthropogenic drivers that are causing water quality changes? What are the impacts of those changes on reserve ecosystems, including their associated human communities?

Habitat Protection: What is the magnitude and variability of ecosystem change in reserve targeted watersheds and their State of Connecticut-defined or federally-designated ESA Critical Habitats? What are the relative influences of environmental and anthropogenic drivers in initiating and sustaining these changes? How do reserve ecosystems and reserve habitats respond to ecosystem change?

11.1.6 Objectives and Actions - Research and Monitoring Program

The three proposed CT NERR reserve-wide goals are presented in *Section 3.4*. The Research Program objectives, while supporting all three goals, are most responsive to Goal 1:

Goal 1: Increase our understanding of the effects of human activities and natural events through collaborative research and monitoring to improve informed decision making and support adaptive management of coastal ecosystems.

Table 11-1: Proposed CT NERR Research and Monitoring Objectives—R1

Objective R1. Improve opportunities to support and conduct basic and applied research within the reserve.	
Strategies	Tasks
<p>S1. Develop research priorities and research questions for the proposed CT NERR.</p>	<p>T1. Work with strategic partners, local experts, and local stakeholders to identify the research priorities and questions for the reserve. A few key items are included in <i>Section 11.1.5</i>.</p> <p>T2. Develop a plan for keeping abreast of local research and for coordinating research activities within the reserve, including guidelines for and expectations of researchers working within the reserve properties.</p> <p>T3. Develop a method for tracking research results and outcomes, and for publicizing these outputs.</p> <p>T4. Identify potential sources of funding, both traditional (federal- and state- funded grant opportunities) and non-traditional (partnerships, family foundations, donor-supported research, crowd-funding, etc.)</p>
<p>S2. Provide logistical support to facilitate research at the reserve.</p>	<p>T1. Identify and develop sufficient access and parking alternatives for vehicles in the NERR sites.</p> <p>T2. Provide laboratory facilities, field supplies, vehicles, vessels, and other essential equipment as required by visiting and resident researchers.</p> <p>T3. Improve and develop field research facilities at the reserve and improve storage for visiting scientists' gear.</p> <p>T4. Assist visiting researchers with field implementation of on-site and off-site research projects.</p> <p>T5. Work with the Education Coordinator to develop and support a volunteer monitoring program supportive of the reserve research priorities (align with R1.S1.T1.).</p>

<p>S3. Ensure scientists are aware that logistical support is available to facilitate research at the reserve.</p>	<p>T1. Develop summary information regarding logistics and research opportunities at the reserve and post on the reserve’s website.</p> <p>T2. Maintain an updated annual list of cooperative research projects, research papers, Davidson Fellowship projects, and NERRS Science Collaborative and other research products generated by or at the reserve.</p> <p>T3. Submit (and keep current) the outcomes of T2 to the NERRS Research and Monitoring database. Distribute to other appropriate websites or similar vehicles for sharing.</p> <p>T4. Ensure that multiple high quality, competitive proposals are submitted that address reserve and Reserve System research priorities and goals.</p>
<p>S4. Engage with regional and national science communities.</p>	<p>T1. Collaborate with the scientific research community to encourage development of research proposals and actively recruit researchers to work with or at the reserve.</p> <p>T2. Support the involvement of researchers from both Research I¹⁵ and non-Research universities and colleges in reserve programs and research activities with special attention to supporting the success of underrepresented participants in the field of marine and coastal science.</p> <p>T3. Lead and participate in regional and national scientific meetings to review progress in priority focus areas and promote research in the reserve.</p> <p>T4. Prioritize efforts to promote social diversity, equity, inclusion, and environmental justice in the reserve programs and across communities that interact with the reserve.</p>

¹⁵ Research I (R1) universities are those which engage in the highest levels of research activity, according to the Carnegie Classification of Institutions of Higher Education. Criteria include: offer a full range of baccalaureate programs, committed to graduate education through the doctorate, award 50 or more doctoral degrees each year, give high priority to research, receive \$40 million or more annually in federal support. University of Connecticut and Yale University are the only R1 universities in Connecticut.

<p>S5. Develop and foster partnerships with Indigenous Peoples and Local Communities.</p>	<p><i>We acknowledge the traditional owners of the proposed CT NERR land and recognize their continuing connection to land, waters, and culture. We pay our respect to their Elders, past, present, and emerging.</i></p> <p>T1. Over the first five years of the proposed CT NERR establishment, foster partnerships with the local Mashantucket-Pequot and Mohegan Tribal Nations and gage interest of the Western Nehântick, Wappinger and Hammonasett Tribal Nations.</p> <p>T2. Establish regular interaction with tribal members and particularly youth groups to develop research goals and opportunities that aim to recover the areas to their pre-industrial conditions through indigenous practices.</p> <p>T3. Create fellowship opportunities for K-12 and undergraduate tribal members to conduct summer research in the proposed CT NERR; work with the Friends Group to establish funding.</p>
<p>S6. Develop and foster partnerships with a diverse array of local stakeholders.</p>	<p>T1. Engage with local watershed groups, NGOs, and other environmental organizations to investigate potential partnerships and synergies in efforts.</p> <p>T2. Develop a directory of stakeholders and partners for dissemination of results and notification of opportunities.</p> <p>T3. Utilize existing connections to underrepresented people and Environmental Justice Communities available through proposed CT NERR partners and those participating in the assorted designation advisory committees to connect and include them in NERR activities.</p> <p>T4. Develop a Friends Group list of interested individuals who receive updates on reserve activities.</p> <p>T5. Consider “meet-the-scientist / educator / manager” events co-hosted with the Friends Group to reach out to groups of stakeholders and encourage donations to the NERR through personal interactions.</p>
<p>S7. Provide the necessary resources to support and increase in-house research.</p>	<p>T1. Explore ways to expand the capacity of in-house research by adding seasonal research interns and volunteers.</p> <p>T2. Prepare and submit proposals to secure funds to support in-house research and expanded monitoring efforts.</p>

<p>S8. Encourage the next generation of coastal scientists and managers.</p>	<p>T1. Support a Margaret A. Davidson Fellow at the proposed CT NERR.</p> <p>T2. Identify fellowships and opportunities to support expansion of initiatives to support social diversity, equity, inclusion, and environmental justice.</p> <p>T3. Encourage and support the work of students and early-career researchers in the reserve (e.g., NSF fellows, USEPA Star fellows, etc.).</p> <p>See also R1.S2.T3. and R1.S4.T3.</p>
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Table 11-2: Proposed CT NERR Research and Monitoring Objectives—R2

<p>Objective R2. Contribute to status and trends assessments and forecasting of environmental quality by tracking short-term variability and long-term changes in abiotic and biological parameters within the reserve through establishment of the System Wide Monitoring Program (SWMP).</p>	
Strategies	Tasks
<p>S1. Establish the SWMP.</p>	<p>T1. Work with local researchers, partners, and Research Coordinators from the neighboring reserves to identify an appropriate monitoring strategy and sampling design, incorporating statistical consideration of the NERR-SWMP sampling design. Coordinate and build on monitoring already underway by the USGS, Millstone Environmental Lab (met data), and UConn LISICOS stations and meteorological monitoring.</p> <p>T2. Maintain quality assurance and quality control per NOAA guidance for NERR SWMP programs.</p> <p>T3. Establish long-term abiotic monitoring (water, nutrient, and weather parameters) in accordance with the national System-Wide Monitoring Program (SWMP) at four stations for water quality and one station for meteorological data.</p>

S2. Conduct abiotic and biological monitoring consistent with national Reserve System programs to facilitate comparisons of the reserve to other Reserve System sites.

- T1. Participate actively in national and regional synthesis and interpretation of SWMP data.
- T2. Synthesize reserve SWMP data in annual technical reports.
- T3. Create interactive graphical interfaces for data on the proposed CT NERR website.
- T4. Consider including elective SWMP elements, based on research priorities and capacity of the CT NERR.
- T5. Coordinate directly with DEEP to leverage existing Surface Elevation Table (SET) equipment for deployment and use in marsh monitoring research or NERR sentinel site efforts.
- T6. If aligned with reserve research priorities (see R1.S1.T1.), evaluate feasibility and seek funding to support continuous monitoring of carbonate system parameters that include both air and water $p\text{CO}_2$ monitoring.

<p>S3. Characterize and establish benchmark conditions and determine trends for key environmental quality parameters and natural resource populations and communities.</p>	<p>T1. Develop a site profile and provide an electronic database of information on reserve natural resources, including state and federal threatened / endangered species.</p> <p>T2. Update the list of relevant literature and conduct a literature review on relevant topics for the proposed CT NERR.</p> <p>T3. Working with the Stewardship Coordinator, use GIS to map habitat and land cover in the reserve over time to assess changes in accordance with the national Reserve System Habitat Mapping and Change Initiative. Given the large submerged component of the CT NERR, mapping of submerged habitats is likely to be a research priority.</p> <p>T4. Encourage investigators within the Long Island Sound and Fishers Island Sound region using the reserve as a reference site or a control for experimental research and monitoring projects.</p> <p>T5. Evaluate feasibility of conducting additional monitoring of key parameters outside of SWMP such as a vertical control network to further characterize conditions of the reserve as it may serve as a sentinel site for monitoring sea level rise impacts on marshes</p> <p>T6. Evaluate feasibility of integrating regional efforts to document migratory bird patterns and population evaluation into the proposed CT NERR monitoring program.</p>
<p>S4. Establish electronic accessibility of reserve research, monitoring and site characterization data and information.</p>	<p>T1. Develop and maintain electronic infrastructure (e.g., network and database capabilities, geographic information systems, etc.) for staff and researchers to promote access to reserve data.</p> <p>T2. Develop interfaces and tools to support access, analysis, and synthesis of information from the reserve.</p> <p>T3. Provide a mechanism for near-real-time access to provisional data from SWMP water quality sites for researchers. through the NERRS Centralized Data Management Office.</p> <p>T4. Provide research summaries and outreach material in multiple languages to make the research accessible to a broader audience.</p>

<p>S5. Assess ecological conditions and design and evaluate restoration efforts in support of the reserve stewardship program.</p>	<p>T1. Collaborate in ongoing coastal restoration efforts (eelgrass, shellfish, and salt marshes) and assess the ecological effects of restoration (e.g., vegetation composition, extent, and faunal use) by serving as a reference site for other impacted areas.</p> <p>T2. Conduct research on natural ecological processes (using new or established tools) to help devise protection and restoration techniques for coastal wetlands, including marsh migration and impacts of sea level rise on natural habitats and built infrastructure.</p> <p>T3. Assess extent of recent habitat changes and the potential outlook for restoration of these habitats (marshes, seagrass, forests, beaches, spread of seaweed blooms).</p> <p>T4. Disseminate research results that analyze restoration of coastal and estuarine habitats, including restoration techniques, ecological responses and impacts of past practices.</p>
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Table 11-3: Proposed CT NERR Research and Monitoring Objectives—R3

Objective R3.	
Encourage and assist in a multi-agency approach to research, monitoring, and science ecosystem-based management.	
Strategies	Tasks
<p>S1. Participate in, enhance, and facilitate opportunities for joint research and monitoring efforts among local, state, and federal resource agencies.</p>	<p>T1. Actively coordinate with DEEP, USGS, and the Unified Water Study monitoring efforts and explore ways to enhance and expand the reserve’s role in the Long Island Sound and Fishers Island Sound ecological monitoring initiatives.</p> <p>T2. Collaborate with others to establish a long-term program for assessing habitat and biological community trends in Long Island Sound and Fishers Island Sound, including marine invasive species and nuisance species.</p> <p>T3. Work to improve indicators, monitoring protocols and technology to improve the effectiveness of monitoring (including long-term monitoring of restoration efforts) and assess the usefulness of using the reserve as a reference for estuary-wide assessments and forecasts.</p> <p>T4. Develop Memoranda of Understanding and interagency agreements with resource agencies to facilitate cooperative research and monitoring.</p> <p>T5. Coordinate reserve research with local and regional resource management efforts.</p> <p>T6. Participate in the Long Island Sound Study’s Scientific and Technical Advisory Committee (LISS STAC) and relevant working groups.</p> <p>T7. Participate in collaborative studies to develop the scientific basis for management, ideally using external grant funds.</p>
<p>S2. Support periodic updates and ongoing implementation of the Comprehensive Conservation Management Plan for Long Island Sound.</p>	<p>T1. Work closely with local, state, and federal agencies including DEEP and Save the Sound to align with goals in the Long Island Sound and its watershed.</p> <p>T2. Assist in the development of an effective Long Island Sound, Fishers Island Sound, and watershed research and monitoring strategy.</p>

Table 11-4: Proposed CT NERR Research and Monitoring Objectives—R4

Objective R4	
Provide coastal resource managers, the scientific community, and general education practitioners with appropriate scientific and technical information to foster informed decision-making.	
Strategies	Tasks
<p>S1. Provide scientific data and tools to appropriate coastal decision-makers through the reserve’s Coastal Training Program (CTP).</p>	<p>T1. Collaborate with the CTP Coordinator to ensure that proper scientific data and tools are disseminated in the proper venues to coastal decision-makers, as appropriate.</p> <p>T2. Leverage Reserve System digital library and Reserve System experiences.</p>
<p>S2. Collaborate with the reserve’s Education Program to improve public understanding of estuarine research projects in the proposed CT NERR, Long Island Sound, and its watershed.</p>	<p>T1. Develop demonstration areas around the reserve based on current and ongoing research and monitoring projects.</p> <p>T2. Provide information to support the development of publications, interpretive signs, workshops, and seminars to better inform both the local and broader Connecticut community about ongoing coastal and estuarine research and monitoring, including multiple languages and accessible to those with disabilities.</p> <p>T3. Consistent with Connecticut education standards, including the Next Generation Science Standards, work with the Education Coordinator to focus on a systems approach to coastal education, focusing on ecosystem diversity in a human-influenced system and to improve public understanding of estuarine research projects through watershed education.</p>

<p>S3. Work with the reserve’s Education Program to make estuarine research and monitoring data available to Connecticut schools and the general public.</p>	<p>T1. Request information and periodic updates from researchers working within the reserve area (eastern Long Island Sound, Fishers Island Sound, lower Connecticut River, lower Thames River, and assorted upland reserve properties) with external, non-reserve funding as a routine course of business.</p> <p>T2. Provide current and up-to-date information and data from the reserve’s research and monitoring program suitable for the reserve’s website or other media.</p> <p>T3. Encourage staff and visiting researchers to participate in appropriate lecture and seminar series to discuss current research projects.</p>
<p>S4. Publicize results of the reserve research and monitoring efforts to scientific and management communities.</p>	<p>T1. Attend local, regional, and national scientific conferences and present reserve research and monitoring projects as poster or oral presentations.</p> <p>T2. Prepare, submit, and publish high-quality reserve research projects in appropriate peer-reviewed scientific journals.</p> <p>T3. Prepare and submit technical reports for other reserve research and monitoring projects that are not appropriate for the peer-reviewed scientific literature in the NERR Technical Series.</p>
<p>S5. Foster relationships with groups engaged in community-based science (including Citizen Scientists).</p>	<p>T1. Engage with local groups to share data in both directions, allowing for long-term and broader-scale comparisons.</p> <p>T2. Evaluate the possibility of supporting local community-based monitoring efforts in embayments, streams, and watersheds.</p> <p>T3. Assess the needs and opportunities available through partnering with community-based groups to expand the outreach and communication efforts of the proposed CT NERR.</p>

11.2 Education Program

Estuaries are invaluable resources for coastal dwellers, from plankton to whales, and the human communities. For people, these ecosystems offer protection, recreation, and a wealth of educational opportunities. The Reserve System offers educators and estuary enthusiasts a variety of resources,

including specially developed activities, animations, videos, educator training workshops, real-time data, and opportunities to volunteer. This information helps educators share the wonders of estuaries with students and others.

11.2.1 Reserve System Education Program

The Reserve System seeks to enhance public awareness and understanding of estuarine areas and provide suitable opportunities for public education and interpretation. The Reserve System increases estuary literacy among students, teachers, and the public through the K-12 Estuarine Education Program (KEEP) and Conservation Action Education programs.

The K-12 Estuarine Education Program helps educators bring estuarine science into the classroom through hands-on learning, experiments, fieldwork, and data explorations using grade-appropriate lessons, activities, and videos. Reserves also offer teacher development programs that use established coastal and estuarine science curricula aligned with state and national science education standards. Teachers on the Estuary (TOTE) workshops give teachers the opportunity to explore coastal habitats and conduct field investigations, learn how to integrate local and national monitoring data into the classroom, and gain hands-on experience using estuary education resources.

As part of the Conservation Action Education program, reserves conduct formal and informal education activities and outreach activities that target culturally diverse audiences of educators, students, and environmental professionals; people who use these natural resources for work or play; and the public. Reserves integrate research and monitoring into their educational and outreach efforts, providing a multi-faceted, locally focused approach aimed at engaging the community.

The Reserve System Strategic Plan outlines education objectives designed to increase the public's awareness of and participation in stewardship activities; improve educators' and students' understanding and use of the Reserve System and NOAA resources for place-based and inquiry-based learning; and grow and motivate the next generation of coastal professionals through access to programs and facilities that facilitate research, resource management, and educational opportunities.

11.2.2 Context - Education Program

Geographic Scope: The ecological, geographic, land use, and economic diversity within the proposed CT NERR provide many environmental education and interpretation opportunities particularly those focused on human impacts. The area has a long history of environmental education; both Bluff Point and the Connecticut River marshes are regular locations for informal nature programs. Submerged lands in both watersheds support active education and community science programs focused on a variety of themes: water quality, aquatic and marine ecosystems, and benthic communities. The proposed CT NERR has the ability to develop environmental education programs supporting disciplines including ecology, physics, chemistry, geology, biology, archaeology, habitat restoration, coastal resource management, sustainability, and ecosystem services. There are multiple areas within the site properties

that provide access via vehicle, boat, and foot for targeted audiences including K-12 students, visitors, community members, and local decision makers. Additionally, Haley Farm State Park and Bluff Point State Park include parking access and a wheelchair accessible trail system.

Priority Audiences: The region surrounding the proposed CT NERR is home to an economically and culturally diverse mix of people. Communities range widely in permanence, from North America's oldest Indian Reservation (the Mashantucket Pequot) to Ledyard and Groton, which experience high population turnover each year because of personnel movement into and out of Naval Submarine Base New London, Groton, CT. The cities of New London, Norwich, and Groton are ethnically diverse, with higher poverty rates relative to surrounding towns, while towns such as Lyme and Old Saybrook are relatively wealthy and homogenous (Table 11-2). Communities in this region are connected by the estuary they share, and by common vulnerabilities to climate change and related environmental hazards.

Since the *Sheff vs. O'Neill* decision by the Connecticut Supreme Court in 1996 (238 Conn. 1, 678 A.2d 1267), Connecticut schools have been under court order to desegregate. As a result, public education in Connecticut is a complex mixture of traditional public-school districts, magnet schools, charter schools, and independent schools. The result has been a widening gap in how students are educated in urban and rural and suburban areas: most urban students attend magnet, charter, or independent schools, while most rural and suburban students attend traditional school districts. In the region of the proposed CT NERR, students in Norwich, Groton, and New London attend magnet schools for all or part of their education. While most students from other communities attend traditional public-school systems. Despite the influx of magnet-related funding to Norwich, Groton, and New London school systems, these schools underperform across a variety of performance metrics compared to surrounding wealthier communities (Table 11-5). All three of these districts have been designated as Alliance school districts under C.G.S. § 10-262u, a designation reserved for the low-performing, underserved districts. Norwich and New London have additionally been designated as Opportunity Districts, a designation reserved for the ten lowest-performing districts in the state. Groton, New London, and Norwich are also the only school districts in the region that receive federal funding for Title 1 schoolwide programs, a program designed to boost schools in which at least 40% of students are living in poverty.

Some local magnet and charter schools have STEM, marine science, or environmental science themes, providing an avenue for collaboration with the proposed CT NERR. Examples include Moriarty Environmental Science Magnet Elementary and Kelly STEAM Magnet Middle in Norwich; New London's STEM Magnet Pathway including Winthrop Elementary STEM Magnet, a STEM pathway at Bennie Dover Middle School, and the Science and Technology Magnet High School of Southeastern Connecticut; and Groton's Thames River Environmental Sciences Magnet Elementary, Catherine Kolnaski STEAM Magnet School, and the Marine Science Magnet High School.

Higher Education Institutions - The University of Connecticut's Avery Point Campus hosts the proposed CT NERR, but the proposed CT NERR is also situated in close proximity to a wide diversity of colleges and universities, providing access to undergraduate and graduate students in a wide range of disciplines.

These institutions include private four-year colleges such as Connecticut College and Mitchell College, the U.S. Coast Guard Academy, and Three Rivers Community College.

Table 11-5: Community and School Demographics

Demographic and school district data for communities in and adjacent to the proposed CT NERR. Data was obtained from Connecticut’s EdSight portal (DOE 2021). Connecticut’s Next Generation Accountability System is a broad set of 12 indicators outlining how well a school is preparing its students for success in college, careers and life; the goal for the summary indicator is 75 or better (out of 100); data provided are from the 2018-2019 school year. Connecticut Alliance districts are in bold and italicized; these districts also contain CT Title 1 (schoolwide) schools. Data bars in cells indicate the relative magnitude of the Next Generation Accountability Index (compare vertically, green bars), the percent of students who qualify for free or reduced lunch (compare vertically, pink bars), and the race or ethnicity of the student population at the time of enrollment for the 2019-2020 school year (read horizontally for each school district, yellow or blue bars; may also be read vertically for comparisons among school districts).

SCHOOL DISTRICT	NEXT GENERATION ACCOUNTABILITY INDEX (SCORE)	STUDENTS WHO QUALIFY FOR FREE OR REDUCED LUNCH (%)	Student Race / Ethnicity						
			AMERICAN INDIAN	ASIAN	BLACK OR AFRICAN AMERICAN	HISPANIC OR LATINO OF ANY RACE	NATIVE HAWAIIAN OF OTHER PACIFIC ISLANDER	TWO OR MORE RACES	WHITE
Stonington	81.9	27.0	*	2.1	1.3	6.0	*	4.2	85.9
<i>Groton</i>	77.0	49.6	0.8	6.1	7.8	22.1	0.4	10.0	52.7
<i>New London</i>	63.2	81.1	*	1.2	17.6	52.1	*	11.5	16.8
Waterford	81.6	31.1	0.3	4.7	2.8	11.5	0.3	4.7	75.7
East Lyme	81.3	22.8	*	8.9	1.6	7.6	*	5.3	76.3
Lyme-Old Lyme (Region. 18)	86.6	17.1	0.0	2.7	*	6.0	*	2.9	87.6
East Haddam	82.2	25.8	*	1.5	*	3.7	0.0	2.0	91.6
Haddam-Killingsworth	82.1	12.8	0.0	1.7	0.9	3.4	0.0	2.8	91.2
Chester	87.0	22.0	0.0	*	*	8.1	0.0	3.2	87.6
Deep River	81.8	36.6	*	*	*	6.8	0.0	5.5	83.8
Essex	91.1	22.7	0.0	*	*	7.6	0.0	5.1	84.9
Old Saybrook	85.4	27.5	0.0	3.6	*	12.6	*	2.8	79.8
Ledyard	76.1	26.1	2.9	3.5	4.9	10.8	0.4	4.9	72.5
Montville	77.9	45.5	*	7.7	3.0	14.1	*	11.8	62.4
<i>Norwich</i>	59.3	67.3	0.5	6.4	18.5	34.5	0.4	10.1	29.6
Norwich Free Academy	69.1	52.0	1.1	7.9	14.7	17.4	0.5	6.0	52.3

Local Communities - The proposed CT NERR will also include environmental education programs targeting local communities. Concern for their community is a major local driver of environmental stewardship in individuals (Romolini et al. 2012), and NERR educational programming is ideally situated to take advantage of this by connecting local residents to their estuary in a variety of ways. During our stakeholder input process, participants identified a wide range of potential target audiences outside of formal education systems, including businesses, non-profit and community service organizations, civic leaders, and Environmental Justice Communities. The State of Connecticut has designated New London, Norwich, and Montville as Environmental Justice Communities, with Groton appearing on a secondary list.

Local Environmental Education Groups - The region of the proposed CT NERR already benefits from a large number of environmental education groups. The Community Foundation of Eastern Connecticut, a local organization offering competitive grant programs that fund many of these groups, has identified a need for coordination between organizations and increased professional development opportunities, particularly related to project and program assessment.

During the first five years of the proposed CT NERR, the Education team will focus on the following target audiences:

1. K-12 educators and students from CT Alliance and Opportunity districts.
2. Environmental Justice Communities designated by the State of Connecticut as outreach targets for place-based educational opportunities designed for the general public
3. Environmental Education professionals through professional learning experiences and networking opportunities.

Finally, the Education team will prioritize conducting a K-12 Market Analysis and Needs Assessment to further refine the niche of the education program.

Priority Issues: Communities along the proposed CT NERR are diverse but are geographically connected by a common estuary and common environmental challenges. The proposed CT NERR and its partners are ideally situated to engage students, educators, and community members in hands-on, inquiry-based environmental education programs on the water and on the shores of Long Island Sound and Fishers Island Sound.

Like many estuaries across the nation, one of the primary ecological challenges facing the proposed CT NERR are the impacts resulting from climate change. We have identified this as a critical priority theme for proposed CT NERR education programs. The Connecticut Institute of Resilience and Climate Adaptation (CIRCA) has projected sea level rise of at least 0.5 meters by 2050 in coastal Connecticut, with additional sea level rise likely in subsequent years (O'Donnell 2019). Rapid sea level rise is associated with habitat loss and salt marsh migration, two issues of particular concern to the proposed CT NERR. Salt marshes are the centerpiece of the intertidal portions of the proposed CT NERR, and we anticipate that salt marshes and the diverse organisms they support (including migratory birds) will be an important focus of the proposed CT NERR education programs.

Storms Irene and Sandy in 2011 and 2012 strongly impacted the region and focused more attention on the impacts, magnitude, and drivers of storm surges and inundation. Climate change is expected to increase intense precipitation events across New England. High volume events exacerbate coastal erosion, increase stormwater flows, and increase the concentration of nonpoint source pollutants. Water quality in both the Thames River and Connecticut River is already heavily influenced by current and historical land use practices in the upper watersheds, and these environmental connections will be impacted by climate change. Water quality is a cross-cutting issue in the proposed CT NERR that can be used in education programs to involve students, educators, and community members and citizen science efforts to monitor and improve water quality in Long Island Sound and Fishers Island Sound. Microplastics are an emerging and related issue that we expect will be increasingly important and of interest to students, educators, and community members that interact with the proposed CT NERR.

Human impacts are another important theme for the proposed CT NERR, which is in one of the most urbanized estuaries in North America. Beyond the water quality issues already mentioned, we anticipate that proposed CT NERR education programs will include a focus on other human impacts (e.g., microplastics and other marine debris) and on coastal economics. Overall, the proposed CT NERR will be focused on supporting access and connections to coastal habitats.

11.2.3 Capacity - Education Program

The proposed CT NERR includes several established state parks and NAPs with parking and trails for exploration of these habitats. Currently, none of the properties include facilities, beyond the two listed facilities: UConn Avery Point campus and DEEP Marine District Headquarters. During the first five years, the possibility of erecting open-air pavilions that can improve on-site space for educational programs will be investigated with DEEP. At Avery Point and Marine Headquarters, educational storage space is available, as are meeting rooms for small and large groups. Working with local partners, the proposed CT NERR will also have access to teaching labs. The proposed CT NERR core staff will begin the process of planning for a visitor center within the first five years of establishment.

The proposed CT NERR anticipates hiring a full-time Education Coordinator upon establishment of the proposed CT NERR. One part-time education specialist will join the team six months post-opening, with a second part-time education specialist one-year post-opening. During the first year, the Education Coordinator will work with the Friends Group and other CT NERR Coordinators to establish a volunteer program. The Friends Group anticipates supporting a full-time Volunteer Coordinator starting in year two. Additional education support will be added as needs and funding dictates; these positions may be filled by seasonal staff, volunteers, and through strategic partnerships.

The proposed CT NERR habitats are already a base of operations for multiple organizations that provide environmental education to a wide diversity of K-12 students, college students, and community members. These organizations are listed in the introduction to this section and include non-profit organizations, other centers within the University of Connecticut, and several active land trusts and watershed organizations. During the stakeholder process, we identified an overarching need for the

NERR to coordinate with and support existing environmental education organizations rather than compete with them. Strategic partners will be key during the first five years of the proposed CT NERR, and we anticipate the NERR may enter into contracts and agreements with one or more of the partners described above. Partners may provide access to facilities including vessels equipped for research and teaching, staffing, expertise, and access to established networks and contacts in the educational landscape across Connecticut.

The proposed CT NERR will conduct a K-12 education market analysis and needs assessment during the first five years to refine the education niche of the proposed CT NERR and to identify core strategic partners for education programs. The market analysis and needs assessment should consider the extent of overlap in mission, approach, audience, and geographic area served between the NERR and potential partners, and the availability of facilities and resources such as vessels to support NERR educational programs both on land and on the water. The market analysis and needs assessment should also consider the potential for synergy between the NERR and the potential partner: will the partnership allow both parties to expand the scope and mission of educational programming in a way that reaches a greater portion of the target audience, or meets the identified objectives, strategies, and tasks of the NERR more effectively?

11.2.4 Delivery - Education Program

The proposed NERR and its strategic partners will provide students, teachers, and members of the public with hands-on, inquiry led, experiential environmental education programming, on the water and on the shore of both the eastern and western portions of the NERR. Proposed CT NERR education programs will be strongly grounded in science, taking advantage of SWMP and other research activities to engage participants as stewards of the NERR. They will also include development of and expansion of access to digital resources, such as story maps, virtual field trips, online curricular and other educational resources, and environmental data. The NERR education programs will initially be supported by a full-time coordinator, with the addition of education specialists expected in year two.

The NERR Education Coordinator will build on existing resources, expertise, and facilities available through the partner organizations described above to develop and implement the Teachers on the Estuary (TOTE) program during the first five years. The NERR education coordinator will also work with the local environmental education community to coordinate resources, and to develop a plan for the K-12 Estuary Education Program (KEEP) that increases access to NERR ecosystems for all students, particularly those from underserved communities, and enhances existing programs while minimizing duplication. NERR education programs should demonstrate cultural competence and be accessible to all, including those with visual, auditory, or physical impairments, and to neurologically diverse communities. A key goal is to offer public programming targeting Environmental Justice Communities.

Because there is already a thriving environmental education community in and around the proposed CT NERR, during the first five years, the proposed CT NERR Education Coordinator will also focus on developing resources and trainings for environmental education professionals. This work will amplify the reach of the proposed CT NERR by helping local nonprofit organizations improve program quality,

assessment, and access for all. These offerings will focus on leveraging existing NERR and NOAA education resources including curriculum materials and best practices, assessment, and strategies to improve social diversity, equity, inclusion, and environmental justice.

Finally, program assessment will be a strong focus for the proposed CT NERR. During the first five years, the Education Coordinator will develop evaluation protocols for TOTE, KEEP, and other programs that are consistent with the NERRS Education Performance Monitoring Guide and make use of existing evaluation instruments provided by the Reserve System. All performance metrics will be submitted within the required time periods to the Reserve System's KNACK database or other entities as required.

11.2.5 Needs and Opportunities - Education Program

The education-related needs identified during our stakeholder process include the following:

- Improve access to NERR ecosystems and hands-on, experiential environmental education opportunities for all students, particularly those from underserved and Environmental Justice Communities.
- Promote and build environmental stewardship, environmental literacy, understanding of ecological interdependencies, and human connections to the environment across a wide diversity of sectors, including students, teachers, businesses, municipalities, and the public.
- Enhance the work of the existing environmental education community through partnership, resources, and coordination.
- Take advantage of NERR and other scientific research activities to ground education programming in ongoing scientific research and environmental monitoring and provide access to civic ecology opportunities.

As previously described, the proposed CT NERR Education program will initially be staffed by a full-time education coordinator, with a plan to add support in the form of an education specialist in year two. During this initial period, the education coordinator will prioritize the TOTE program, coordination and partnership building with local non-profits and other strategic partners, the development and implementation of KEEP and public programs, and collaborating with the Coastal Training Program Coordinator around strategic initiatives.

During the first few years of the proposed CT NERR, the education sector Market Analysis and Needs Assessment will be used to refine and revise the initial set of identified needs and opportunities, and to further develop the niche of the proposed CT NERR education program. The proposed CT NERR will also form an Education Advisory Committee to guide development of the proposed CT NERR education program.

11.2.6 Objectives and Actions - Education Program

The three proposed CT NERR reserve-wide goals are presented in *Section 3.4*. The Education Program objectives, while supporting all three goals, are most responsive to Goals 2 and 3:

Goal 2: Strengthen stewardship, protection, and management of estuaries and their watersheds through place-based approaches to training and education in order to maintain and enhance natural environments.

Goal 3: Advance environmental appreciation and scientific literacy utilizing a place-based approach, to enhance people’s ability to make science-based decisions that positively affect estuaries, watersheds, and coastal communities.

Table 11-6: Proposed CT NERR Education Objectives—E1

Objective E1.	
Use education to develop and support the next generation of environmental stewards and environmentally literate citizens by providing hands-on, experiential, place-based learning opportunities in the NERR to students and teachers, particularly those from underserved and Environmental Justice Communities.	
Strategies	Tasks
S1. Characterize existing environmental education needs and opportunities in local K-12 systems.	T1. Within the first year, conduct a K-12 education sector market analysis and needs assessment focused on access to environmental education opportunities for K-12 students and educator in the NERR that are aligned with NERR education goals. T2. Identify potential strategic partners in the existing environmental education community (Aligned with E2.S1.). T3. Coordinate with DEEP on educational opportunities in the reserve (e.g. No Child Left Inside program and similarly themed programs).

<p>S2. Develop a program strategy and guiding principles.</p>	<p>T1. Establish an Education Advisory Group, following the general procedures outlined for establishing the Reserve Advisory Committee, in the Administration Plan.</p> <p>T2. Work with local partners and the Education Advisory Group to evaluate the outcome of the K-12 market analysis and needs assessment to set priorities for the education program during the first five years.</p>
<p>S3. Investigate the idea of a plan to enable all K-12 students in the region of the NERR to have access to at least one outdoor, hands-on, stewardship-focused, place-based environmental education opportunity conducted in the NERR during their K-12 careers.</p>	<p>T1. Use the education market analysis and needs assessment (E1.S1) to identify students in the region of the NERR that do not currently have access to at least one such environmental education opportunity.</p> <p>T2. Collaborate with strategic partner(s) to implement the KEEP program, with a focus on students identified above, and on students attending school in CT Opportunity and Alliance Districts, CT Environmental Justice Communities, and Title 1 (schoolwide) schools.</p>
<p>S4. Support the ability of local educators to incorporate environmental stewardship, environmental literacy, and hands-on watershed and estuary education into their teaching practice.</p>	<p>T1. Use the market analysis and needs assessment (E1.S1) to evaluate the needs of local schools and teachers for resources to support environmental education.</p> <p>T2. Collaborate with strategic partner(s) to implement and support the TOTE program, with a focus on teachers working in CT Opportunity and Alliance Districts, CT Environmental Justice Communities, and Title 1 (schoolwide) schools.</p> <p>T3. Develop NGSS-aligned curricular materials to support use of the NERR as an outdoor classroom.</p> <p>T4. Collaborate with teachers and schools to develop curricular materials and educational experiences in the NERR that support students to meet CT NGSS expectations and assessments.</p>

<p>S5. Enhance the work of the existing environmental education community through partnership, coordination, and professional learning events.</p>	<p>T1. Hold professional development events and facilitate information sharing and networking among environmental education community partners.</p> <p>T2. Work with strategic partner(s) to expand the reach of KEEP and TOTE to additional audiences.</p> <p>T3. Hold tours of the proposed CT NERR for local educators, to introduce them to the reserve properties as outdoor classrooms.</p> <p>T4. Host events to introduce educators to the KEEP and TOTE programs.</p>
<p>S6. Establish continuing support for the Education Program.</p>	<p>T1. Pursue opportunities to fund several education specialists.</p> <p>T2. Formalize education partnerships with school districts, existing programs, and strategic partners.</p> <p>T3. Seek funding to provide support for program participants, particularly for participant’s support costs and supplies for teachers and aids from the CT Opportunity and Alliance districts.</p>
<p>S7. Develop education infrastructure.</p>	<p>T1. The Education Coordinator will contribute to the pursuit of opportunities for interpretive and informational signage, electronic resources such as story maps and digital field trips, and other infrastructure to support educational uses of NERR properties.</p>

Table 11-7: Proposed CT NERR Education Objectives—E2

Objective E2. Promote environmental stewardship, environmental literacy, and science-based management and decision-making across a wide variety of sectors, including businesses, municipalities, and the public.	
Strategies	Tasks
S1. Identify a suitable niche for proposed CT NERR environmental education public programs.	T1. Within the first year, conduct an education sector market analysis and needs assessment, focusing on identifying priority audiences outside of K-12 education currently not being served and development of additional strategic partnerships. (Aligned with E1.S1.)
S2. Support community-based science opportunities (including Citizen Science) in the NERR for educators and their students, the public, and other interested groups.	T1. Working with the Friends Group, develop a variety of volunteer opportunities to support stewardship in the proposed CT NERR. T2. Working with the Research Coordinator, support a volunteer monitoring program that enhances NERR research. T3. Work with the Friends Group to support a full-time Volunteer Coordinator.
S3. Develop infrastructure to support environmental education and stewardship	T1. Pursue opportunities for interpretive signage and other on-site educational resources and infrastructure in collaboration with DEEP. All signage and infrastructure should be universally designed to maximize accessibility to all, and in accordance with all standards and policies for land held by the state of CT. T2. Develop electronic resources such as story maps, web content, and digital tours and field trips to enhance the educational significance of NERR properties, bring the NERR into classrooms, and make the NERR more accessible. Where possible, leverage NERRS library of educational materials.
S4. Collaborate with the Coastal Training Program Coordinator to promote science-based management practices and environmental stewardship among decision-makers.	T1. Collaborate with strategic partners to offer workshops for decision-makers focused on science-based management and environmental stewardship. T2. Develop online and other resources to support stewardship and science-based management practices among decision makers and publicize these resources.

<p>S5. Collaborate with partner organizations to promote environmental stewardship and environmental literacy in events designed for sectors outside of K-12 education.</p>	<p>T1. Use various local festivals and events as outreach opportunities, targeting underserved and Environmental Justice Communities.</p> <p>T2. Develop partnerships with existing educational organizations and host events at the proposed CT NERR.</p> <p>T3. Utilize the Friends Group to establish connections with external organizations.</p>
<p>S6. Promote proposed CT NERR educational opportunities.</p>	<p>T1. Regularly update the education section of the website.</p> <p>T2. Advertise and otherwise promote educational opportunities in the proposed CT NERR.</p> <p>T3. Maintain online postings highlighting interesting information about the proposed CT NERR, upcoming events and opportunities, and report out on successes of the NERR.</p>

11.3 Coastal Training Program

The goal of the reserve’s Coastal Training Program is to foster better-informed decision-making by local and regional decision-makers thereby improving coastal stewardship. The CTP accomplishes this mission by serving as a link between research, policy, community, and education.

As an active member of the coastal management community, the CTP Coordinator understands current scientific research and policy issues and engages with local, regional, and state organizations involved in coastal issues. The CTP Coordinator incorporates the best available science and most current and effective educational techniques into CTP programs and materials. Activities include targeted training and collaborative research that is directly responsive to the needs of the coastal management community and that develops and disseminates the best available information, including cutting-edge research, project results, practical tools, and solutions to coastal management problems.

The CTP also draws upon a network of experts in relevant fields as workshop presenters, further enhancing the value of these forums. The CTP is also available to provide technical assistance on a limited basis to local municipalities and may provide online resources and training materials to coastal decision-makers.

As the CTP develops, it is our hope that it will serve as a key programmatic vehicle through which the reserve integrates research, training and stewardship activities that can shape public policy, and coastal management on-the-ground. We hope to develop programming that facilitates learning through the

integration of case study projects both from within the proposed CT NERR and throughout the Reserve System.

11.3.1 Reserve System Coastal Training Program

The Coastal Training Program provides up-to-date scientific information and skill-building opportunities to coastal decision-makers on relevant coastal management issues. Target audiences may vary for each reserve, but generally include local elected or appointed officials, managers of both public and private lands, natural resource managers, coastal and community planners, and coastal business owners and operators. They may also include such audiences as farmers, watershed councils, professional associations, recreation enthusiasts, researchers, and more.

The place-based nature of reserves makes them uniquely positioned to deliver pertinent information to these audiences. Each reserve conducts an analysis of the training market and assessment of audience needs to identify how best to deliver relevant training on priority issues to their area.

Partnerships are integral to the program's success. Reserves work closely with a host of local partners, as well as several NOAA programs, to determine key coastal resource issues and the appropriate target audiences and expertise needed to deliver relevant and accessible programs.

The Reserve System Strategic Plan outlines coastal training objectives designed to ensure that coastal decision-makers and environmental professionals understand and effectively apply science-based tools, information, and planning approaches that support resilient estuaries and coastal communities.

11.3.2 Context - Coastal Training Program

Geographic Scope: The geographic scope of the Coastal Training Program is similar to that of the proposed CT NERR; the lower reaches of the Connecticut River watershed and the Thames River watershed. However, this involves working with a wide range of organizations, both those whose missions are entirely within the boundaries of the proposed CT NERR, and those with larger statewide or region wide ranges of operation.

Of particular concern for the CTP is capturing the rich diversity of human uses and opportunities both within the relatively rural portions of the lower Connecticut River and the more urban communities of the lower Thames River watershed, including several Environmental Justice Communities therein. The connection between these communities and the watershed brings many opportunities for the proposed CT NERR to collaborate with a well-established network of upstream organizations.

Priority Audiences: A number of organizations which are involved in activities synergistic to the Coastal Training Program have been involved with the process of designating the proposed CT NERR—participating in public meetings, offering input on the *Draft Environmental Impact Statement* and on this *Draft Management Plan*, and participating in interviews to start the process of identifying overlap between reserve programs and existing program offerings. These groups form a core list of potential

partners for the CTP and through collaboration, the proposed CT NERR can gain access to a wide range of potential audiences. In addition, the CTP Coordinator will spend the first year after designation building relationships with potential decision makers. This includes municipalities, regulatory staff, members of conservation commissions, members of Councils of Governments and other stakeholders involved with making land-use and water-use management decisions. In addition, the “general public” is likely to be interested in some of the training offered as part of the CTP. The market analysis and needs assessment will guide the choice of audience to prioritize during the first few years.

Priority Issues: Coastal Training Programs are designed so that participating coastal decision-makers will gain the knowledge, tools and resources they need to make sustainable coastal management decisions. CTP workshops address topics identified through:

- Informal audience needs assessments;
- Formal CTP needs assessments (e.g., market analysis / needs assessment); and
- Emerging issues identified through research at the reserve and elsewhere that may be useful for coastal policy or decision making.

In terms of geographic coverage, the CTP plans on initially focusing on communities in counties immediately adjacent to the reserve but the overall decision on what communities to prioritize during the first few years will largely be driven by the market analysis / needs assessment which will identify needs and opportunities (see proposed CT NERR educational demographics table, Table 11-5, page 191), but over time will expand based on the results of the market analysis and needs assessment, to serve decision-makers spread across Connecticut. These communities are quite different from each other, with some fairly urbanized sections along the coastline, such as New London, Groton, and Norwich, but mostly suburban and rural communities away from the shoreline. The region includes some highly affluent beachfront communities with heavy recreational and tourism use, and median household incomes over \$90,000 (e.g., Waterford, Haddam, Lyme) and other areas with environmental justice concerns and more than half of K-12 students on free or subsidized lunch (e.g., New London, Norwich).

A key first step for the CTP Coordinator will be working with the RAC and as part of the market analysis to identify and consult with key partner organizations, in order to determine an appropriate niche for reserve activities. The public meetings to solicit feedback on this management plan identified many areas for expansion of training opportunities within the local organizational landscape. A key feature of the proposed CT NERR CTP will be the ability to offer place-based, hands-on training for coastal managers. To that end, development of a “living laboratory” as a place of learning is a critical step in supporting the CTP, like the salt marsh classroom located at the Waquoit Bay NERR.

11.3.3 Capacity - Coastal Training Program

The proposed CT NERR anticipates having a fully functioning CTP by the start of year three. However, this involves building up the staff, facilities, and infrastructure necessary to support the program. In order to support the development of the CTP, a half-time (fully encumbered) CTP Coordinator will be

employed in year one to conduct the market analysis and needs assessment, begin developing relationships with local government and management officials, and begin building relationships with strategic partners. The CTP coordinator will work closely with the Reserve Manager and the RAC will use the results of the market analysis and needs assessment and continue to build and strengthen relationships to prioritize trainings. We anticipate the CTP Coordinator will be full-time by the start of year two and will be aided by a part-time CTP Program Assistant who will aid with planning, outreach, program delivery, and tracking of performance metrics.

Reaching out to members of volunteer boards and commissions, such as local elected and appointed officials, is a major undertaking, and these relationships will take time to develop. Further complicating this undertaking, the membership of these organizations changes regularly, members typically have other jobs and responsibilities during the day, and the most direct communication channels are not always apparent. Despite the inherent difficulty in reaching this audience, it is imperative that the CTP Coordinator do so effectively. As such, continually assessing audience needs and staying abreast of issues that affect our target audiences as well as how these groups change and evolve over time is an important “behind the scenes” activity of the CTP and education programs.

11.3.4 Delivery - Coastal Training Program

During year one, the focus of the CTP will be on conducting the market analysis and needs assessment in order to develop program priorities and target audiences. Working with the other Coordinators and Reserve Manager and in consultation with strategic partners, the CTP Coordinator will develop a portfolio that identifies a few key topics relevant to the needs and audience of the reserve area. To support these efforts, a Training Advisory Group will be convened, including local partners and members of the target audience. Lessons learned from the Reserve System during the COVID-19 pandemic regarding developing and delivering remote / virtual trainings are likely to play an integral role.

During the first few years of establishment, the CTP Coordinator will rely heavily on existing NOAA OCM trainings on topics of interest to our local communities and will consider local tools such as SLAMM and the Blue Plan (Clough et al. 2019; DEEP 2019b). Currently, NOAA OCM provides resources for numerous training topics (<https://coast.noaa.gov/digitalcoast/training/>). As the CTP Coordinator gains experience and develops relationships, the Coordinator may develop programs of interest to our local communities. A need for consistent training in support of local land-use commissions has been identified as a priority need.

As research, stewardship, and education coordinators bring NERRS programs such as SWMP, TOTE, and KEEP, and the NERRS Climate Initiative online, the CTP coordinator will work closely with those individuals to determine where the CTP can support, and be supported by, those programs.

At UConn Avery Point campus and DEEP Marine District Headquarters, the proposed CT NERR will have access to on-site facilities, virtual platforms, and the ability to bring participants into the field for place-based, hands-on training. The facilities available include small meeting rooms for 6 people, to mid-size rooms for 20 to 40 people, to an auditorium which can seat 325. UConn Avery Point campus offers

catering facilities and is often the chosen site for hosting trainings and educational programs for the general public. Avery Point has made substantial investments into the development of telepresence and virtual connectivity, which is a powerful tool that the CTP can make use of to reach audiences unable to visit in person. A successful CTP will feature both in person, virtual, and hybrid offerings, and continually work to adjust the ratio of programming, to maximize the reach of the program. Looking to the future, the proposed CT NERR will be investigating the construction of a visitor center and accompanying facilities to support research, education, and training, though only planning activities are anticipated in the first five years. These activities are referenced in the Education Plan.

11.3.5 Needs and Opportunities - Coastal Training Program

Within the first two years, the proposed CT NERR will conduct a market analysis and need assessment, to further refine the focus and objectives of the proposed CT NERR CTP. For this management plan, the process for determining initial goals, strategies, and actions for the proposed CT NERR CTP program was guided by the results of a listening session conducted with local and regional experts from academic, government, non-profit, and private sector organizations who are interested in or involved in this or other nearby NERR programs. The results of this listening session were distilled, and the emergent ideas captured to see how the CTP can best identify objectives to meet reserve goals. The results of this process are included in *Appendix E - Evaluation of Objectives and Strategies for the CTP*.

A key aspect of the proposed CT NERR's development in this process will be the consistent use of assessments and evaluations as well as adaptive management techniques to shape activities and improve our ability to meet audience needs. Toward this end, the CTP Coordinator will maintain open and regular dialog with the Training Advisory Group and other key partners in the fields of coastal management, science, education, and advocacy. Furthermore, the CTP Coordinator will be an active member of the coastal management community, working with reserve staff and other contacts within the scientific community to stay abreast of emerging science and technology.

The CTP also undertakes formal needs assessments to help the program provide current and targeted information to coastal decision-makers. For example, the CTP will undertake a formal market analysis, either using a contractor, or led by the CTP Coordinator, in the first year. This study, along with the final Reserve Management Plan, will be used to guide development of the next five-year strategic plan for the CTP.

Following a workshop or event, reserve staff will evaluate the success with which the program satisfied audience needs. The program evaluations help the CTP to provide better training programs in the future and to identify new training topics. Reserve staff will consider workshop discussions and analyze evaluations to learn which aspects of the workshop were most appreciated, which could be enhanced, and what other topics or formats should be considered.

11.3.6 Objectives and Actions - Coastal Training Program

The three proposed CT NERR reserve-wide goals are presented in *Section 3.4*. The Coastal Training Program objectives, while supporting all three goals, are most responsive to Goal 2:

Goal 2: Strengthen stewardship, protection, and management of estuaries and their watersheds through place-based approaches to training and education in order to maintain and enhance natural environments.

Table 11-8: Proposed CT NERR Coastal Training Objectives—C1

Objective C1. Establish the proposed CT NERR’s Coastal Training Program as a reliable and relevant source for training and support on coastal management issues.	
Strategies	Tasks
S1. Build a community-centric framework for the proposed CT NERR Coastal Training Program.	<p>T1. Within the first year, conduct a market analysis and needs assessment to better understand CTP’s role in both training and technical assistance, including identifying the niche of other organizations offering training programs.</p> <p>T2. Identify and develop partnerships with other organizations providing and in need of trainings.</p> <p>T3. Identify stakeholders and develop relationships.</p> <p>T4. Develop an understanding of town organizational structures and decision making processes within the proposed CT NERR with respect to coastal management responsibilities, to improve our ability to shape CTP programming</p> <p>T5. Establish relationships with underserved communities, especially DEEP Environmental Justice Communities.</p>
S2. Develop a support network for the CTP.	T1. Establish a Training Advisory Group, following the general procedures outlined for establishing the Reserve Advisory Committee in the Administration Plan.

<p>S3. Develop long-term program priorities.</p>	<p>T1. Work with local partners and the Training Advisory Group to evaluate the outcome of the market analysis and needs assessment to develop program portfolio with continuity and which works towards priority issues and specific outcomes.</p> <p>T2. Evaluate the feasibility and local needs to incorporate ecosystem services as a new theme within CTP trainings.</p>
<p>S4. Provide technical assistance as a service and to build partnerships and relationships.</p>	<p>T1. Serve in an advisory or leadership role on a committee or watershed group with regular, active contributions, where these meetings are influenced by Coastal Training Program participation.</p> <p>T2. Provide value-added services to groups or organizations that relate to CTP priority issues. These may include meeting facilitation, best management practice implementation, needs assessment / survey design and evaluation, developing tools for effective webinars, etc.</p> <p>T3. Create publications or websites for use by coastal decision makers.</p> <p>T4. Act as referral service or information “clearing house” connecting coastal decision-makers and community groups with relevant information and contacts.</p>
<p>S5. Grow the program by seeking additional financial and staff support.</p>	<p>T1. Work with fellow Coordinators, strategic partners, and the Friends Group to seek additional funding to support the CTP.</p> <p>T2. As funding allows, hire additional support staff for the CTP.</p> <p>T3. Consider using volunteers and taking advantage of strategic partnerships to meet the program needs.</p> <p>T4. Take advantage of programs such as Margaret Davidson fellowships, NOAA Hollings Scholarships, and NERR Graduate Research Fellowships to bring highly skilled young scientists at low / no cost.</p>

Table 11-9: Proposed CT NERR Coastal Training Objectives—C2

Objective C2.	
Deliver science-based knowledge and skills appropriate to the needs of coastal decision-makers in Connecticut, taking advantage of relationships with other Reserve System staff to support program content.	
Strategies	Tasks
S1. Bring emerging coastal issues of significance into the spotlight locally.	<p>T1. Starting in year two, deliver a minimum of five high-quality training events on priority coastal issues annually.</p> <p>T2. By year five, expand the scope of training activities to become a recognized leader in coastal training more broadly across coastal Connecticut.</p> <p>T3. Work with regional scientific organizations to convene an average of one Coastal Management workshop, symposium, or standalone conference for local officials, starting in year three.</p> <p>T4. Actively engage in the Governor’s Council on Climate Change, or other similar state-wide groups to and broaden the distribution of CT NERR CTP knowledge base.</p>
S2. Engage in effective and thorough program evaluation and follow-up.	<p>T1. Provide pre- and post-workshop evaluations to participants in all workshops / symposia / etc. to adaptively manage the CTP to reflect changing needs.</p> <p>T2. Work with local and national experts on program evaluation to enhance the rigor and relevance of program evaluations.</p> <p>T3. Provide organized workshop follow-up, including but not limited to dissemination of workshop agendas, presentations, proceedings, reference material, and contact</p> <p>T4. Use workshop feedback to identify and address barriers to effective coastal management as identified by participants.</p> <p>T5. Conduct periodic review of the CTP program to ensure target audiences are being reached.</p>

<p>S3. Build cross-sector relationships to stay abreast of recent research results and take advantage of educational opportunities.</p>	<p>T1. Support the Education Coordinator by supplying information and training support.</p> <p>T2. Engage with relevant Education audiences, using the Education Coordinator as a point of contact.</p> <p>T3. Contribute to the TOTE program where appropriate and make training resources developed through the CTP available.</p> <p>T4. Coordinate with the Research and Stewardship Coordinators as resources for information and potential workshop leaders, especially for place-based activities.</p> <p>T5. Work with the Stewardship Coordinator to review the results from the market analysis and needs assessment to identify opportunities for establishing a workshop on habitat restoration issues spanning project design to implementation and monitoring.</p> <p>T6. Engage with the Volunteer Coordinator and the Friends Group to broaden the potential audience and reach new sectors of stakeholders.</p>
<p>S4. Utilize cross-reserve relationships for support and professional development.</p>	<p>T1. Identify opportunities to work with reserve staff from other states, to facilitate joint learning and to meet the local needs of stakeholders.</p> <p>T2. Work with other reserve staff to develop research ideas that may lead to NERRS Science Collaborative proposals or proposals to other funding sources.</p> <p>T3. Establish a two-way relationship with the national CTP program to facilitate information exchange.</p>

Table 11-10: Proposed CT NERR Coastal Training Objectives—C3

Objective C3.	
Increase access of CTP target audiences to science-based information that connects to their work to increase networking and information sharing.	
Strategies	Tasks
<p>S1. Deliver training opportunities asynchronously, in addition to the more typical synchronous training.</p>	<p>T1. Develop or modify existing resources into a portable and repeatable subset of training workshops and materials that can be used in different geographic locations and varying timings to ensure that target audience members who have differing work schedules can have easier access to these events.</p> <p>T2. Use technology and distance learning techniques such as webinars and podcasts to bring science-based information to target audiences.</p>
<p>S2. Adapt trainings to faster paced work environments and limited availability audiences</p>	<p>T1. Develop several short core training presentations that can be delivered to local officials and municipal boards at their regular meetings.</p> <p>T2. Provide brief, focused hand-outs on key concepts and advertise longer training opportunities and place-based opportunities during these short sessions.</p> <p>T3. Leverage remote learning technology and platforms that can deliver quick and accessible trainings emphasizing convenience and ease of use.</p>

<p>S3. Develop science translation products for coastal decision-makers to explain priority coastal management issues and NERRS research.</p>	<p>T1. Utilize NOAA’s Digital Coast Academy to identify readily available resources that may reduce or streamline the need for development of new materials.</p> <p>T2. Engage with the Education, Research, and Communications Coordinators to develop engaging and informative outreach products, delivered digitally or in hard copy.</p> <p>T3. Leveraging the market analysis / needs assessment, identify and engage with relevant partners to deliver translation products on topics involving climate change, SWMP data delivery, water quality, and habitat management / land use.</p>
<p>S4. Provide networking opportunities to stakeholders.</p>	<p>T1. Build in and offer networking opportunities at training events and seek to connect coastal decision-makers working on similar issues.</p> <p>T2. Host special events at the reserve, which include structured activities and unstructured time for exploring the environment and meeting colleagues.</p> <p>T3. Based on the results of the market analysis and needs assessment, actively participate in existing Communities of Practice¹⁶ or develop a Community of Practice (Wenger et al. 2002), if none exists.</p>

¹⁶ A community of practice is a group of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly.

12 Works Cited

- Al-Haj, A.N., and R.W. Fulweiler. 2020. A synthesis of methane emissions from shallow vegetated coastal ecosystems. *Global Change Biology* 26: 2988-3005. 10.1111/gcb.15046
- Alden, P., B. Cassie, R. Forster, R. Kern, A. Leventer, and W.B. Zomelefer. 1998. *National Audubon Society Field Guide to New England*. NY: Alfred A. Knopf.
- Audubon Connecticut. 2021. Atlantic Flyway > About Ospreys, website. <https://ct.audubon.org/conservation/about-ospreys>. *last accessed*: 21 May 2021.
- Barrett, J. 1997. Distribution and Abundance of Submerged Aquatic Vegetation in the Lower Tidal Connecticut River. final report provided to Connecticut Department of Environmental Protection.
- Barrett, J. 2014. Long Island Sound Stewardship Ecological Sites Inventory Update (including an Access database). Final report prepared by Connecticut Sea Grant. Prepared for: Long Island Sound Study and NEIWPC.
- Bradley, M., and S. Paton. 2018. Tier 1 2017 mapping of *Zostera marina* in Long Island Sound and change analysis. University of Rhode Island, U.S. Fish and Wildlife Service, USGS. 19 pp. https://longislandsoundstudy.net/wp-content/uploads/2019/03/LIS_2017_report_eelgrass_FINAL.pdf.
- Brenchley, G.A., and J.T. Carlton. 1983. Competitive displacement of native mud snails by introduced periwinkles in the New England intertidal zone. *Biological Bulletin* 165: 543-558.
- CABI. 2021. Invasive Species Compendium, website. *from*: CAB International. www.cabi.org/isc. *last accessed*: 15 May 2021.
- CAES IAPP. 2021. Mapviewer - Connecticut River Gateway Zone Invasive Aquatic Plant Study [web application]. *from*: The Connecticut Agricultural Experiment Station Invasive Aquatic Plant Program. <https://caes.maps.arcgis.com/apps/webappviewer/index.html?id=e77ef6d97fc44e6296c1a77b35887eca>. *last accessed*: 23 May 2021.
- Capers, R.S., G.J. Bugbee, R. Selsky, and J.C. White. 2005. Invasive Aquatic Plants of Connecticut. Bulletin No. 997, The Connecticut Agricultural Experimental Station. <https://portal.ct.gov/-/media/CAES/Invasive-Aquatic-Plant-Program/Plant-Information/AquaticsGuidepdf>. *last accessed*: 27 March 2021.
- City Population. 2021. NORWICH - NEW LONDON Metropolitan Statistical Area in USA, website. https://www.citypopulation.de/en/usa/metro/35980__norwich_new_london/. *last accessed*: 15 May 2021.
- Clough, J., A. Polaczyk, and M. Propato. 2019. Advancing existing assessment of Connecticut marshes' responses to SLR. Prepared by Warren Pinnacle Consulting, Inc. Prepared for Northeast Regional Oceans Council. 162 pp.

- http://warrenpinnacle.com/prof/SLAMM/NROC/SLAMM_NROC_Report_Final_Corrected.pdf. *last accessed*: 4 May 2021.
- Connecticut Invasives Plant Council. 2018. Connecticut Invasive Plant List. <https://cipwg.uconn.edu/wp-content/uploads/sites/244/2018/12/CT-Invasive-Plant-List-2018Scientific-Name.pdf>. *last accessed*: 15 May 2021.
- Covey, S.R. 2020. *The 7 Habits of Highly Effective People, "Habit 4: Think Win/Win,"* Simon and Schuster.
- CT RC&D. 2021. Connecticut River Aquatic Invasives - Hydrilla Management Collaborative. Connecticut Resource Conservation and Development Environmental Review Team Program. https://portal.ct.gov/-/media/CAES/Invasive-Aquatic-Plant-Program/Survey-Results/C/Connecticut-River/Executive-Summary---The-River-Hydrilla-Collaborative-ERT-Report-Jan_2021.pdf. *last accessed*: 23 May 2021.
- CT.gov. 2019. State Water Plan, website. <https://portal.ct.gov/Water/Water-Planning-Council/State-Water-Plan>. *last accessed*: 15 May 2021.
- CT.gov. 2021. New London Region, website. <https://portal.ct.gov/ChooseCT/Regions/New-London>
- CTECO. 2021. Blue Plan Map Viewer [web application]. *from*: Connecticut Environmental Conditions Online (CTECO). <https://cteco.uconn.edu/projects/blueplan/index.htm>. *last accessed*: 15 May 2021.
- DA/BA. 2021. Recreational Shellfishing, website. *from*: Connecticut Department of Agriculture Bureau of Aquaculture. <https://portal.ct.gov/DOAG/Aquaculture1/Aquaculture/Recreational-Shellfishing>. *last accessed*: 15 May 2021.
- Dam, H.G., J. O'Donnell, and A.N.S. Siuda. 2010. A synthesis of water quality and planktonic resource monitoring data for Long Island Sound. Final Report EPA Grant Number LI-97127501. 363 pp. DOI: 10.13140/RG.2.1.3598.4404.
- DECD. 2021. Distressed Municipalities, website. *from*: Connecticut Department of Economic and Community Development. https://portal.ct.gov/DECD/Content/About_DECD/Research-and-Publications/02_Review_Publications/Distressed-Municipalities. *last accessed*: 15 May 2021.
- DEEP. 2010. Wildlife - Bald Eagle, website. *from*: Connecticut Department of Energy and Environmental Protection. <https://portal.ct.gov/DEEP/Wildlife/Fact-Sheets/Bald-Eagle>. *last accessed*: 15 May 2021.
- DEEP. 2015a. Connecticut's Endangered, Threatened and Special Concern Species 2015. *from*: Connecticut Department of Energy and Environmental Protection. https://portal.ct.gov/-/media/DEEP/wildlife/pdf_files/nongame/ETS15pdf.pdf
- DEEP. 2015b. Connecticut's Wildlife Action Plan -- 2015 Revision, Appendix 1a: Sources of Information. Connecticut Department of Energy and Environmental Protection. https://portal.ct.gov/-/media/DEEP/wildlife/pdf_files/nongame/CTWAP/CTWAPAppendix1pdf.pdf. *last accessed*: 15 May 2021.

- DEEP. 2016. Connecticut's Wildlife Action Plan -- 2015 Revision. *from:* Connecticut Department of Energy and Environmental Protection. <https://portal.ct.gov/DEEP/Wildlife/CT-Wildlife-Action-Plan/CT-WAP-Current-Status>
- DEEP. 2017. Water Quality, website. *from:* Connecticut Department of Energy and Environmental Protection. <https://portal.ct.gov/DEEP/Water/Water-Quality/Water-Quality>. *last accessed:* 15 May 2021.
- DEEP. 2019a. 2018 Integrated Water Quality Report. Prepared by: Connecticut Department of Energy and Environmental Protection. Prepared for U.S. Environmental Protection Agency. https://portal.ct.gov/-/media/DEEP/water/water_quality_management/305b/2018CTIntgratedWaterQualityReportpdf.pdf. *last accessed:* 15 May 2021.
- DEEP. 2019b. Long Island Sound Blue Plan. Connecticut Department of Energy and Environmental Protection. Hartford, CT. https://portal.ct.gov/-/media/DEEP/coastal-resources/LIS_blue_plan/blueplanfinaldraftversion12september2019pdf.pdf.
- DEEP. 2020a. 2020 Integrated Water Quality Report. Prepared by: Connecticut Department of Energy and Environmental Protection. Prepared for U.S. Environmental Protection Agency. https://portal.ct.gov/-/media/DEEP/water/water_quality_management/305b/2020/2020IWQRFinal.pdf. *last accessed:* 15 May 2021.
- DEEP. 2020b. Endangered, Threatened, and Special Concern Species in Connecticut, website. *from:* Connecticut Department of Energy and Environmental Protection. <https://portal.ct.gov/DEEP/Endangered-Species/Endangered-Species>. *last accessed:* 15 May 2021.
- DEEP. 2020c. Invasive Species - Examples of Aquatic Invasive Species In Connecticut, website. *from:* Connecticut Department of Energy and Environmental Protection. <https://portal.ct.gov/DEEP/Invasive-Species/Examples-of-Aquatic-Invasive-Species-In-Connecticut>. *last accessed:* 15 May 2021.
- DEEP. 2020d. Invasive Species, website. *from:* Connecticut Department of Energy and Environmental Protection. <https://portal.ct.gov/DEEP/Invasive-Species/Invasive-Species>. *last accessed:* 15 May 2021.
- DEEP. 2020e. Wildlife - Black Bear, website. *from:* Connecticut Department of Energy and Environmental Protection. <https://portal.ct.gov/DEEP/Wildlife/Fact-Sheets/Black-Bear>. *last accessed:* 15 May 2021.
- DEEP. 2020f. Wildlife - Bobcat, website. *from:* Connecticut Department of Energy and Environmental Protection. <https://portal.ct.gov/DEEP/Wildlife/Fact-Sheets/Bobcat>. *last accessed:* 15 May 2021.

- DEEP. 2020g. Wildlife - Cottontail Rabbits, website. *from:* Connecticut Department of Energy and Environmental Protection. <https://portal.ct.gov/DEEP/Wildlife/Fact-Sheets/Cottontail-Rabbits>. *last accessed:* 15 May 2021.
- DEEP. 2021a. Bluff Point State Park - Overview/History, website. <https://portal.ct.gov/DEEP/State-Parks/Parks/Bluff-Point-State-Park/Overview>. *last accessed:* 15 May 2021.
- DEEP. 2021b. Bluff Point State Park and Coastal Reserve - trail map. *from:* Connecticut Department of Energy and Environmental Protection. <https://explorect.org/bluff-point/>. *last accessed:* 15 May 2021.
- DEEP. 2021c. Boat Launches / Access / Transient Slips, website. *from:* Connecticut Department of Energy and Environmental Protection. <https://portal.ct.gov/DEEP/Boating/Boat-Launches--Access--Transient-Slips>. *last accessed:* 15 May 2021.
- DEEP. 2021d. Coastal Access in Connecticut, website. *from:* Connecticut Department of Energy and Environmental Protection. <https://portal.ct.gov/DEEP/Coastal-Resources/Coastal-Access>. *last accessed:* 15 May 2021.
- DEEP. 2021e. Coastal Management, website. *from:* Connecticut Department of Energy and Environmental Protection. <https://portal.ct.gov/DEEP/Coastal-Resources/Coastal-Management/Coastal-Management>. *last accessed:* 15 May 2021.
- DEEP. 2021f. Connecticut Coastal Access Guide [web application]. *from:* Connecticut Department of Energy and Environmental Protection. <https://www.depdata.ct.gov/maps/coastalaccess/index.html>. *last accessed:* 15 May 2021.
- DEEP. 2021g. Endangered Species > Natural Diversity Data Base (NDDDB) Maps, website. *from:* Connecticut Department of Energy and Environmental Protection. <https://portal.ct.gov/DEEP/Endangered-Species/Natural-Diversity-Data-Base-Maps>. *last accessed:* 15 May 2021.
- DEEP. 2021h. Haley Farm State Park - Overview/History, website. <https://portal.ct.gov/DEEP/State-Parks/Parks/Haley-Farm-State-Park>. *last accessed:* 15 May 2021.
- DEEP. 2021i. Haley Farm State Park - trail map. *from:* Connecticut Department of Energy and Environmental Protection. <https://portal.ct.gov/-/media/DEEP/stateparks/SkysTheLimit/haleymappdf.pdf>. *last accessed:* 15 May 2021.
- DEEP. 2021j. Integrated Water Quality Report to Congress, website. *from:* Connecticut Department of Energy and Environmental Protection. <https://portal.ct.gov/DEEP/Water/Water-Quality/Water-Quality-305b-Report-to-Congress>. *last accessed:* 15 May 2021.
- DEEP. 2021k. Maps and GIS Data / GIS Data, website. <https://portal.ct.gov/DEEP/GIS-and-Maps/Data/GIS-DATA#NaturalResourcesManagement>. *last accessed:* 15 May 2021.

- DEEP. 2021l. Overview - Environmental Justice Program, website. *from*: Connecticut Department of Energy and Environmental Protection. <https://portal.ct.gov/DEEP/Environmental-Justice/Environmental-Justice-Program-Overview>. *last accessed*: 15 May 2021.
- DEEP. n.d.-a. An Atlas of the Crayfish of Connecticut, website. <https://www.arcgis.com/apps/MapJournal/index.html?appid=b9b8fa8441ac4ccab088db6c38ff0500>. *last accessed*: 27 March 2021.
- DEEP. n.d.-b. Connecticut Critical Habitats GIS data layer, website. Connecticut Department of Energy and Environmental Protection, <https://ct-deep-gis-open-data-website-ctdeep.hub.arcgis.com/>. *last accessed*: 2 July 2020.
- DEEP. n.d.-c. Natural Resources Inventory of and Management Recommendations for Bluff Point Coastal Reserve and State Park, Groton, CT. Unpublished Connecticut Department of Environmental Protection report.
- DEEP, UConn, and Connecticut Sea Grant. 2018. The Connecticut National Estuarine Research Reserve Site Selection and Nomination Report. Submitted by the Office of the Governor of the State of Connecticut, Dannel P. Malloy. Submitted to U.S. Department of Commerce, National Oceanic and Atmospheric Administration. 557 pp. <https://portal.ct.gov/-/media/DEEP/coastal-resources/NERR/CTNERRSiteNominationFINAL20181221reportpdf.pdf>. *last accessed*: 15 May 2021.
- DeGraaf, R.M., and D.D. Rudis. 1983. New England Wildlife: Habitat, Natural History, and Distribution. U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station, General Technical Report NE-106.
- DOE. 2021. EdSight, website. *from*: Connecticut Department of Education. <https://portal.ct.gov/SDE/Performance/EdSight>. *last accessed*: 15 May 2021.
- Dowhan, J.J., and R.J. Craig. 1976. Rare and Endangered Species of Connecticut and their Habitats. State Geological and Natural History Survey of Connecticut, Report of Investigations, No. 6. Hartford, CT.
- DPH. 2021. If I Catch It, Can I Eat It? A guide to eating fish safely., Connecticut Department of Public Health (DPH). https://portal.ct.gov/-/media/Departments-and-Agencies/DPH/dph/environmental_health/eoha/Fish_/If-I-Catch-It-Can-I-Eat-It--Final-English_2021.pdf. *last accessed*: 23 May 2021.
- Dreyer, G.D., and M. Caplis. 2001. Living Resources and Habitats of the Lower Connecticut River. Connecticut College Arboretum, Bulletin No. 37. New London, CT. 79 pp. <https://digitalcommons.conncoll.edu/arbulletins/37>. *last accessed*: 15 May 2021.
- Dreyer, G.D., and W.A. Niering. 2001. Tidal Marshes of Long Island Sound: Ecology, History and Restoration. Connecticut College Arboretum, Bulletin No. 34. New London, CT. 77 pp. <http://digitalcommons.conncoll.edu/arbulletins/34>. *last accessed*: 15 May 2021.
- Ebbin, S. 2010. Pine Island: an Island Exploration. *Wrack Lines* 54.

- FEMA. 2020. National Flood Hazard Layer (NFHL) for Connecticut, GIS data layer. FEMA, U.S. Department of Homeland Security <https://www.fema.gov/flood-maps/national-flood-hazard-layer>. *last accessed*: 2 July 2020.
- Fontenault, J. 2018. All Vessel Transit Counts from - 2017 AIS - Northeast and Mid-Atlantic United States. RPS. Prepared for: Northeast Regional Ocean Council (NROC) Northeast Ocean Data www.northeastoceanandata.org. <https://www.northeastoceanandata.org/files/metadata/Themes/AIS/AllAISVesselTransitCounts2017.pdf>. *last accessed*: 15 May 2021.
- Getchis, T.L., D.H. Carey, S. Kelly, C.M. Rose, K. Romero, and D. Gonyea. 2019. A Guide to Marine Aquaculture Permitting in Connecticut. Connecticut Sea Grant. CTSG-19-06. Groton, Connecticut. <http://aquaculture.uconn.edu/commercial/>. *last accessed*: 15 May 2021.
- Goldberg, R., J.M. Rose, R. Mercaldo-Allen, S.L. Meseck, P. Clark, C. Kuropat, and J.J. Pereira. 2014. Effects of hydraulic dredging on the benthic ecology and sediment chemistry on a cultivated bed of the Northern quahog, *Mercenaria mercenaria*. *Aquaculture* 428-429: 150-157. 10.1016/j.aquaculture.2014.03.012
- Governor's Council on Climate Change. 2018a. Building a Low Carbon Future for Connecticut. K. Enright-Kato, J. Howard and J. Hunt, Connecticut Department of Energy and Environmental Protection. 67 pp. <https://portal.ct.gov/-/media/DEEP/climatechange/GC3/GC3StatementofPrinciples32018pdf.pdf>. *last accessed*: 15 May 2021.
- Governor's Council on Climate Change. 2018b. Mid-term Target Recommendation and Statement of Principles. Connecticut Department of Energy and Environmental Protection. <https://portal.ct.gov/-/media/DEEP/climatechange/GC3/GC3StatementofPrinciples32018pdf.pdf>. *last accessed*: 15 May 2021.
- Governor's Council on Climate Change. 2021a. Final Report: Working & Natural Lands Working Group Rivers Sub-Working Group. Governor's Council on Climate Change (GC3) & Department of Energy and Environmental Protection. <https://portal.ct.gov/-/media/DEEP/climatechange/GC3/GC3-working-group-reports/GC3-WNLWG-Rivers-Final-Report-11-20-20.pdf>. *last accessed*: 15 May 2021.
- Governor's Council on Climate Change. 2021b. Governor's Council on Climate Change, website. <https://portal.ct.gov/DEEP/Climate-Change/GC3/Governors-Council-on-Climate-Change>. *last accessed*: 15 May 2021.
- Governor's Council on Climate Change. 2021c. Taking Action on Climate Change and Building a More Resilient Connecticut for All - Phase 1 Report: Near-Term Actions., Governor's Council on Climate Change (GC3) & Department of Energy and Environmental Protection. https://portal.ct.gov/-/media/DEEP/climatechange/GC3/GC3_Phase1_Report_Jan2021.pdf *last accessed*: 15 May 2021.
- Hallenbeck, B. 2019. Tribe renews bid to fill museum's executive director position. The Day. Published March 29. 2019 8:23PM | Updated March 29. 2019 8:26PM.

- Hammerson, G.A. 2004. *Connecticut Wildlife: Biodiversity, Natural History, and Conservation*. Hanover: Hanover : University Press of New England.
- Howard, J., S. Hoyt, K. Isensee, M. Telszewski, E. Pidgeon, and (eds.). 2014. Coastal Blue Carbon: Methods for assessing carbon stocks and emissions factors in mangroves, tidal salt marshes, and seagrasses. Conservation International, Intergovernmental Oceanographic Commission of UNESCO, International Union for Conservation of Nature. Virginia, USA.
- Johnson, M., E.J. Beckwith, D. Carey, E. Parker, E. Smith, J. Volk, P. Aarrestad, M. Huang, E. Mariani, R. Rozsa, D. Simpson, and H. Yamalis. 2007. An assessment of the impacts of commercial and recreational fishing and other activities to eelgrass in Connecticut's waters and recommendations for management. Connecticut Department of Environmental Protection and Connecticut Department of Agriculture. Hartford, CT. 119 pp.
<http://ct.gov/dep/lib/dep/fishing/saltwater/eelgrassreport.pdf>.
- Klemens, M.W. 1993. *Amphibians and Reptiles of Connecticut and Adjacent Regions*. Hartford, Conn.: Hartford, Conn.: State Geological and Natural History Survey of Connecticut.
- Kocian, M., A. Fletcher, G. Schundler, D. Batker, A. Schwartz, and T. Briceno. 2015. The Trillion Dollar Asset: The Economic Value of the Long Island Sound Basin. Earth Economics. Tacoma, WA.
<http://www.eartheconomics.org/FileLibrary/file/Reports/Earth%20Economics%20Long%20Island%20Sound%20Basin%202015%20Final%20Report.pdf>. *last accessed*: 14 May 2015.
- Latimer, J.S., M. Tedesco, R.L. Swanson, C. Yarish, P. Stacey, and C. Garza. 2014. Long Island Sound: Prospects for the Urban Sea. In *Springer Series on Environmental Management*, 539: Springer Publishers, NY.
- Lavin, L. 2013. *Connecticut's Indigenous Peoples*: Yale University Press.
- Lavin, L., and M. Banks. 2008. Connecticut's First Fishermen - LeBeau Fishing Camp and Weir. Connecticut State Historic Preservation Office, LeBeau Fishing Camp & Weir Archaeological Preserve. <https://www.iaismuseum.org/wp-content/uploads/2017/02/preserve-booklet-lebeau-fishing-camp.pdf> *last accessed*: 15 May 2021.
- LISS. 2021a. Targets/Indicators > Habitats and Wildlife > Ecosystem Targets and Indicators > Lobster Abundance, website. *from*: Long Island Sound Study. <https://longislandsoundstudy.net/ecosystem-target-indicators/lobster-abundance/>. *last accessed*: 15 May 2021.
- LISS. 2021b. Targets/Indicators > Habitats and Wildlife > Ecosystem Targets and Indicators > Shellfish Harvested, website. *from*: Long Island Sound Study. <https://longislandsoundstudy.net/ecosystem-target-indicators/shellfish-harvested/>. *last accessed*: 15 May 2021.
- Long Island Sound Inventory and Science Subcommittee of the Blue Plan Advisory Committee. 2019. Long Island Sound Resource and Use Inventory. University of Connecticut. Groton, CT.
https://portal.ct.gov/-/media/DEEP/coastal-resources/LIS_blue_plan/resourceanduseinventoryversion14september2019pdf.pdf.

- Longley-Wood, K. 2015. Distance Sailing Races - Northeast United States. SeaPlan. Prepared for: Northeast Regional Ocean Council (NROC) Northeast Ocean Data www.northeastoceandata.org. <https://www.northeastoceandata.org/files/metadata/Themes/Recreation/DistanceSailingRaces.pdf>. *last accessed*: 15 May 2021.
- Longley, K. 2013. Northeast Recreational Boater Route Density. SeaPlan. Prepared for: Northeast Regional Ocean Council (NROC) Northeast Ocean Data www.northeastoceandata.org. <https://www.northeastoceandata.org/files/metadata/Themes/Recreation/RecreationalBoaterRouteDensity.pdf>. *last accessed*: 15 May 2021.
- Lynch, P.J. 2017. *A field guide to Long Island Sound*: Yale University Press.
- Mascia, S. n.d. Midway Railroad Roundhouse Archaeological Complex, Groton CT, A New CT State Archaeological Preserve. Friends of the Office of State Archaeology - Selected Reprints. https://www.fosa-ct.org/SpecialFeatures/Midway_Railroad_Complex_Side_1.jpg; https://www.fosa-ct.org/SpecialFeatures/Midway_Railroad_Complex_Side_2.jpg. *last accessed*: 25 May 2021.
- Mercaldo-Allen, R., S. Meseck, R. Goldberg, P. Clark, C. Kuropat, and J.M. Rose. 2017. Effects of clam dredging on benthic ecology of two cultivated northern quahog beds with different harvest histories and sediment grain sizes. *Aquaculture international* 25: 1971-1985. 10.1007/s10499-017-0167-5
- Meseck, S.L., R. Mercaldo-Allen, J.M. Rose, P. Clark, C. Kuropat, J.J. Pereira, and R. Goldberg. 2014. Effects of Hydraulic Dredging for *Mercenaria mercenaria*, Northern Quahog, on Sediment Biogeochemistry. *Journal of the World Aquaculture Society* 45: 301-311. 10.1111/jwas.12114
- Metzler, K.J., and J.P. Barrett. 2006. The vegetation of Connecticut: a preliminary classification. State Geological and Natural History Survey of Connecticut, Department of Environmental Protection. Report of Investigations No. 12. Hartford, CT.
- Millennium Ecosystem Assessment. 2005. *Ecosystems and human well-being: general synthesis*. Washington D.C.: Island Press.
- Moore, R.B., L.D. McKay, A.H. Rea, T.R. Bondelid, C.V. Price, T.G. Dewald, and C.M. Johnston. 2019. User's guide for the national hydrography dataset plus (NHDPlus) high resolution. U.S. Geological Survey Open-File Report 2019-1096. 66 pp. <https://doi.org/10.3133/ofr20191096>.
- Mystic Aquarium. 2020. The 2020 Strategic Plan. <https://www.mysticaquarium.org/wp-content/uploads/2017/02/Strategic-Plan-Jan-2016.pdf>. *last accessed*: 15 May 2021.
- Mystic Seaport Museum. 2020. 2019 Annual Report. https://issuu.com/mysticseaport/docs/2020_annualreport_for2019_final_singlepages. *last accessed*: 15 May 2021.

- Niantic Children's Museum. 2021. Niantic Children's Museum > Support the Museum > Donate Now, website. <https://www.nianticchildrensmuseum.org/support-the-museum/>. *last accessed*: 15 May 2021.
- Niering, W.A., P.E. Fell, S.L. Taylor, M. Villalard-Bohnsack, and N.C. Olmstead. 1978. Plants and Animals of the Estuary, Bulletin No. 23. The Connecticut Arboretum, Connecticut College. New London, CT. <https://digitalcommons.conncoll.edu/arbbulletins/23>. *last accessed*: 15 May 2021.
- Ninigret Partners, and Fitzgerald & Halliday Inc. 2016. GrowSMART: RiverCOG's Regional Economic Growth Strategy. https://rivercog.org/wp-content/uploads/2020/01/growsmart-final-report_020416.pdf. *last accessed*: 15 May 2021.
- NOAA. 2010. Next Generation Strategic Plan. NOAA Performance, Risk & Social Science Office. NOAA Performance, Risk & Social Science Office. <https://www.performance.noaa.gov/ngsp/>. *last accessed*: Jul 14 2021.
- NOAA. 2018. Tides & Currents, website. *from*: National Oceanic and Atmospheric Administration. <https://tidesandcurrents.noaa.gov/>. *last accessed*: 2018.
- NOAA. 2021a. Climate at a Glance: Statewide Time Series [web application]. NOAA National Centers for Environmental Information <https://www.ncdc.noaa.gov/cag/>. *last accessed*: 15 May 2021.
- NOAA. 2021b. Ecosystem-Based Management, website. <https://ecosystems.noaa.gov/>. *last accessed*: 24 May 2021.
- NOAA Fisheries. 2018. Fisheries Economics of the United States, 2016. U.S. Dept. of Commerce, NOAA Tech. Memo. NMFS-F/SPO-187a.
- NOAA Fisheries. 2021a. Habitat Conservation mapper [web application]. *from*: National Oceanic and Atmospheric Administration, Fisheries. <https://www.habitat.noaa.gov/application/efhmapper/index.html#>. *last accessed*: 27 March 2021.
- NOAA Fisheries. 2021b. NOAA Fisheries > Ecosystems > Invasive and Exotic Marine Species, website. *from*: National Oceanic and Atmospheric Administration. <https://www.fisheries.noaa.gov/insight/invasive-and-exotic-marine-species>. *last accessed*: 1 May 2021.
- NOAA Fisheries. 2021c. NOAA Fisheries > Habitat Conservation > Threats to Habitat, website. *from*: National Oceanic and Atmospheric Administration. <https://www.fisheries.noaa.gov/insight/threats-habitat>. *last accessed*: 1 May 2021.
- NOAA Fisheries. 2021d. NOAA Fisheries, website. *from*: National Oceanic and Atmospheric Administration. <https://www.fisheries.noaa.gov/>. *last accessed*: 1 May 2021.
- NOAA OCM. 2013. Reserve System Management Plan Guidelines and Resources. National Oceanographic and Atmospheric Administration, Office for Coastal Management. Silver Spring, MD.

- <https://coast.noaa.gov/data/docs/nerrs/reserves-management-plan-guidelines.pdf>. *last accessed*: 15 May 2021.
- NOAA OCM. 2017. The National Estuarine Research Reserve System Strategic Plan 2017-2022. National Oceanographic and Atmospheric Administration, Office for Coastal Management. <https://coast.noaa.gov/data/docs/nerrs/StrategicPlan.pdf>. *last accessed*: 15 May 2021.
- NOAA OCM. 2021. C-CAP Land Cover For Connecticut. Coastal Change Analysis Program (C-CAP) High-Resolution Land Cover, ed. National Oceanographic and Atmospheric Administration - Office for Coastal Management. Charleston, SC www.coast.noaa.gov/htdata/raster1/landcover/bulkdownload/hires/. *last accessed*: 25 May 2021.
- NRCS USDA. 2021. Web Soil Survey, website. *from*: Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. <http://websoilsurvey.sc.egov.usda.gov/>. *last accessed*: 15 May 2021.
- O'Donnell, J. 2019. Sea Level Rise in Connecticut Department of Marine Sciences and Connecticut Institute for Resilience and Climate Adaptation. 28 pp. <https://circa.uconn.edu/wp-content/uploads/sites/1618/2019/10/Sea-Level-Rise-Connecticut-Final-Report-Feb-2019.pdf>. *last accessed*: 15 May 2021.
- Pendleton, L., D.C. Donato, B.C. Murray, S. Crooks, W.A. Jenkins, S. Sifleet, C. Craft, J.W. Fourqurean, J.B. Kauffman, N. Marbà, P. Megonigal, E. Pidgeon, D. Herr, D. Gordon, and A. Baldera. 2012. Estimating global "blue carbon" emissions from conversion and degradation of vegetated coastal ecosystems. *PLoS One* 7: e43542-e43542. 10.1371/journal.pone.0043542
- Romolini, M., W. Brinkley, and K. Wolf. 2012. What is urban environmental stewardship? Constructing a practitioner-derived framework. USDA Forest Service Research Note (PNW-RN-566), Seattle, WA. Prepared for: US Department of Agriculture, Forest Service, Pacific Northwest Research Station.
- Rozsa, R. 1994. Long term decline of *Zostera marina* in Long Island Sound and Fishers Island Sound. Office of Long Island Sound Programs, CT Department of Environmental Protection, <http://www.lisrc.uconn.edu/eelgrass/index.html> (Little Narr. Bay page). 10 pp.
- Sacred Heart University. 2021. Project Limulus, website. <https://www.sacredheart.edu/academics/colleges--schools/college-of-arts--sciences/departments/biology/project-limulus/>. *last accessed*: 15 May 2021.
- Save the Sound, and Connecticut Fund for the Environment. 2017. Sound Health Explorer. <http://www.soundhealthexplorer.org/pages/contact-us/>. *last accessed*: 2 November 2017.
- Save the Sound, J.M.P. Vaudrey, and J. Krumholz. 2020. Long Island Sound Report Card 2020. <https://www.savethesound.org/report-card>. *last accessed*: Jul 14 2021.
- Seth, A., G. Wang, C. Kirchoff, K. Lombardo, S. Stephenson, R. Anyah, and J. Wu. 2019. Connecticut Physical Climate Science Assessment Report (PCSAR) - Observed trends and projections of

temperature and precipitation. Prepared for the Connecticut Institute for Resilience and Climate Adaptation (CIRCA). <https://circa.uconn.edu/wp-content/uploads/sites/1618/2019/11/CTPCSAR-Aug2019.pdf>; <https://circa.uconn.edu/wp-content/uploads/sites/1618/2019/08/CTPCSAR-Appendix-Aug2019.pdf>. *last accessed*: 15 May 2021.

Snyder, J.T., M.M. Whitney, H.G. Dam, M.W. Jacobs, and H. Baumann. 2019. Citizen science observations reveal rapid, multi-decadal ecosystem changes in eastern Long Island Sound. *Mar Environ Res* 146: 80-88. 10.1016/j.marenvres.2019.03.007

Starbuck, K., A. Lipsky, and SeaPlan. 2012. 2012 Northeast Recreational Boater Survey: A Socioeconomic and Spatial Characterization of Recreational Boating in Coastal and Ocean Waters of the Northeast United States. Doc #121.13.10. Boston, MA. <https://www.openchannels.org/sites/default/files/literature/2012%20Northeast%20Recreational%20Boater%20Survey.pdf>. *last accessed*: 15 May 2021.

The Maritime Aquarium. 2021. Mission and Heritage, website. <https://www.maritimeaquarium.org/mission-and-heritage>. *last accessed*: 15 May 2021.

The Southeastern Connecticut Enterprise Region, CEDS Strategy Committee, J. Hodge, N. Cowser, R. Mills, S. Nugent, and Co-Chairmen of Economic Development and Marketing Committee. 2017. 2017 Comprehensive Economic Development Strategy for the Southeastern Connecticut Economic Development District. <https://www.nado.org/wp-content/uploads/2018/05/2017-Complete-CEDS-003.pdf>. *last accessed*: 15 May 2021.

Trueblood, D., P. Robinson, K. Curtis, J. Gao, K. Genskow, J. Jones, D. Veroff, A.K. Leight, E. Martino, and B. Wood. 2013. Climate Sensitivity of the National Estuarine Research Reserve System. https://coast.noaa.gov/data/docs/nerrs/Research_DataSyntheses_130725_climate%20sensitivity%20of%20nerrs_Final-Rpt-in-Layout_FINAL.pdf. *last accessed*: 15 May 2021.

Twilley, R.R., and J.W. Barko. 1990. The Growth of Submersed Macrophytes under Experimental Salinity and Light Conditions. *Estuaries* 13: 311-321. 10.2307/1351922

UConn. 2021a. College of Liberal Arts and Sciences - Marine Sciences, website. <https://marinesciences.uconn.edu/>

UConn. 2021b. LEED Buildings, website. *from*: University of Connecticut, Institute of the Environment, Office of Sustainability. <https://sustainability.uconn.edu/leed-buildings-2-2/>. *last accessed*: 15 May 2021.

UConn, Connecticut Department of Environmental Protection, National Undersea Research Center, and Long Island Sound Resource Center. 2010. Explore Long Island Sound, website. *from*: Long Island Sound Resource Center, . <http://www.lisrc.uconn.edu/explorelis/index.htm>. *last accessed*: 15 May 2021.

UConn CLEAR, Connecticut Sea Grant Program, and DA/BA. 2018. Aquaculture Mapping Atlas [web application]. Produced by: University of Connecticut's Center for Land Use Education and Research

(CLEAR) and the Connecticut Sea Grant Program, in collaboration with the Connecticut Department of Agriculture Bureau of Aquaculture. It is hosted on the Connecticut Environmental Conditions Online (CT ECO) website, a collaboration between UConn CLEAR and the Connecticut Department of Energy and Environmental Protection.
<https://cteco.uconn.edu/viewer/index.html?viewer=aquaculture>. *last accessed*: 1 May 2021.

United States Census Bureau. 2021. American Community Survey - 2014—2018 ACS 5-Year Narrative Profile, Norwich-New London, CT Metro Area, website.
<https://www.census.gov/acs/www/data/data-tables-and-tools/narrative-profiles/2018/report.php?geotype=msa&msa=35980>. *last accessed*: 15 May 2020.

University of Wisconsin-Extension. 2010. Lake Superior National Estuarine Research Reserve Management Plan 2010-2015. Madison, WI.

USEPA. 2021a. Basic Information on PFAS, website. <https://www.epa.gov/pfas/basic-information-pfas>.
last accessed: 23 May 2021.

USEPA. 2021b. Dredged Material Management in Long Island Sound. <https://www.epa.gov/ocean-dumping/dredged-material-management-long-island-sound>

USFWS. 1994. (Ramsar Nomination) Nomination Report to the Convention on Wetlands of International Importance: Connecticut River and Tidal River Wetlands Complex. Prepared by: U.S. Fish and Wildlife Service, Southern New England - Long Island Sound Coastal and Estuary Office.
<https://rsis.ramsar.org/RISapp/files/RISrep/US710RIS.pdf>; <https://rsis.ramsar.org/ris/710>. *last accessed*: 15 May 2021.

USFWS. 2021. Environmental Conservation Online System - Proposed for Listing species believed to or known to occur in Connecticut [web application]. <https://ecos.fws.gov/ecp/report/species-listings-by-state?stateAbbrev=CT&stateName=Connecticut&statusCategory=Proposed%20for%20Listing>.
last accessed: 15 May 2021.

USGS. 2021a. Nonindigenous Aquatic Species Database: Connecticut State search [web application], ed. United States Geological Survey. Gainesville, FL <http://nas.er.usgs.gov>. *last accessed*: 27 March 2021.

USGS. 2021b. Nonindigenous Aquatic Species Database: query by drainage (8-digit HUC): 01100003-Thames & 01080205-Lower Connecticut [web application], ed. United States Geological Survey. Gainesville, FL <http://nas.er.usgs.gov>. *last accessed*: 27 March 2021.

USGS. 2021c. Nonindigenous Aquatic Species Database: zebra mussel query for Connecticut [web application], ed. United States Geological Survey. Gainesville, FL <http://nas.er.usgs.gov>, <https://nas.er.usgs.gov/queries/zmbyst.aspx>. *last accessed*: 27 March 2021.

Valiela, I. 1995. *Marine Ecological Processes*. New York, New York, U.S.A.: Springer-Verlag New York, Inc.

Van Patten, M. 2009. *Seaweeds of Long Island Sound*: Connecticut Sea Grant College Program.

- Vaudrey, J.M.P. 2008. Establishing restoration objectives for eelgrass in Long Island Sound - Part I: review of the seagrass literature relevant to Long Island Sound. Final Grant Report to the Connecticut Department of Environmental Protection, Bureau of Water Protection and Land Reuse and the U.S. Environmental Protection Agency. <http://www.lisrc.uconn.edu/eelgrass/index.html> (select Literature Reviews > Seagrass Literature Survey Report). Groton, CT. 58 pp.
- Vaudrey, J.M.P., J. Eddings, C. Pickerell, L. Brousseau., and C. Yarish. 2013. Development and application of a GIS-based Long Island Sound Eelgrass Habitat Suitability Index Model. Final report submitted to the New England Interstate Water Pollution Control Commission and the Long Island Sound Study. 171 p. + appendices. http://digitalcommons.uconn.edu/marine_sci/3/. *last accessed: 27 January 2015.*
- Weather Atlas. 2021. Monthly weather forecast and climate Connecticut, USA [web application]. https://www.weather-us.com/en/connecticut-usa-climate#climate_text_1. *last accessed: 15 May 2021.*
- Weiss, H.M. 1995. *Marine animals of southern New England and New York: identification keys to common nearshore and shallow water macrofauna*. Hartford, CT: State Geological and Natural History Survey of Connecticut, Dept. of Environmental Protection.
- Wenger, E., R.A. McDermott, and W. Snyder. 2002. *Cultivating communities of practice: A guide to managing knowledge*. Boston, MA: Harvard Business School Press.
- Werth, J. 2020. Survey Reveals 200 Acres of Invasive Hydrilla in Lower Connecticut River. Connecticut Examiner. <https://ctexaminer.com/2020/02/13/survey-reveals-200-acres-of-invasive-hydrilla-in-lower-connecticut-river/>.
- Whitney, M.M., and P. Vlahos. 2021. Reducing Hypoxia in an Urban Estuary Despite Climate Warming. *Environmental Science & Technology*. 10.1021/acs.est.0c03964
- Yarish, C., R.E. Linden, G. Capriulo, E.W. Koch, S. Beer, J. Rehnberg, R. Troy, E.A. Morales, F.R. Trainor, M. DiGiacomo-Cohen, and R. Lewis. 2006. Environmental monitoring, seagrass mapping and biotechnology as means of fisheries habitat enhancement along the Connecticut coast. University of Connecticut. Stamford, Connecticut. 105 pp. http://www.lisrc.uconn.edu/DataCatalog/DocumentImages/pdf/Yarish_2006.pdf. *last accessed: 27 January 2015.*

13 Appendix A: NERRS Regulations

The NERRS Regulations can be accessed here: <https://coast.noaa.gov/czm/act/sections/#315>

14 Appendix B: Memorandum of Understanding Between University of Connecticut, Connecticut Department of Energy and Environmental Protection, and National Oceanic and Atmospheric Administration

Memorandum of Understanding
Between the
National Oceanic and Atmospheric Administration,
The University of Connecticut,
and the Connecticut Department of Energy and Environmental Protection
Detailing the State-Federal Roles in the Management of the Connecticut National Estuarine
Research Reserve

I. PARTIES AND PURPOSE

This Memorandum of Understanding (Agreement) establishes the framework for the cooperative management of the Connecticut National Estuarine Research Reserve (CT NERR) in the State of Connecticut, among the National Oceanic and Atmospheric Administration (NOAA), Office for Coastal Management, the University of Connecticut (UConn), and the Connecticut Department of Energy and Environmental Protection (DEEP) (individually, “party;” jointly, “parties”).

II. AUTHORITY

The authority for NOAA to enter into this Agreement is the Coastal Zone Management Act of 1972, as amended (CZMA, 16 U.S.C. §§ 1451 et seq.), and its implementing regulations at 15 C.F.R. Parts 921 and 923. DEEP is authorized to enter into this Agreement pursuant to the Connecticut General Statutes (C.G.S.) Sections 4-8, 22a-5, and 22a-6(a)(2). The University of Connecticut is authorized to enter into this Agreement under C.G.S. Sections 10a-104, 10a-108, and 10a-110 to 10a-110g, as amended to date.

III. BACKGROUND

- A. The State of Connecticut has determined the waters and related coastal habitats of the state reserve areas (see CT NERR Management Plan, which can be obtained from the NOAA National Estuarine Research Reserve System website at <https://coast.noaa.gov/nerrs>) provide unique opportunities for the study of natural and human processes to contribute to the science of estuarine ecosystem processes, enhance environmental education opportunities and public

understanding of estuarine areas, and provide a stable environment for research through the long-term protection of reserve resources.

- B. The State of Connecticut has determined that the resources of the CT NERR and the values they represent to the citizens of Connecticut and the United States will benefit from the National Estuarine Research Reserve (NERR) System's management structure.
- C. The CT NERR Management Plan, which was approved by NOAA, describes the goals, objectives, strategies/actions, administrative structure, and institutional arrangements for the CT NERR.
- D. UConn will serve as the lead state agency for the CT NERR. UConn will implement the Agreement and Management Plan in close collaboration with DEEP and in accordance with the CT NERR Management Plan or subsequent agreements that clarify or further define aspects of the Management Plan.
- E. UConn, as the lead state agency, and in collaboration with DEEP, is responsible for maintaining, operating and managing the CT NERR in accordance with Section 315 of the CZMA, 16 U.S.C. § 1461, and acknowledges the value of state-federal cooperation for the long-term management and protection of the CT NERR in a manner consistent with the purpose of its designation.
- F. NOAA finds that the State of Connecticut satisfied the legal and procedural requirements for designation and, pursuant to its authority under Section 315 of the CZMA, 16 U.S.C. § 1461, and in accordance with the CZMA implementing regulations at 15 C.F.R. Part 921, designated the CT NERR.
- G. Property considerations: The establishment of a NERR does not transfer ownership of property from its current owners as of the date of this Agreement. Nor does it alter the responsibilities of the property owners to manage and ensure the operation of the lands and any associated facilities in accordance with established state laws, regulations, and policies. Specifically, DEEP serves as land owner for all of the properties included in the CT NERR designation except the UConn Avery Point campus and Pine Island, which are owned by UConn.

IV. STATE-FEDERAL ROLES IN RESERVE MANAGEMENT

- A. UConn shall:
 - 1. be responsible for compliance with all federal laws and regulations, and ensure that the CT NERR Management Plan is consistent with the provisions of the CZMA and its implementing regulations (including 15

C.F.R. § 921.33(c), which requires UConn to revise its Management Plan at least every five years);

2. in collaboration with DEEP, ensure protection of the natural and cultural resources of the CT NERR as identified in the CT NERR Management Plan, in accordance with applicable laws and regulations;
3. in collaboration with DEEP, ensure adequate, long-term protection and management of lands and waters included within the CT NERR boundary, in accordance with applicable laws and regulations;
4. cooperate with NOAA to apply for and manage funds to support the CT NERR in accordance with federal and state laws, the NERR Management Plan, annual funding guidance from NOAA, and any other NOAA directives pertaining to CT NERR operations, research and monitoring, education and stewardship, and, as necessary, land acquisition and CT NERR facility construction;
5. conduct and coordinate research and monitoring programs that encourage scientists from a variety of institutions to work together to understand the ecology of the CT NERR ecosystem to improve coastal management;
6. conduct and maintain programs that disseminate research results via materials, activities, workshops, and conferences to resource users, state and local agencies, school systems, the general public, and other interested parties;
7. in collaboration with DEEP, provide staff and endeavor to secure funding for the manager, education coordinator, and research coordinator, among other staff positions;
8. in collaboration with DEEP, secure facilities and equipment required to implement the provisions within the CT NERR Management Plan;
9. in collaboration with DEEP, ensure adequate support for facilities operation and maintenance;
10. maintain effective liaison with local, regional, state, and federal policy makers, regulators, and the general public;
11. serve as principal contact for issues involving proposed boundary changes and/or amendments to the CT NERR Management Plan; and
12. cooperate with NOAA regarding review of performance pursuant to Sections 312 and 315 of the CZMA, 16 U.S.C. §§ 1458 and 1461, 15 C.F.R. § 921.40, and ongoing Management Plan approvals.

B. DEEP shall:

1. Provide CT NERR volunteers, partners, and sponsors with access to facilities and sites within its care and control and within the CT NERR consistent with applicable statutes, regulations, and policies for the following purposes:
 - A. to support general environmental education and training programs including but not limited to K-12 environmental science programming, educational nature hikes/walks, and beach/park clean-ups; and
 - B. to facilitate long-term and short-term, period-specific scientific research studies regarding climate change, wildlife/habitat management, water quality, or other suitable topics in line with NERR priorities.
2. In accordance with available resources, collaborate with UConn as indicated in subparagraphs A. 2, 3, 7, 8, and 9 of this Agreement.
3. As deemed acceptable by DEEP, cooperate in the installation of informational signage, kiosks, trails, or similar low-impact structures to support public access and conveyance of environmental education/information on habitats, species, or points of interest about the properties/places in line with CT NERR priorities and DEEP's mission to protect and conserve the environment and natural resources of the state.

C. NOAA's Office for Coastal Management shall:

1. administer the provisions of Sections 312 and 315 of the CZMA, 16 U.S.C. § 1458 and 16 U.S.C. § 1461, respectively, to ensure that the CT NERR operates in accordance with the goals of the NERR System and the CT NERR Management Plan;
2. review and process applications for financial assistance from UConn, consistent with 15 C.F.R. Part 921, for management and operation of the CT NERR, and, as appropriate, land acquisition and facility construction;
3. advise UConn and DEEP of existing and emerging national and regional issues that have bearing on the CT NERR and NERR System;
4. maintain an information exchange network among reserves, including available research and monitoring data and educational materials developed within the NERR System; and
5. to the extent possible, facilitate the allocation of NOAA resources and capabilities in support of CT NERR goals and programs.

V. GENERAL PROVISIONS

- A. Nothing in this Agreement shall obligate any party in the expenditure of funds, or for future payments of money. Each party bears its own costs to implement this Agreement. NOAA may provide Federal funding in accordance with the CZMA and any requirements of the U.S. Department of Commerce through financial assistance awards that are separate from this Agreement.
- B. A free exchange of research and assessment data between the parties is encouraged and is necessary to ensure success of cooperative studies.
- C. UConn and DEEP each reserve the right to require additional agreements or written permission in exchange for access to their property in the form of permits or temporary, fully-revocable licenses. Nothing in this Agreement is intended to require the permanent or long-term disposition of any interest in real property.

VI. OTHER PROVISIONS

- A. Nothing in this Agreement diminishes the independent authority or coordination responsibility of any party in administering its respective statutory obligations. Nothing in this Agreement is intended to conflict with current written directives or policies of any party. If the terms of this Agreement are inconsistent with existing written directives or policies of any party entering this Agreement, then those portions of this Agreement that are determined to be inconsistent with such written directives or policies shall be invalid; but the remaining terms not affected by the inconsistency shall remain in full force and effect. In the event of the discovery of such inconsistency, and at the first opportunity for revision of this Agreement, the parties shall seek to amend or terminate this Agreement in accordance with the provisions of section VIII of this Agreement.
- B. Any disagreement on the interpretation of a provision, amendment, or other matter related to this Agreement shall be resolved informally at the lowest operating level of each party's respective organization. If such disagreement cannot be resolved, then the area(s) of disagreement shall be stated in writing and presented to the other parties for further consideration. If agreement is not reached within thirty (30) days of presentation, then the parties shall forward the written presentation of the disagreement to their respective duly authorized senior official for appropriate resolution.

VII. PROGRAM EVALUATION

In accordance with sections 312 and 315 of the CZMA, 16 U.S.C. §§ 1458 and 1461, and 15 C.F.R. § 921.40, NOAA's Office for Coastal Management will schedule periodic evaluations of UConn's performance in meeting the terms of this Agreement and the CT NERR Management Plan. Where findings of deficiency occur, NOAA may initiate action in accordance with the interim sanctions or withdrawal of designation procedures

established by the CZMA and applicable regulations at 15 C.F.R. Part 921, Subpart E.

VIII. EFFECTIVE DATE, REVIEW, AMENDMENT, AND TERMINATION

- A. This Agreement is effective on January 14, 2022, and shall be in effect until terminated by any party.
- B. This Agreement will be reviewed periodically by all parties and may only be amended by the mutual written consent of all parties.
- C. This Agreement may be terminated by mutual consent of all parties or by unilateral termination by any party by providing written notice to the other parties thirty (30) days in advance of the effective date of termination. Termination of this Agreement may provide grounds for NOAA (at its discretion) to withdraw designation of the CT NERR from the NERR System, pursuant to applicable provisions of the CZMA and its implementing regulations as described under 15 C.F.R. Parts 921 Subpart E and 923 Subpart L. Section 315 of the CZMA, 16 U.S.C. § 1461, provides that NOAA may withdraw designation of a NERR if: 1.) NOAA finds that any of the criteria for establishing the reserve no longer exist; or 2.) a substantial portion of the research conducted within the reserve fails to meet NERR System guidelines. In making any decision to withdraw designation, NOAA will take into consideration factors set forth in 15 C.F.R. § 921.40.
- D. If any clause, sentence, or other portion of this Agreement shall become illegal, null, or void for any reason, the remaining portions of this Agreement shall remain in full force and effect.
- E. No waiver of right by any party of any provision of this Agreement shall be binding unless expressly confirmed in writing by the party giving the waiver.

IN WITNESS THEREOF, the parties have caused this Agreement to be executed.

Jeffrey L. Payne, Ph.D.
Director
Office for Coastal Management
National Ocean Service
National Oceanic and Atmospheric Administration
U.S. Department of Commerce

Radenka Maric, Ph.D.
Vice President for Research,
Innovation and Entrepreneurship
University of Connecticut

Date

Date

Katie S. Dykes
Commissioner
Connecticut Department of Energy and Environmental Protection

Date

15 Appendix C: Public Engagement / Meetings

15.1 Overview:

Public engagement was a vital component in the development of this plan and occurred in two stages.

The first, immediately following the nomination was coordinated by Steering Committee members from the Connecticut Audubon Society (CAS) with assistance from the Pew Charitable Trust. This initial effort was aimed at delivering a series of webinars and presentations to local community groups, municipal leaders and officials, and other organizations with relevant interest in the NERR concept to communicate more information about the CT NERR efforts and to begin to solicit feedback. These resulted in a better basis for understanding what the critical needs and issues are as well beginning to build the foundations for thinking strategically on partnering – both at programmatic level (e.g., connections to research, monitoring, education, and training) as well as the operational level (e.g., external funding and developing support networks.) These were supplemented by interviews and communications with staff from several existing Reserves and Reserve advocacy and support organizations to better understand their approaches in these areas and to solicit suggestions for pathways forward for Connecticut. As a result of these efforts, a detailed and comprehensive second stage was developed to seek broad and diverse input into the specific components required to develop a management plan and designed in way to work interactively to present and receive information.

The second took the form of ten (10) public meetings were held to gather public feedback on developing the priorities and goals for the proposed CT NERR management plan. To comply with guidelines regarding in-person gatherings resulting from the COVID-19 pandemic, these were conducted online through WebEx, with an associated phone line also available. Planned and developed by the CT NERR Steering Committee in conjunction with NOAA NERRS staff, they were held between February 3, 2021 and March 12, 2021, and advertised beginning in January 2021 through a mass e-mail campaign, postings to the CT NERR project website (<https://portal.ct.gov/DEEP/Coastal-Resources/NERR/NERR-Home-Page#status>), phone calls, and word-of-mouth. Prior to scheduling, a survey was distributed via e-mail to the project mailing list (numbering roughly 800 individuals and organizations) to identify days and time of days best suited for participation. No advanced registration or sign up was required to attend, and invitations were encouraged to be shared broadly to encourage participation. In the event conflicts prevented attending the schedule meeting, WebEx recordings were made available online at the CT NERR project website, and the window to submit feedback and comments was open until the end of April 2021 – approximately a month and half beyond the last scheduled meeting.

Each meeting followed a similar 1.5 to 2 hour format, with introductory remarks and information provided by members of the NERR Steering Committee, and a time devoted to invited representative from the Reserve System and/or staff members of other Reserves to offer their input and thoughts on the meeting's topic or theme areas. A brief pause was taken for immediate questions and answers, followed by an approximately hour-long facilitated exercise using Mural, an online whiteboard that allows participants to post electronic "notes" in response to questions and topics that were developed

in advance to stimulate discussion. Meetings ended with an additional time for questions and general discussion.

Overall, meeting participation and input exceeded the expectation of the planning team and provided a robust level of information to help develop this plan. The meeting attendance breakdowns and attendee category descriptions are:

	Kickoff	Strategic Planning	Coastal Training	Research & Monitoring	Education	Stewardship	Partnerships	Administration	Facilities	Diversity, Equity, Justice, Inclusion (DEIJ)
	2/3/2021	2/4	2/17	2/19	2/24	2/26	3/3	3/5	3/10	3/12
NOAA	8	4	3	4	3	5	3	3	2	5
CT.gov & .us	21	13	12	13	9	11	7	5	8	6
other .gov	13	3	4	6	5	3	2	3	1	5
UConn	13	5	9	14	5	7	6	6	7	3
other .edu	2	1	0	1	3	1	1	0	0	1
.org	27	15	10	13	19	14	12	7	9	9
.net & .com	33	15	16	18	13	13	14	9	7	5
not identified	7	6	3	2	3	3	1	1	1	3
TOTAL	124	62	57	71	60	57	46	34	35	37

NOAA	includes only those with "NOAA" in their email address and does not include staff from other National Estuarine Research Reserves—those staff are captured in other categories.
CT.gov & .us	state, county, and town employees and commission members, as well as some school districts
other .gov	CT State Legislature staff, U.S. Fish and Wildlife Service, Vermont River Conservancy
UConn	UConn faculty and staff, including Centers (CIRCA, CTSG, CLEAR)
other .edu	non-UConn higher education institutions
.org	typically: not-for-profit organizations, aquaria/nature centers/museums, some school districts
.net & .com	typically: individuals, businesses, some not-for-profits and schools
not identified	individuals, representing all options above

In addition to seeking general input on the meeting topics the Steering Committee also invited participation from stakeholder attendees to be part of a *Draft Management Plan* Advisory Committee

(DMPAC) to help synthesize the meeting materials, compile into an initial planning document, and provide ongoing review and editing. Approximately 16 individuals (including members of the Steering Committee and members of the public) volunteered to be part of the group. The DMPAC was instrumental in not only compiling materials and drafting sections of the plan, but also bringing a diversity of thoughts and perspectives to the process.

15.2 February-March 2021 Meeting Summaries

Note: Italicized text presented below reflects input taken directly from Mural board notes but does include a limited editing effort to correct obvious spelling/grammatical issues. Where possible, duplicative entries were removed, as well as notations on or about specific individuals. However, we have not tried to after-the-fact correct or address other aspects of the material in order to preserve the author's original intent to the greatest extent possible.

The descriptions of the meetings are copied from the planning documents and have not been edited after-the-fact.

15.2.1 Overview / Kick-off Meeting

Wednesday Feb 3, 3:00 - 5:30 PM (124 attendees)

Overview: We will present background information about the Reserve programs, Reserve Management Plans and the management planning process. Presenters will include NOAA Office for Coastal Management (OCM) staff to provide an overview of the NERRS core programs and the local Connecticut team will address what we hope to achieve during the upcoming meetings. We encourage attendance by anyone interested in this process, to provide a basis for informed participation in subsequent meetings. This meeting will include presentations by NOAA OCM and Connecticut partners coupled with short question and answer periods.

15.2.2 Overall Strategic Plan

Thursday Feb 4, 2:30 - 5:00 PM (62 attendees)

Overview: We will describe the framework used in the development of the strategic plan, introduce the vision and mission statements of the Reserve system overall and for Connecticut's Reserve, and introduce the required components of the Strategic Plan. Attendees will identify, discuss, and prioritize the key national and local coastal management issues the Reserve should seek to address and identify what the NERR can add to the Connecticut landscape of organizations working on these issues

15.2.2.1 Mission/Vision Statement Review:

Vision Draft shared: "A resilient, healthy Long Island Sound ecosystem where human and natural communities thrive for generations."

Stakeholder Comments:

- *Would like to see something included that references the level of collective knowledge we will have attained if successful. This level of shared knowledge will inform effective adaptation of ecosystems and communities across Long Island Sound*
- *I like the proposed vision statement it is short, to the point and covers most of the points*
- *I like this although I think RI's is very strong and well worded*
- *I like the proposed vision. It is short and to the point*
- *Work in the word estuary somewhere*
- *Awesome!*
- *Short and sweet!*
- *This one looks good*
- *Could just leave it at "...thrive." Don't think for generations adds anything.*
- *I like this statement*
- *It's broader than Long Island Sound*
- *Resilient and healthy Long Island Sound and coastal ecosystems where humans and Nature coexist and thrive in harmony*
- *I like the proposed vision*

Mission Draft shared: "To collaboratively integrate science, conservation and management with learning, recreation and economic viability using ecologically unique sites in southeastern Connecticut."

Stakeholder Comments:

- *The phrase "ecologically unique" is vague - how is it to be defined? In some sense all local environments are unique composites of attributes*
- *This may need to be broken up more for understanding*
- *I like the inclusion of economic viability which reflects the existing activities that are part of the ecosystem*
- *What is the philosophy behind the groupings? E.g., 'science, conservation, and management' vs. 'learning, recreation, and economic viability'*
- *I agree that focusing on the estuary is obviously what the NERR is about but somehow connect to the watershed to engage more than just coastal residents*
- *Economic considerations/job loss/job protection/ tourism*
- *Collaboratively integrate science and education (the tools), and the results should be conservation, sound management, recreation, economic viability, etc.?*
- *Consider looking beyond the estuary into the broader watershed where many of the impacts originate*
- *Ecologically unique is vague. In some sense all sites have unique attributes*
- *For me, education should be one of the tools along with science and conservation*

- *I think the groupings make sense--science, conservation and management relate to the target of direct research and action (natural ecosystems), while recreation and economic viability are impacts of conservation and restoration efforts on human systems*

15.2.2.2 Coastal Management Issues:

Responses reflected the following:

- *Climate/Sea-level rise/marsh migration/erosion/hardening shorelines*
- *Species related issues*
- *Boundary conditions*
- *Ecosystem services*
- *Infrastructure impacts (dredging, offshore wind, aquaculture)*
- *Heritage*
- *Access/JEDI*
- *Habitat integrity*
- *Water quality/pollution/monitoring*
- *Communication*
- *Integration across all aspects*

15.2.2.3 Gaps:

Coastal Training: Crosscutting all Four Sectors: Integration of management activities into a social-ecological context and framework that balances both human and ecosystem goals and outcomes.

- *How to achieve consensus decisions*
- *How to solve tough problems*
- *How to prioritize community needs and collaborate with the NERR*
- *Use of macroalgae for bioextraction of pollutants and Nitrogen/Carbon*
- *Identifying and pursuing opportunities for marsh migration*
- *Stormwater management - stormwater authorities - MS4 compliance*
- *Working with municipal leaders to re-zone or otherwise limit development in sensitive/flood-prone areas; ways to finance property buyouts and increase coastal access for underserved/low-income communities*
- *Understanding of new or future conflicts resulting from coastal changes due to climate change and blue economic growth*
- *Hands-on place-based training at NERR sites*
- *Field trips for young people*
- *local land use commission education concerning NERR goals, objectives, education, and technical assistance that might be available*
- *Local water quality conditions*
- *Citizen science training*
- *Workshops on best mgt practices for local decision makers*
- *Education programs for coastal town government officials and commissions*

Research & Monitoring:

- *Citizen science opportunities*
- *Collaborative Science Programs - leverage resources*
- *Research on the far upper watershed contribution of nitrogen, sediment and other pollutants*
- *Crosscutting all Four Sectors: Integration of management activities into a social-ecological context and framework that balances both human and ecosystem goals and outcomes.*
- *Changes in the timing and intensity of spring freshet in the major river basins.*
- *Long-term monitoring of benthic communities*
- *Long-term monitoring in a variety of coastal habitats - marsh, eelgrass, etc.*
- *Use of macroalgae for bioextraction of pollutants and Nitrogen/Carbon*
- *Monitoring annual fish runs at index streams*
- *Marsh restoration monitoring*
- *Long-term sentinel monitoring*
- *Living shoreline monitoring*
- *Near shore monitoring of water quality, fish, benthic species*
- *Study impacts of fish restoration/dam removals*
- *Permeable reactive barriers*
- *Invasive species research and management.*
- *Increasing marsh capacities for holding Carbon, Nitrogen, ...*
- *Marsh sediment budgets*
- *Coastal erosion; long-term and interannual*
- *Nitrogen -reducing septic systems (maybe not research but widespread adoption*
- *Valuing the loss of habitat for sensitive species*
- *Understanding sediment transport for marsh evolution*
- *Community changes due to climate change*
- *Following effectiveness of restorations and recovery activities*

Education:

- *Funding to extend rich array of existing environmental education opportunities to underserved communities*
- *Lack of tools for appropriately (and feasibly) assessing the impact of educational intervention efforts specific to the coastal environment*
- *Environmental justice*
- *TOTE Module on how to teach Title 1 students (JEDI)*
- *Positive benefits of increased use of permeable surfaces*
- *Sustained community outreach on land use issues*
- *How development affects coastal waters*
- *Connecting the entire watershed to conditions in Long Island Sound*
- *Lack of awareness of issues/concerns*

Stewardship:

- *Following effectiveness of restorations and recovery activities*
- *Living shoreline implementation --several practices and types--particularly in a way that allows for direct comparison of efficacy in different energy environments*
- *Identifying and pursuing opportunities for marsh migration*
- *Working alongside local fisherman that depend on the Sound financially.*
- *Manage habitats and to steward nesting bird habitats*
- *Habitat and species stewardship is relevant here, need to manage habitats and to steward nesting bird habitats*
- *Support stream connectivity projects, e.g., dam removals & fishway construction*
- *Salt marsh restoration*
- *"Conservation" - preserving what's still naturally functional and providing valued ecosystem goods and services*
- *Opportunities /pathways for land acquisition matching needs to options*
- *Managing Invasive Species*
- *Beneficial use of dredged sediments*
- *Support for First Nations to encourage integration of local and traditional knowledge.*
- *Preserve critical upland areas*
- *Access to meaningful interactions with coastal spaces by broad and diverse communities of people*
- *Volunteer recruitment*
- *Better coordination needed -- goals, money, science to inform local stewardship*

15.2.2.4 Reserve Niche:

Probing Question 1: Who else is working on issues near the Reserve?

Coastal Training	Research	Education	Stewardship
<i>CIRCA</i>	<i>CIRCA</i>	<i>Aquaria - Norwalk and Mystic</i>	<i>Alewife Cove Cons</i>
<i>CLEAR</i>	<i>Conn College</i>	<i>CIRCA</i>	<i>Avalonia Land Trust</i>
<i>Connecticut Ornithological Association</i>	<i>Connecticut Ornithological Association</i>	<i>CLEAR</i>	<i>Bakers Cove Committee</i>
<i>CT Audubon Society and Audubon CT/NY</i>	<i>CT Audubon Society and Audubon CT/NY</i>	<i>CT Audubon Society and Audubon CT/NY</i>	<i>Bike and horse groups</i>
<i>CT River Coastal Conservation District</i>	<i>CT River Coastal Conservation District</i>	<i>CT River Conservancy</i>	<i>Connecticut Ornithological Association</i>
<i>CT Sea Grant</i>	<i>CT River Conservancy</i>	<i>CT River Joint Commissions (NH/VT)</i>	<i>Conte NF&WR</i>
<i>Eastern CT Conservation District</i>	<i>CT River Joint Commissions (NH/VT)</i>	<i>CT River Museum</i>	<i>CT Audubon Society and Audubon CT/NY</i>

Coastal Training	Research	Education	Stewardship
<i>Long Island Sound Study</i>	<i>CT Sea Grant</i>	<i>CT Sea Grant</i>	<i>CT River Conservancy</i>
<i>Niantic River Watershed Committee</i>	<i>CTDEEP/Fisheries Division</i>	<i>Eastern CT Conservation Districts</i>	<i>CT Sea Grant</i>
<i>Project Oceanology</i>	<i>CUSH - Clean Up Stonington Harbor</i>	<i>Florence Griswold Museum</i>	<i>CTDEEP/Fisheries Division</i>
<i>Save the Sound</i>	<i>DABA</i>	<i>Friends of Conte</i>	<i>CUSH - Clean Up Stonington Harbor</i>
<i>Southern Connecticut State University</i>	<i>Eastern CT Conservation Districts</i>	<i>Friends of Whalebone Cove</i>	<i>Eastern CT Conservation District</i>
<i>Thames River Basin Partnership</i>	<i>Five Colleges</i>	<i>Haddam Neck Spirit</i>	<i>Friends of Conte</i>
	<i>LIS Cable Fund</i>	<i>land trust</i>	<i>Friends of the Oswegatchie Hills Nature Preserve</i>
	<i>Long Island Sound Study</i>	<i>Long Island Sound Study</i>	<i>Friends of Whalebone Cove</i>
	<i>Millstone Environmental Lab</i>	<i>Maritime Education Network</i>	<i>Haddam Neck Spirit</i>
	<i>Niantic River Watershed Committee</i>	<i>Mashantucket Pequot Tribal Nation (MPTN)</i>	<i>Land Trusts</i>
	<i>NOAA Fisheries</i>	<i>Mentoring Corps for Community Development</i>	<i>Local Conservation Commissions</i>
	<i>NOAA Restoration Center</i>	<i>Mystic Aquarium</i>	<i>Long Island Sound Study</i>
	<i>Niantic River Watershed Committee</i>	<i>NESS</i>	<i>Mashantucket Pequot Tribal Nation</i>
	<i>Project Oceanology</i>	<i>Niantic River Watershed Committee</i>	<i>Millstone Environmental Lab</i>
	<i>Save the Sound</i>	<i>Project Oceanology</i>	<i>Mis. NG</i>
	<i>Shellfish commissions</i>	<i>Resilient CT</i>	<i>Municipalities</i>
	<i>Southern Connecticut State University</i>	<i>River COG</i>	<i>New England Forestry Foundation</i>
	<i>TNC</i>	<i>Roger Tory Peterson Estuary Center of CAS</i>	<i>Project Oceanology</i>
	<i>UConn Marine Sciences</i>	<i>Southern Connecticut State University</i>	<i>Save The Sound</i>
	<i>UConn SHARP and Biological Sciences</i>	<i>UConn Extension</i>	<i>Southern Connecticut State University</i>
	<i>Uconn/lisicos</i>	<i>UConn Marine Sciences</i>	

Coastal Training	Research	Education	Stewardship
	<i>UConn/Natural Resources</i>		
	<i>UMass- in partnership with UConn, DEEP, USFWS</i>		
	<i>USFWS</i>		
	<i>USFWS- Fisheries</i>		
	<i>USGS</i>		
	<i>UVM/UNH/Dartmouth College/Antioch</i>		
	<i>VT DEC / NH DES</i>		
	<i>WHOI</i>		
	<i>Yale- EEB</i>		

Probing Question 2: What should the Reserve focus on, given the context/efforts of other groups?

Coastal Training	Research	Education	Stewardship
<i>Technical Expertise</i>	<i>Benthic habitat monitoring</i>	<i>The NERR has the advantage of being place-based and should take advantage of that, including opening a visitor center as a priority.</i>	<i>The NERR has the advantage of being place-based and should take advantage of that, including opening a visitor center as a priority.</i>
<i>Demonstration sites for on-site training</i>	<i>Forage fish spatial habitat use</i>	<i>Homeowner education that could encourage/assist with BMP's at local level</i>	<i>Nutrient enrichment control</i>
<i>Serve as a boundary organization/ a platform for enabling transdisciplinary science</i>	<i>Localized SET measurements (regular)</i>	<i>Work with Sea Grant to provide reports for the average citizen</i>	<i>AIS management</i>
<i>The NERR has the advantage of being place-based and should take advantage of that, including opening a visitor center as a priority.</i>	<i>There are existing researchers, programs, activities that struggle for funds for studies/monitoring that have local but not national significance. Need for funding.</i>	<i>Integration of arts institutions into the scientific pursuits of the NERR</i>	<i>The big problem is biodiversity - a global dilemma that affects everything local. Goals for conservation and recovery are key, e.g., E.O. Wilson's "Half Earth" target for protecting diversity, and ecosystem integrity.</i>
	<i>Sea level rise and predictions</i>	<i>Place-based programs</i>	<i>Place based demonstration programs</i>

Coastal Training	Research	Education	Stewardship
	<i>Coordinated University research</i>	<i>Partner with Project O to extend existing education opportunities related to watersheds, climate change, community resilience, watershed management, etc.</i>	<i>There are existing programs, partners, and activities that struggle for funds for designing and implementing connectivity work (dam removals and fishways) because NOAA only wants to fund dam removals for endangered species (i.e., Maine salmon). Need for supplemental funding.</i>
	<i>Data Visualization including GIS support</i>	<i>Support for graduate student experiential learning</i>	
	<i>Research that benefits from the monitoring infrastructure</i>	<i>Creating educational opportunities that connect social and ecological education</i>	
	<i>Coastal erosion monitoring</i>	<i>Target education to coastal urban areas/issues</i>	
	<i>Post-restoration monitoring</i>	<i>Develop virtual place-based laboratories/lesson plans - with partners</i>	
	<i>The NERR has the advantage of being place-based and should take advantage of that, including opening a visitor center as a priority.</i>	<i>Support for enhanced interpretation signage and programs at existing fishways where there is very little public outreach/education</i>	
	<i>Nutrient enrichment control</i>		

Probing Question 3: How should the Reserve work to fill gaps/address issues?

Lead	Facilitate/ Coordinate	Engage Partnerships	Other
<i>Science to inform management (and policy)</i>	<i>Work with non-traditional partners (chambers of</i>	<i>Bringing local science to local communities</i>	<i>Bringing local science to local communities</i>

Lead	Facilitate/ Coordinate	Engage Partnerships	Other
	<i>commerce, ex) to get buy-in outside environmental community</i>		
<i>Technical assistance in monitoring</i>	<i>An important role for NERRS! Science-Service-Stewardship - NOAA's Mantra</i>	<i>Only way to go - integrate with social-economic institutions to keep ecological institutions (ecosystems) in the social-ecological context. Takes a lot of partners.</i>	<i>Thru information garnered from science, help local communities and partnerships to provide consistent messaging about the NERR and environmental actions needed to protect the site(s)</i>
<i>information sharing among partners</i>	<i>Seek to understand existing coastal conflict and opportunities for encouraging collaboration</i>	<i>Work with other local nonprofits to get kids out on the water. Especially those who might have never seen the sound before</i>	<i>Competitive grant program to fund educational outreach initiatives at existing and future facilities (including fishways, observation platforms, etc.)</i>
<i>Negotiate expansion of the Reserve's area when strategically important</i>	<i>LIS research</i>	<i>Coordinate with watershed/wqm groups such as ECCD, CUSH, NRWC, STS</i>	<i>Arts institution integration</i>
<i>Monitoring for coastal OA and potential effects on shellfish, in collaboration with shellfish aquaculture sector</i>	<i>Competitive grant program to help fund research and monitoring</i>	<i>Competitive grant program to help fund fishway construction and dam removal</i>	<i>Helping with local plans of conservation and development</i>
<i>Review/disseminate science-based information</i>	<i>Facilitate coordinated research on the watershed scale</i>	<i>Coordinate forage fish estuary studies with DEEP and UConn</i>	
<i>Environmental education assessment</i>	<i>Coordinate monitoring with existing programs.</i>	<i>Educating public school students</i>	
<i>On-site programs</i>		<i>Local COGS</i>	
<i>Directions planning and adaptive management</i>		<i>Partner with ECCD, TRBP, Project O, and others to train coastal decision makers</i>	

Lead	Facilitate/ Coordinate	Engage Partnerships	Other
<i>of Science collaborative Project</i>			
<i>Offer DEI training to local non-profit and other leaders</i>		<i>Project O: watershed education, connecting the upper watershed to Long Island Sound, citizen science and citizen science-based education, professional development for teachers, general estuary education & environmental monitoring, place-based instruction in the reserve (Project O works extensively in both the Thames and CT River). Hands-on, inquiry-based science education</i>	
<i>Big Picture: Table the Reserve's Communities to realize the full benefits of the Reserve</i>		<i>With local land trusts and community foundations</i>	
<i>Train Coastal Decision makers</i>		<i>Coordinate monitoring with other ongoing monitoring efforts (LISICOS, LISS water quality) and integrate access to data if possible</i>	
<i>Coordinate Research and Monitoring Activities</i>			
<i>Champion Community JEDI Initiatives</i>			
<i>Professional Development for teachers who instruct public school students</i>			
<i>Inform LIS community of activities and innovations from other NERRs.</i>			

15.2.2.5 Goals:

Consider the following question. The year is 2027. The headlines in the news praise your program for the impact you have had. What does the headline say?

Goals - JEDI:

- *We championed several community JEDI initiatives that successfully engaged underserved groups to their great benefit: health, education and employment.*
- *The NERR is a place where everyone feels welcome to come and learn!*
- *Removing/reducing barriers for underserved communities to access and steward their local area.*
- *Seek input from underserved communities as to what they want from the NERR.*
- *Improved water quality in envnr. distressed coastal communities*
- *Brought all walks of citizens to outdoor education and appreciation*
- *CT NERR works to restore justice in communities lacking coastal access*
- *Let's not forget equity and justice for Nature, which will serve human justice as well. Balance between ecosystems and social systems is essential to the future of both.*
- *Improved coastal access to distressed communities*
- *Brought coastal science education to urban schools*
- *Improved coastal access for all!*
- *Provide educational opportunities to underserved communities and peoples*
- *Facilitate the visitation of inner city or under-served schools to the NERR and its facilities (field trips)*
- *Better tools to engage disadvantaged communities and involve them in decision making processes*
- *Offer tools for disadvantaged voices to be heard*

Goals - Educating Communities:

- *Generated award winning STEM students*
- *Increase education of local, regional, and state decision makers concerning research and monitoring activities*
- *NERR, a place where kids come to have fun and go home having learned something*
- *CT NERR facilitates partnerships to broaden science education opportunities across CT*
- *Responsible for increasing the career success rates of public school students in Title 1 schools.*
- *Mentoring of several minority students responsible for their becoming renowned environmental scientists*
- *Increased community awareness of climate issues*
- *Increasing community engagement in science generation and in doing so increase local stewardship*
- *CT NERR honored for its work in supporting the meaningful assessment of environmental education, outreach, and engagement*
- *Work with allied groups to lobby govt and educate the public on use of pesticides and synthetic fertilizers*

- *Environmental justice training*
- *Work with fisherman and aqua farmers so that they feel part of the process*
- *CT NERR works w/ other regional and national NERRS to develop novel educational programs that utilize the SWMP data*
- *Increased understanding of what the human impact is on our region (including positive impacts)*
- *Work within communities to engage landowners to adopt environmentally friendly practices that protect the estuary; ensure that the information is readily transferable to other communities (Sustainable CT ex)*
- *Participation in community outreach and advertisement to increase awareness of NERR and its purpose to all parts of the community in CT*
- *Give lectures or demonstrations to educate the public on issues of interest*
- *Developed programs to connect students to coastal science*
- *Work with social marketing tenets to engage local audiences to change behaviors that will benefit the NERRS and surrounding communities*
- *Animate scientific results to make the information palatable to a wider audience*
- *Develop novel ways to visualize coastal ecosystems using multimedia*
- *Climate change education*
- *Environmental education and access for disadvantaged communities*
- *Provide meaningful incentives for homeowners to adopt actions that benefit the estuary*

Goals - Applying Science:

- *The laws of Nature and Science will not conform to the laws and desires of people.*
- *Natural resources inventory and monitoring to better understand the distributions of our species of conservation concern and the most important areas for them.*
- *Increase projects to mitigate and eradicate invasive species*
- *Ensure that research that informs management gets to the audiences that can implement those recommendations*
- *Identification of new invasive species infestations*
- *Train fishers in face of global warming*
- *Better information on key submerged aquatic habitats*
- *Improved grassroots-driven monitoring and science*
- *Study ways to improve resilience of tidal marshes, islands, beaches and dunes in the face of SLR*
- *Science is finally put to work in a way my mother can understand!*
- *Provide college scholarship to this person's mother.*
- *Trained volunteers to collect water quality data which was then used to improve conditions in their communities*
- *Create forum and or collaborate with partner(s) to make science understandable to a wide audience*
- *Increasing science production that is salient, credible & legitimate and is perceived that way by locals*
- *Increase technical assistance to local communities and non-profits*
- *Disseminated data to community leaders to use in informed decision-making*

- *Restore coastal marshes*

Goals - Protecting Places:

- *Improve coastal wetlands to buffer storm damage and improve habitat*
- *Our science collaborative projects created resilient shorelines*
- *Develop a model restored environment at a reserve location.*
- *A short visit and you will understand why some places should be protected*
- *Facilitated greater community understanding and acceptance of alternatives to hardened shoreline.*
- *Increased connectivity throughout the watershed improving aquatic & terrestrial wildlife movement*
- *Preserve currently healthy tidal marshes. aka. No loss of wetlands over the next 15 years.*
- *Increased funding for open space*
- *Increase land protection activities in lower Ct River and coastal area*
- *Adequate resources for habitat management and species/habitat stewardship*
- *Monitor effects of protecting key habitats*
- *Restore functionally stressed coastal habitats*
- *Identify and prioritize key watershed lands for water quality protection and habitat values*
- *Identify areas in watershed that may be contributing to degradation of estuarine habitat and either facilitate a solution or first facilitate a White Knight to acquire the land and then facilitate a solution*
- *Guide coastal town resiliency programs for sea level rise*
- *Tested new practices for coastal protection*
- *Prioritize watershed lands to be protected*
- *Improved habitat and restored threatened fisheries/species*
- *Use tools available to identify key land for conservation protection within and in proximity to NERRS*
- *Improve migratory bird habitats*
- *Identify biodiversity "hotspots" in submerged waters and provide meaningful protection*
- *Trusted voice in environmental stewardship*
- *Provided data that was used to support land protection decisions*
- *Partner with the Plum Island folks to protect waters in between both areas*
- *In times of change, only Nature can provide adaptive solutions and the most appropriate outcomes. "Nature does nothing uselessly" - Aristotle. Four words to describe the path forward.*
- *Increased funding for open space under protecting places*

Goals - Supporting Research & Monitoring

- *Increase monitoring of CT River and her wetlands for management opportunities and pending threats to ecosystem health.*
- *Natural resources inventory and monitoring to better understand the distributions of our species of conservation concern and the most important areas for them.*

- *Long-term monitoring establishes baseline for sensitive habitat in coastal CT, including marshes and eelgrass beds*
- *Increase knowledge of forage/larval fish usage of estuarine waters*
- *Became a trusted source of environmental data*
- *Financially and technically supported watershed-wide research to improve conditions in LIS*
- *Study ways to improve resilience of tidal marshes, islands, beaches and dunes in the face of SLR*
- *Coordinate opportunities for students from any local college/university to assist with research in the NERR.*
- *Long-term monitoring of changes due to nitrogen reduction efforts*
- *Provide \$X/ year for grants to support existing and new research and monitoring programs*
- *Identify and prioritize key watershed lands for water quality protection and habitat values*
- *Study best approaches to living shorelines*
- *Long-term study data convinces public to reduce carbon footprint and to recycle, reduce, and, reuse*
- *Created platform for information sharing, reduced communication barriers, and helped coordinate ongoing efforts*
- *Inventory existing aquatic life to establish baseline measures and to identify needed areas for mitigation*
- *Natural resources inventory and monitoring to better understand the distributions of our species of conservation concern and the most important areas for them*
- *Help to leverage other larger sources of funding.*
- *Supported cutting edge research*

Goals - Other?

- *Green infrastructure*
- *Reducing pollutants and nitrogen*
- *Strengthen beaches and shorelines by facilitating sediment transport by removal of dams, thus also encouraging fish migration*
- *Ensure that the NERR is respected and seen as a fair and beneficial entity especially by the communities where it occurs*
- *Identify impacts on the reserve and work with the appropriate agencies/groups to mitigate them*
- *Beneficial use of dredge spoils*
- *My vision for LIS has always been fairly simple – “Healthy Watersheds – Healthy Long Island Sound”. It expresses both a vision, and a goal.*
- *Helped manage/mitigate conflicts between ecologic and human uses through trusted science and communication*
- *East Lyme Land Trust*
- *CT NERR program helps coastal communities resolve coastal land-use conflict*
- *Reduction of plastic waste*
- *Work with green energy sector to ensure best placement of windmills, etc.*

15.2.3 Coastal Training Program

Wednesday Feb 17, 2:30 - 5:00 PM (57 Attendees)

Overview: Helping communities and the nation address coastal issues is what drives the NERR training efforts. The Coastal Training Program plan will describe how to move national coastal management priorities forward, address local needs, and ensure the effective use of reserve-based science. This meeting will start with a short introduction to this program and our goals for the meeting. Attendees will actively participate in identifying and prioritizing the proposed CT NERR activities in this arena during our first five years.

15.2.3.1 Who is doing what?

Science/Knowledge Transfer:

- *Three Rivers Community College*
- *CT Council on Soil and Water Conservation*
- *University cooperative extension*
- *Estuary Magazine*
- *UConn CLEAR*
- *The Nature Conservancy*
- *Project Oceanology*
- *Universities e.g., UConn, Yale, Conn*
- *CT Audubon Society*
- *Conservation Districts*
- *DA/BA*
- *Woods Hole Oceanographic Institute*
- *UMass*
- *CT River Conservancy*
- *CTDEEP Fisheries Division*
- *Save the Sound*
- *CT Sea Grant*
- *CTDEEP LIS Water Quality Monitoring Group.*
- *UConn CIRCA*
- *Yale School of the Environment*
- *Boating Education Assistant for DEEP*
- *Federal partners including*
- *USEPA LISS*
- *USFWS Conte Wildlife Refuge*
- *USDA NRCS*

Economic Development:

- *Project Blue @ SCSU*
- *UConn Extension in collaboration with CCM and CT Chapter of American Planning Assoc.*
- *Mentoring Corps for Community Development (JEDI)*

- *Local visitor bureaus/ tourism development councils*
- *Chambers of Commerce*
- *Environmental Justice as Economic Diversity using the Watershed Approach*
- *Thames River Basin Partnership, The Last Green Valley, The Ct Fund for the Environment, Sierra Club, Natural Resources Defense Council, New England Environmental Justice Research Collaborative and Farm to Institution New England*
- *State Division of Planning*
- *Economic Development Commissions*
- *Chambers of Commerce*
- *LISS*
- *Local Town commissions and Chambers of Commerce*
- *Regional Planning Agencies*
- *River COG & SECCOG*

Technical Assistance Services:

- *NEIWPCC*
- *CT Councils of Government*
- *CT Sea Grant*
- *UConn CIRCA*
- *UConn Extension*
- *Audubon CT Society*
- *CT River COG*
- *Save the Sound*
- *CT Audubon Society*
- *Conservation Districts*
- *Eastern CT CD*
- *CT River Coastal CD*
- *The Nature Conservancy*
- *Private consultants*
- *CT CLEAR NEMO*
- *CT RC&D*
- *CT Council on Soil and Water Conservation*
- *UCIR*
- *DA/BA*
- *NRCS*
- *CIRCA*
- *Federal partners including*
- *USEPA LISS*
- *USFWS Conte Wildlife Refuge*
- *USDA NRCS*
- *Project*
- *League of cities and towns*

- *Municipal Boards and Commissions*
- *Municipal Public Works and Planning Departments*

Field based Education for Coastal Managers:

- *Environmental Justice as Economic Diversity using the Watershed Approach*
- *Thames River Basin Partnership, The Last Green Valley, The Ct Fund for the Environment, Sierra Club, Natural Resources Defense Council, New England Environmental Justice Research Collaborative and Farm to Institution New England*
- *Save the Sound/ Soundkeeper*
- *CT Sea Grant*
- *The Nature Conservancy*
- *DA/BA*
- *Local Land Trusts*
- *Permitting entities*
- *Ecotourism operators*
- *Country Parks and recreation*
- *CT Audubon Society - EcoTravel*
- *Federal partners including*
- *USEPA LISS*
- *USFWS Conte Wildlife Refuge*
- *USDA NRCS*
- *Conservation Districts*
- *CT Council on Soil and Water Conservation*

Other

- *Not sure where this goes but Coast Guard and Naval base*

15.2.3.2 Primary Training Topics needed:

Climate Change:

- *Coastal Resilience of built infrastructure*
- *Sea level rise and loss of coastal habitats*
- *Smart coastal development*
- *Issues of housing in an era of sea level rise*
- *Working waterfronts and climate change*
- *Relationships between built infrastructure and natural habitats*
- *Suggestion for Addition to Climate Change/Habitat: effectiveness and monitoring of living shorelines as a resilience strategy*
- *Suggestion for Addition to Climate Change/Habitat: related to the living shorelines topic: outreach and training needed for permitting these types of projects*

Habitat:

- *Habitat restoration*

- *Monetizing habitat preservation (e.g., blue carbon)*
- *Sea level rise and allowing migration of coastal habitats as a stewardship goal.*
- *Development supportive of natural habitats (e.g., zoning decisions)*
- *Equitable access to coastal resources*
- *Working waterfronts & interactions with natural habitats*
- *Human use of natural resources*
- *Impact of invasive species*

Water Quality:

- *Importance of water quality to habitats*
- *Stormwater management in support of water quality*
- *Climate and nutrient interactions - impact on water quality*
- *Land use and nutrient loading to coastal waters*
- *Water quality in support of seafood safety*
- *Benefits natural habitats have on water quality*

15.2.3.3 Required Elements for Success:

Resources:

Required	Desired in the first 5 years	Long-term needs
<i>Branding for the NERR</i>	<i>Adequate to build a "presence" in the state/region.</i>	<i>visitor/interpretive center</i>
<i>Logo?</i>	<i>Develop a few core short training presentations that can be delivered to local officials and Municipal boards at their regular meetings.</i>	<i>Develop a salt marsh observatory as a field trip destination for CTP trainings where appropriate.</i>
<i>Informed and engaged community with awareness and appreciation of the NERR, its ecological resources and the interdependence between the health of resources in the NERR and community well-being</i>	<i>Develop and offer a science translation workshop for scientists to support enhanced communication of scientific concepts to local decision-makers.</i>	<i>Create High school training course</i>
<i>Social marketing applications</i>		<i>To be determined as the early engagement and discussions evolve. Adaptive Management based on successes, and failures.</i>

Required	Desired in the first 5 years	Long-term needs
<i>Not only an email list but a system to manage multiple interest groups (i.e.: Little Green Light)</i>		
<i>Plan with collaborators to avoid duplication of effort</i>		
<i>Build an extensive network of collaborators</i>		
<i>Identification of the niches that the NERR can fill in protecting LIS without duplicating the effort of other efforts in the region - close coordination and collaboration with those partners</i>		
<i>Develop list of watershed management plans completed or in progress in the NERR area</i>		
<i>Develop list of all federal programs and activities to complement rather than compete with each other.</i>		

Outreach/Connections:

Required	Desired in the first 5 years	Long-term needs
<i>On the water outreach and education to boaters about the NERR and its aquatic resources - especially sensitive/at-risk habitats and actions boaters can take to protect them (e.g., see Team Ocean program in the RBNERR)</i>	<i>Develop a few core short training presentations that can be delivered to local officials and municipal boards at their regular meetings.</i>	<i>Partnerships - fill blanks. Start as a catalyst within the CT Reserve to bring Research, Stewardship and Communication into one cohesive group.</i>
<i>Act as referral service connecting coastal decision-makers and community groups with relevant information and contacts.</i>	<i>Serve on regional and local committees and boards relevant to coastal management where possible.</i>	<i>Build a bridge between CZM/NERR Fellowship programs (CM Fellowships and MAD Fellowships)</i>
<i>Coastal Training should be participatory to engage users of NERRS products and services. Real problems - real solutions. NEVER call your partners "the audience".</i>	<i>Bring coastal decision-makers and scientists together for focused round-table discussions on specific issues.</i>	<i>Build in and offer networking opportunities at training events and seek to connect coastal decision-makers working on similar issues.</i>

Required	Desired in the first 5 years	Long-term needs
<i>Foster a strong relationship with your other NERR sectors</i>	<i>Organize a Coastal Conference for local officials</i>	<i>Create relationships with non-traditional partners like realtors and restaurants.</i>
<i>Visit other regional Reserve System and attend other CTP programming</i>	<i>Create art and science collaborative with area museums and non-profits to provide site specific opportunities to get to know the estuary</i>	<i>Develop and nurture strategic partnerships with other organizations to continue to deliver training and technical assistance to coastal decision-makers and broaden the reach of the CTP.</i>
<i>Map social networks in the community served by the NERR</i>	<i>Make connections with local aquaculture groups</i>	<i>Boundary Spanning</i>
<i>Develop a short course on a topic of interest to the community.</i>	<i>Host a "State of the Reserve" scientific symposium</i>	
<i>Science - service- stewardship is a pretty good guide.</i>	<i>Develop multilingual outreach materials</i>	
<i>Provide opportunities for multiple audiences to visit and learn about the estuary</i>	<i>Conduct specific outreach to community leaders and grassroots orgs in vulnerable communities on the front line of climate change impacts</i>	
<i>Participate on a NERRS CTP workgroup spearheading the development and implementation of a streamlined performance monitoring system for the CTP.</i>	<i>Establish a Friends Group</i>	
<i>Coordinate activities with other organizations working on climate adaptation efforts and establish strategic partnerships where necessary and appropriate to continue to provide effective programming in this theme.</i>	<i>Provide an "elder hostel" and or Road Scholar program for local/visiting audiences</i>	
<i>Coordinate and use an Advisory Group to help plan and guide activities of the CTP.</i>	<i>Lecture Series</i>	
<i>Get to know people</i>	<i>Engage community science participants</i>	
<i>Needs assessment</i>	<i>Develop data visualization tools that can be used by partners</i>	

Required	Desired in the first 5 years	Long-term needs
<i>Marketing assessment</i>	<i>Take a road trip to New England Reserve System to meet CTP Coordinators and attend an event at that location. Post pandemic or virtual.</i>	
	<i>Respond to requests for assistance from local coastal decision-makers and municipalities and provide technical assistance when possible and appropriate to the Reserve's mission.</i>	
	<i>Establish/coordinate database for research topics/findings</i>	
	<i>Mobilize Public to advocate for enlightened environmental policies</i>	
	<i>Training course for private conservation and municipal coastal land owners</i>	
	<i>Ensuring decision makers understand the niche that the NERR has compared to other programs/organizations working on these topics. Or through partnerships with these organizations, have them deliver content through NERR CTP Programming</i>	
	<i>Develop connections with universities, community colleges, trade schools, etc.</i>	
	<i>Initiate a blog about scientific findings and applications</i>	
	<i>Connections between art and science building on strong art presence in communities like Old Lyme</i>	
	<i>A friends group will become an important support and advisory group. from outside</i>	

Programming /planning:

Required	Desired in the first 5 years	Long-term needs
<i>People-skills seminar series</i>	<i>Use technology and distance learning techniques such as webinars and podcasts to bring science-based information to target audiences (e.g., launch a Climate Connections Podcast series).</i>	<i>Develop and offer a science translation workshop for scientists to support enhanced communication of scientific concepts to local decision-makers.</i>
<i>This grid is a good start in thinking logically and aiming towards goals - a fundamental of project design promoted by NOAA. Needs to be done in workshops!</i>	<i>Develop and offer a science translation workshop for scientists to support enhanced communication of scientific concepts to local decision-makers.</i>	<i>Seek to incorporate NERRS-based research findings from the biomonitoring program into CTP trainings.</i>
<i>Host trainings that engage local residents in stewardship activities such as human uses monitoring (see MPA Watch in CA), outreach and education to user groups (e.g., Team Ocean), BMPs for fertilizer use (local landscapers trainings)</i>	<i>Develop a salt marsh observatory as a field trip destination for CTP trainings where appropriate.</i>	<i>Continue to bring emerging coastal issues of significance into the spotlight locally.</i>
<i>Host NOAA Digital Coast trainings to build CTP Coordinator skills and regional skill in collaboration and project planning</i>	<i>Set an agenda based on customer priorities to determine primary services and direction</i>	<i>Develop training program pathways in partnership with public/private educational institutions that convey certificates/digital badges/CECs</i>
<i>Deliver X high quality training events on high priority coastal issues</i>	<i>For EJ need to focus on community and faith-based outreach</i>	<i>Seek to repeat a subset of training workshops in different geographic locations and at varying work and volunteer schedules to ensure that target audience members who have differing work schedules can have easier access to these events</i>
<i>Continue to bring emerging coastal issues of significance into the spotlight locally.</i>	<i>LISS has just started an EJ committee</i>	

Required	Desired in the first 5 years	Long-term needs
<i>Contribute to the TOTE program where appropriate and make training resources developed through the CTP available for access by teachers and students.</i>	<i>There is concern that they are being stretched thin so coordination is key</i>	
	<i>Offering Continuing Education Credits</i>	
	<i>Develop a CTP Scorecard</i>	
	<i>Build in and offer networking opportunities at training events and seek to connect coastal decision-makers working on similar issues.</i>	
	<i>Seek to establish a partnership with municipalities in which the CTP would provide core courses for municipal staff and board members and the towns would require staff and volunteers to attend these core courses</i>	
	<i>Create worthwhile projects with training and learning experiences and measurable outcomes</i>	
	<i>Work with the Stewardship Coordinator to establish a workshop series on habitat restoration issues spanning project design to implementation and monitoring</i>	
	<i>Subsidize transportation and participation of communities (esp. high-minority, low-income, and/or vulnerable communities) in training programs</i>	
	<i>Train munis on how to use NOAA coastal gaging stations during storm events</i>	

15.2.3.4 Goals

Consider the following question. The year is 2027. The headlines in the news praise your program for the impact you have had. What does the headline say?

JEDI:

- *Water quality improvements are good news for subsistence fishing*
- *CT NERR brings climate science awareness to urban coastal communities*
- *All Communities reap the rewards of an equitable distribution of healthy ecosystems and derived goods and services*
- *NERR brings all stakeholders together and reduces coastal use conflicts*
- *NERR training program reaches all coastal communities*
- *LIS NERR has raised the awareness of coastal access and stewardship for EJ 'At Risk' communities*

Protecting Places:

- *Significant tidal marshlands have been saved and protected*
- *Structural and functional integrity has been sustained!*
- *NERR helps towns update their plans of conservation and development*
- *LIS NERR has contributed technical support to LIS Stakeholder habitat restoration projects*
- *Significant tidal marshlands have been saved and protected.*
- *NERR is tracking stormwater sediment transport down CT River causing siltation and loss of water depth for bird habitat and public use of waterways.*
- *Living shorelines protect private property along the Connecticut River*
- *NERR has new plan to combat invasive Phragmites invasive species*

Applying Science:

- *NERR provides state legislators coastal science learning sessions*
- *Communities surprised how science based planning leads to effective resource mgt.*
- *NERR helps communities fight invasive species*
- *Application of science findings lead to balanced social and ecological systems.*
- *Connecticut NERR convenes regional marsh restoration practitioners to showcase best practices*
- *Nature used to guide environmental management decisions.*
- *LIS NERR staff have collaborated with partner agencies and universities in monitoring and research projects*
- *Scallop added to aquaculture success story as eel grass restoration expands*
- *Connecticut planners gather in the Connecticut NERR to observe living shoreline demonstration sites*

Educating Communities:

- *Coastal communities take ownership over their impacts on LIS as a result of NERR education programs*
- *CT NERR has increased scientific literacy of local boards and commissions*
- *Better informed citizenry provides benefits for environmental and human health*
- *LIS NERR has partnered with Sea Grant and other educational institutions to promote coastal resiliency*
- *Connecticut NERR organizes symposium on marsh migration and habitat conservation*
- *75% of town elected officials in SE CT (i.e., consrv & planning commisns) have participated in a NERR workshop*
- *Local officials participate in hand-on, on-the-water workshops*
- *Lawns are disappearing in favor of more LIS-friendly landscapes*

15.2.4 Research & Monitoring Program

Friday, Feb 19, 2:30 - 5:00 PM (71 Attendees)

Overview: The NERR monitoring programs provide long-term data on water quality, weather, biological communities, habitat, and land-use and land-cover characteristics. The use of standardized instrumentation and protocols for data collection at each reserve creates a coordinated network for detecting and understanding environmental change. Reserve research is focused on how environmental factors (including nutrient loading, climate change, invasive species, and storms, etc.,) impact coastal ecosystems. This meeting will start with a short introduction to this program and our goals for the meeting. Attendees will actively participate in identifying and prioritizing the proposed CT NERR activities in this arena during our first five years.

15.2.4.1 Target Audiences:

Habitat:

- *Academic research community*
- *Thames River Basin Partnership*
- *CT River Museum (Essex, CT)/ Community Engagement*
- *SHARP team especially at Mouth of the CT River*
- *The wildlife that needs to migrate*
- *Schools (K-12)*
- *CTDEEP Wildlife Div*
- *Environmental Organizations*
- *Federal Agencies e.g., USFWS*
- *Land Trusts*
- *Conservation Commissions*
- *LISS*
- *Project O*
- *Adjacent landowners (TNC, Old Lyme land trust, Lyme land conservation trust)*
- *UCONN scientists*
- *Land Trusts*
- *Volunteers who could assist with monitoring/research*
- *Local Boards - P&Z, Conservation, Public Works*
- *Academia*
- *Audubon*
- *Municipal Planners and town land use staff*
- *State and federal legislators*
- *Local and national charitable organizations (i.e., community foundations)*
- *Restoration*
- *Education organizations to support student learning*
- *Local Boards of Education*
- *Fishing and boating community*

- *School groups*
- *NMFS NEFSC/GARFO*

Climate Change:

- *Local decision makers*
- *Academic research community*
- *Local Boards of Education*
- *Academia*
- *Municipalities*
- *The wildlife that needs to migrate*
- *Utility Providers*
- *Local business*
- *Federal Agencies e.g., USFWS*
- *UCONN scientists*
- *Municipal Planners and town land use staff*
- *Potentially threatened species*
- *Governor's Commission on Climate Change*
- *CT DEEP*
- *Local chambers of commerce*
- *Town council/ public*
- *Education organizations*
- *LISS NEP Management Conference Community Partners*
- *NMFS NEFSC/GARFO*
- *Emergency Responders*
- *Public Health Professionals*
- *Local and national charitable organizations (i.e., community foundations)*
- *Scientists*
- *Land Use Planners*
- *State and federal legislators*
- *Local recreational fishers*
- *Regional Council of Governments (COGs)*

Water Quality:

- *Local Boards of Education*
- *Education Organizations to support student learning - especially the Marine Magnet High Schools*
- *Municipal Planners and town land use staff*
- *State and federal legislators*
- *District Department of Health*
- *Local and national charitable organizations (i.e., community foundations)*
- *CT River Watershed environmental organizations CRC, Ex.*
- *Academia*
- *Project O*

- *Municipalities*
- *Boating community*
- *Agricultural community*
- *Thames River Basin Partnership*
- *Upper CT River states and communities*
- *UCONN*
- *Homeowners re lawn care; places that sell fertilizer*
- *Transportation*
- *Aquaculture (if permitted)*
- *Unified Water Study*
- *Recreational fishers*
- *Shellfish commissions*
- *Neighborhood Associations*
- *Public*
- *Condo associations*
- *CT DEEP*
- *Homeowners associations*
- *Subsistence fishing community*
- *Local schools*
- *Recreational boaters*
- *Environmental NGOs*
- *LISS*
- *Lawn Care services - that work on coastal properties*

Community Engagement:

- *Conservation commissions*
- *Local boards of education*
- *Local businesses or tourism*
- *Atlantic Saltwater Guides Assoc. and other rec fishing organizations*
- *Municipal planners and town land use staff*
- *Libraries*
- *Local recreational organizations (fishing, hunting)- TU, charter fishing association*
- *School groups*
- *NGOs*
- *Commercial fishing community*
- *Shellfish commissions*
- *Connecticut Ornithological Association*
- *CT River Museum*
- *Harbor management commissions*
- *Local and national charitable organizations(i.e., community foundations)*
- *Summer camps*
- *State and federal legislators*
- *Education Organizations*

- *Our future leaders*
- *CT Audubon*
- *Coastal Residents*
- *Conservations commissions in estuary communities*
- *Students - Project participation; research assistants, hosting research*
- *Trails Day (through CFPA)*
- *Land Trusts*
- *Subsistence anglers*
- *CT Envirothon*
- *CT River Museum*
- *Coastal communities municipal officials*
- *Project O*
- *Eastern Connecticut Conservation District*
- *Florence Griswold Museum*
- *NESS*
- *Academic research community*
- *Local business organizers*
- *Maritime Education Network*
- *EJ Communities*
- *Community Grass Roots organizations*
- *BIPOC Representatives*
- *Youth Organizations (e.g., Boys and Girls Clubs)*
- *Academic Institutions - University to Pre-K*

15.2.4.2 Current make-up of the research and monitoring community

Monitoring:

- *CRCCD CT River Coastal Conservation District*
- *CAES Hydrilla*
- *CT Council Soil Water Conservation*
- *Niantic River Watershed*
- *Project Oceanology-water quality and benthic trawls Thames River Watershed, CT River Watershed, Poquonock River Watershed, Harbor Seal Population, Nesting Gulls, lobster population*
- *UConn Seafloor monitoring?*
- *The COG groups*
- *Save the River - Save the Hills*
- *Many universities- Wesleyan, Yale, CCSU, Sacred Heart, Three Rivers CC, Trinity, Conn College, USCG*
- *VT DEC & NH DES for the upper watershed*
- *UConn, EEB*
- *Millstone Environmental Lab*

- *Unified Water Study (24 groups around the Sound)*
- *Save the Sound*
- *Yale Univ. EEB- alewife recolonization of Rogers Lake system and Bride Lake system (while research, there is monitoring too)*
- *Save the Bay (RI)*
- *NEIWPCC*
- *LISS*
- *Various local groups, e.g. CUSH in Stonington*
- *USGS*
- *Niantic Nitrogen Working group*
- *City Island Oyster Reef Project*
- *NYSDEC*
- *CT River Conservancy*
- *TNC - own, monitor beach-nesting birds at Griswold Point*
- *Audubon Alliance - Shore Nesting Birds*
- *Greenwich Shellfish Commission*
- *IEC*
- *Shellfish Commissions in cooperation with CT Bureau of Aquaculture*
- *Thames River Basin*
- *Forage Fish - H. Bauman (UConn)*
- *Cornell Lab of Ornithology*
- *Monitoring Water Quality (Thames River Basin)*
- *Integrated Sentinel Monitoring for Ecosystem Change (NERACOOS)*
- *DEEP Wildlife- waterfowl*
- *Project Limulus*
- *CTDEEP Volunteer Monitoring Program RBV*
- *Nitrogen/eel grass*
- *LISICOS / NERACOOS / IOOS*
- *Harbor Watch*
- *UConn Marine Sciences*
- *Audubon Alliance for Coastal Waterbirds (Audubon CT and CT Audubon partner to assist the state and FWS with the monitoring of beach-nesting birds across the state of CT)*
- *CT DEEP LISWQMP, developing benthic monitoring program*
- *USFWS - Stewart B. McKinney NWR*
- *UConn, plankton monitoring*
- *USFWS - Coastal Program*
- *Stony Brook Univ.*
- *Southern CT*
- *CT DEEP Marine Fisheries Program Surveys*
- *LISMaRC (UConn & UNH)*
- *Marine invasive species*
- *CT ag experiment station*
- *LISS STAC*

- *Maritime Aquarium*
- *Rapid assessments of introduced species-Sea Grant funded at times, similar to BioBlitzes*

Climate Change – Ecosystem Integrity:

- *CT ag experiment station*
- *Save the Sound*
- *CT DEEP*
- *Project O blue crab abundance variability, trawl studies*
- *Major Drivers - Development, Agriculture, Habitat Change, Climate Change*
- *All groups working on dam removal / habitat connectivity*
- *Project Blue*
- *Millstone Environmental Lab*
- *Other Reserve System Science Collaborative Projects*
- *USFWS Coastal Program*
- *USFWS & Stewart B. McKinney NWR*
- *CT Governor's C3*
- *SoMAS*
- *CT Sea Grant*
- *CIRCA*
- *LISS*
- *UConn*
- *NYSDEC*
- *UConn Marine Sciences*
- *Stony Brook University*
- *NOAA Milford*
- *UConn, EEB*
- *LISICOS*
- *CT DEEP LISWQMP*
- *UConn/Mystic Aquarium - benthic & fish communities, forage fish*

Ecosystem Services:

- *Rapid assessments of introduced species-Sea Grant funded at times, similar to BioBlitzes*
- *ECCD*
- *Roger Tory Peterson Estuary Center - SAV Monitoring*
- *Greenwave*
- *Norwalk Aquarium*
- *UConn/Mystic Aquarium -seafloor habitat ecology, pred-prey interactions, piscivores/higher tropic level predators*
- *CT Sea Grant*
- *LISS*
- *TNC*
- *NOAA Shellfish Research Center Milford*
- *UConn, NRE*

- *City Island Oyster Reef Project*
- *UConn EEB- alewives in Bride Lake*
- *Watersheds! CLEAR and numerous watershed Associations*
- *UCONN Marine Sciences*
- *CT DEEP Fisheries*
- *UMass/USFWS collaboration on river herring research in lower river*
- *USFWS*
- *Conservation/ Preservation Natural Structures and Functions*
- *Soundwaters*
- *Fair distribution of services - EJ*
- *CT River Conservancy*
- *Friends of Conte*

Social Science:

- *UCONN maritime studies dept.*
- *RiverCOG*
- *Socio-ecological Perspective*
- *New England Science and Sailing*
- *Hunters, Anglers, Shellfishers*
- *UConn, EEB*
- *Save the Sound*
- *CT Audubon Society*
- *Coupled Human and Natural Systems research-modeling at BU*
- *SCSU*
- *CT Sea Grant*
- *LISS*
- *CT DEEP*
- *CLEAR*
- *TNC*
- *Clark University*
- *CT Office of Policy & Management*
- *Millstone Environmental Lab Staff*
- *Project O*
- *NERACOOS*
- *YALE*
- *Virginia Tech - has done research on community based social marketing to protect beach-nesting birds*
- *CT Resource Conservation and Development*
- *Preserve Plum Island Coalition*

15.2.4.3 What are the most pressing Research Issues?

Monitoring:

- *Threat of Hydrilla and aquatic invasives*
- *Upland invasives species that threaten ecosystem integrity*
- *Sentinel species: birds, eelgrass, blue crab, flounder, etc.*
- *Monitoring of various organisms to characterize the biodiversity status and change with space and time; Species dynamics*
- *Invasive species*
- *Oyster populations*
- *Cetacean and pinniped population dynamics*
- *eDNA*
- *Marine mammal populations*
- *Pathogen Indicator Bacteria*
- *FIB counts at State Beach inside Reserve*
- *Biological response indicators*
- *Sturgeon*
- *Ichthyoplankton monitoring*
- *Fish community trends*
- *Estuary transport patterns*
- *Declining tidal marsh specialist birds*
- *Estuary flushing times*
- *Onsite Sewage Treatment*
- *Salt marsh monitoring*
- *Better understanding of predator prey dynamic at beach-nesting birds sites*
- *Saltmarsh and coastal bird species*
- *Hypoxic Zone Contraction*
- *Wind turbine-bird impacts (sea ducks/waterbirds)*
- *Trends of migratory fish over time (perhaps NERR is not specialist but cooperate and expedite work of others)*
- *Marsh Migration and sedimentation rates*
- *Migratory species*
- *Groundwater loads*
- *Oxygen levels*
- *Hypoxic zone expansion*
- *Beach nesting birds*
- *Biking and invasive species - relationships/impacts*
- *Legacy pollution - e.g. mercury, other metals*
- *Benthic condition sediments/biota*
- *River loads of nutrients and pollutants ...from the entire watershed*

- *Aquaculture impacts to wildlife*
- *NPS Nitrogen Inputs*
- *Nesting birds*
- *Wintering waterfowl (population trends/stressors)*
- *Invasive species communities*
- *Integrated Multitrophic Bioextraction and aquaculture*
- *Biological Responses - Biocondition Indicators*
- *Organic contaminants*
- *Lobster population monitoring*
- *Eelgrass Loss*
- *Plankton community*
- *Monitoring for coastal ocean acidification*
- *Chlorophyll*
- *Better understanding of threat to Horseshoe crab populations/current population sinks*
- *Point and nonpoint Sources of bacteria*
- *Population variability in forage fish*
- *Eradicate submerged aquatic vegetation*
- *Underwater Noise*
- *Understanding watershed dynamics on submerged habitat*

Climate Change – Ecosystem Integrity

- *Rapid arrival and success of invasive species (land and water)/ lack of awareness of threat*
- *Impacts of legacy and novel pollutants on LIS ecosystem in changing climate*
- *Effects on endangered species*
- *Sentinel species: birds, blue crab, flounder, eelgrass, etc.*
- *Coastal forests change in species composition due to climate change*
- *Climate change effects on forage fish abundance, composition, and size and how that may affect species dependent on those fish e.g., marine mammals, seabirds*
- *Changing ecosystem services*
- *Testing restoration & management actions*
- *CT River corridor as migration route*
- *Land use commissions are not thinking about CC*
- *Salt marsh migration*
- *Salt marsh change*
- *Impact of clearing lands for solar installs and their downstream affects*
- *Better understanding of balance between sediment availability and SLR*
- *Understanding the relationship between climate change projections and actual readings*
- *saltmarsh change on ditched marsh*
- *Change in direction and type of species interactions*
- *Dynamics and change of fish communities*

- *Restoration techniques for maintaining and creating high marsh habitat in the face of SLR and climate change*
- *Economic development commission are not taking climate change seriously*
- *Linking watershed health to estuarine health*
- *Effects of drought*
- *Change in species distributions, development of novel communities*
- *Role of estuaries as habitat for migratory fish (river herring to sharks)*
- *Changing precipitation and river flows*
- *Changes in biotic elements of seafloor habitats*
- *Monitoring of habitat restoration projects to increase resilience of marshes to determine BMPs*
- *Additional modeling to determine what marshes will be the most resilient to SLR*
- *Coastal ocean acidification*
- *Need for realistic timeframes to be incorporated into town plans of conservation and development*
- *Observing genetic shifts in various biota to warming/acidifying water*
- *Rates and effects of warming*
- *Changing role of forage fish across underwater landscapes*
- *Response of fish runs to sea level rise, greater saltwater intrusion, shifting habitats (e.g. marshes) spread of invasive species*
- *Modeling climate change scenarios locally*
- *Climate mediated trophic shifts*

Ecosystem Services:

- *Eelgrass loss in Poquonnock Cove*
- *Upland forest and their relationship to healthy wetlands*
- *What are the impacts of dredging and other coastal development activities on migratory fish runs? Help fine-tune time of year-restrictions with others*
- *Aquatic invasives and their effects on ecosystem services*
- *Ecosystem services of shellfish aquaculture*
- *Connecting watershed pollutant loadings to impacts on ecosystem services*
- *Nature of high marsh in Mumford Cove*
- *Further development of biological controls for invasive plants*
- *Benchmarks for collective biological, physical and chemical attributes that support ecosystem Goods and services*
- *Preserving and restoring vegetated riparian corridors*
- *Conservation and recovery of natural systems*
- *Without a doubt ecosystem profiling expresses the aggregate of human activity*
- *Benefits of coastal islands and salt marshes to communities during storms*
- *Impacts of pollutants and microplastics on food webs*
- *Research efforts relating to efficacy of restoration (and funding for said efforts)*

- *Threat of Hydrilla and aquatic invasive sp. to tidal marshes in CTR estuary*
- *Salt marshes*
- *Preserving and protecting wetland functions (both tidal and inland)*
- *Need for greater awareness by local municipalities re eServices*
- *Different types of waste water treatment and their effects on coastal habitats*
- *Petrochemical via road runoff*
- *Quantifying carbon storage and flux*
- *Evaluating the impacts of coastal restoration on shoreline protection against erosion, biodiversity, pollution mitigation*

Social Science:

- *DEI/Environmental Justice*
- *Balancing mill rate with environmental protection*
- *Social conflict / community backlash to aquaculture siting decisions*
- *Climate Change*
- *Public coastal access*
- *Strategies for protecting marsh migration corridors on private lands*
- *Need for better educations re value of protecting open space for water quality/ecosystem services*
- *Public understanding of watershed connections to the Sound*
- *Need economic incentives to reduce use of nitrogen fertilizers*
- *Public perception of water dependent uses (aquaculture, working waterfronts, etc.)*
- *Integrated Social-Ecological perspectives and management*
- *Lack of equity in local land use related to SLR*
- *Strategies for increasing inclusiveness in research efforts*
- *Individual Behavior*
- *Assess the value of hands on learning*
- *Need for much greater awareness of value of CTR Estuary/ecosystem services, economic, historic*
- *Quantifying protective value of coastal marshes to adjacent landowners*
- *Public access (to facilitate greater understanding of values)*
- *What messaging can conservation organizations use to get the behaviors that are needed for sharing the beach, conserving salt marsh habitat, slowing climate change, etc.*
- *Lack of connection to water quality and land use, esp. fertilizer, chemical use in lawn care*
- *Identifying workable strategies for enabling marsh migration*
- *Coastal resilience to storms and sea level rise*
- *Enhance community understanding of impact on ecosystems (build connections that promote ownership)*
- *Seafood Safety and public perception*
- *Efforts to "learn how to learn" and learn how to teach*
- *Best strategies for engaging boats to protect shoreline nesting birds*

- *Promote LID and Green Infrastructure BMPs*
- *Quantifying recreational value of coastal systems*

15.2.5 Education Program

Wed Feb 24, 2:30 - 5:00 PM (60 Attendees)

Overview: Each reserve is a living outdoor classroom that advances estuary and data literacy and provides meaningful, hands-on educational experiences for adults, children, and teachers. The opportunities and topic areas are as varied as the locations. Educational experiences provide an exciting entryway for students and life-long learners to become actively involved in coastal conservation, and integrate both System-wide curriculum with local programs. This meeting will start with a short introduction to this program and our goals for the meeting. Attendees will actively participate in identifying and prioritizing the proposed CT NERR activities in this arena during our first five years.

15.2.5.1 Who is doing what:

Habitats/ecosystems/biodiversity:

- *Henry L. Ferguson Museum, Fishers Island*
- *LISS*
- *Fishers Island Conservancy*
- *Mashantucket Pequot Indian Museum*
- *Connecticut River Museum*
- *CT Sea Grant*
- *CT DEEP State Parks*
- *CT River Conservancy*
- *National Audubon*
- *Denison Pequotsepos Nature Center*
- *CT DEEP Nature Centers*
- *Mystic Aquarium*
- *SENEME*
- *Connecticut Audubon Society*
- *CT DEEP Wildlife*
- *Maritime Aquarium*
- *Avalonia Land Conservancy*
- *UConn Extension*
- *UConn*
- *New England Science and Sailing (NESS)*
- *Project Oceanology*

- *Maritime Education Center*
- *Conservation Partnership*
- *Conservation Districts*
- *USDA NRCS*
- *CT Council on Soil and Water Conservation*
- *Independent: Fisheries population post larval pre nekton stage*
- *Conn College*

Understanding climate:

- *Mashantucket Pequot Indian Museum*
- *CT Sea Grant*
- *Project Oceanology*
- *Connecticut River Museum*
- *Connecticut Audubon Society*
- *Denison Pequotsepos Nature Center*
- *New England Science and Sailing (NESS)*
- *LISS Outreach Coordinators*
- *CT DEEP state parks*
- *Mystic Aquarium*

Water quality:

- *CT DEEP LIS mon program*
- *CT River Conservancy*
- *CT DEEP State parks*
- *Conservation Partnership:*
- *Conservation Districts*
- *USDA NRCS*
- *CT Council on Soil and Water Conservation*
- *CT River Museum*
- *Save the Sound*
- *Unified Water Study Groups*
- *LISS Outreach Coordinators*
- *Maritime Education Network*
- *New England Science and Sailing (NESS)*
- *CT DEEP Nature Centers*
- *Project Oceanology*
- *Gateway Community College*
- *CUSH*
- *Baker Cove WS committee*
- *CT River Coastal Conservation District*

- *Mystic Aquarium*
- *CT Sea Grant*
- *Norwalk Maritime Aquarium*

Application of data:

- *UConn*
- *Baker Cove WS committee*
- *CT DEEP State Parks*
- *Mystic Aquarium*
- *CT River Conservancy*
- *CTDEEP Wildlife*
- *CTDEEP WQ program*
- *Project Oceanology*
- *Maritime Aquarium*
- *National Audubon*
- *RiverCOG*
- *Save the Sound*
- *New England Science and Sailing (NESS)*
- *Conservation Partnership:*
- *Conservation Districts*
- *USDA NRCS*
- *CT Council on Soil and Water Conservation*
- *CT Sea Grant - LIS mentor teacher programs; teacher research experiences*

Other:

- *On the water experiences - sailing, fishing, adventure sports (surfing, kayaking, SUP, snorkeling, etc.)*
- *Marine Debris and other human impacts*
- *The boats and facilities (i.e., Project O, UConn) and field sites (i.e., Bluff Pt;) available at this NERR makes it ideally suited for using a hands-on, on-the-water approach for programs directed at all of the educational audiences and topics suggested at this webinar. Research in science education over the past several decades suggests that this is the best way for students of all ages to learn and remember.*
- *And also the DEEP site on the CT! Project O boats spend significant time working from the DEEP dock and also up in Essex.*

15.2.5.2 Who are the target audiences:

Habitats/ecosystems/biodiversity:

- *Multiple town agencies/commissions, Zoning, Wetlands, Economic Development*
- *Local Land Use Commissions*

- *College students*
- *K-12 Students and teachers*
- *Alliance school districts*
- *Local Wetlands agencies*
- *Ciastak communities (ed: coastal?)*
- *College students/recent grads (interns, seasonal positions)*
- *Boating and marinas*
- *Land trusts board*
- *Pre-schools*
- *Land trust conservation groups*
- *Local land trusts*
- *Preservice students (teachers in training)*
- *Municipal leaders*
- *Recreational fishermen*
- *Inner-city*
- *Community foundations*
- *Charter fishing boats*
- *Municipal land use staff*
- *K-12 students/teachers with focus on underrepresented groups*
- *After school programs K-6*
- *Municipal officials*
- *Commercial (including aquaculture) and recreational fishers*
- *Youth Camps*
- *Local community members*
- *Economic development commissions*
- *Journalists, especially covering environment*
- *Legislators*
- *Scouts*
- *Recreational user groups (i.e., boating, fishing, hiking, garden clubs etc.)*
- *Home gardeners*
- *Realtors*
- *Local Chambers of Commerce*
- *Shellfish Commissions*
- *Tourism local and state*
- *Environmental justice communities*

Understanding climate:

- *Boating and marinas*
- *Tour boats, recreational boaters*
- *College students*

- *Shellfish Commissions*
- *K-12 students*
- *College students/recent grads (interns, seasonal positions)*
- *K-12 students/teachers with focus on underrepresented groups*
- *Commercial (including aquaculture) and recreational fishers*
- *Alliance school districts*
- *Preservice students (teachers in training)*
- *Municipal officials*
- *Outdoor-dependent businesses: Aquaculture, Recreation, Commercial Fishing*
- *Community foundations*
- *Municipal engineers*
- *Municipal health departments*
- *Local AmeriCorps groups*
- *BIPOC community*
- *Land use departments and town officials*
- *Land Use Commissions*
- *Tourism industry local and state*
- *General public*
- *Land trust conservation groups*
- *Local Businesses associated with tourism, sporting goods*
- *Home owners*
- *Legislators*
- *Scouts*
- *Real estate agents*
- *Environmental justice communities*
- *Inner-city*

Water quality:

- *K-12 students and teachers*
- *College students/recent grads (interns, seasonal positions)*
- *Preservice students (teachers in training)*
- *Underserved Populations*
- *Community Foundations*
- *College students*
- *K-12 students/teachers with focus on underrepresented groups*
- *Inner-city*
- *Municipalities*
- *Local land trusts*
- *Local AmeriCorps groups*
- *Local outdoor sports businesses*

- *Alliance school districts*
- *Shellfish Commissions*
- *Environmental justice communities*
- *Municipal land use staff*
- *Marinas, recreational fishermen*
- *Communities: individuals, orgs., decision makers*
- *Public health departments*
- *Local land use commissions*
- *Businesses*
- *Residents*
- *Commercial (including aquaculture) and recreational fishers*
- *Local Wetlands Agencies, too*
- *Scouts*
- *Home owners*
- *Professional Service providers along the coast (e.g. lawn services)*
- *Recreational users of the reserve*
- *Nature Center*
- *Economic development commissions*
- *Real estate agents*
- *Marsh migration*

Application of data:

- *Shellfish Commissions*
- *Municipal leaders*
- *K-12 students/teachers with focus on underrepresented groups*
- *College students/recent grads (interns, seasonal positions)*
- *Preservice students (teachers in training)*
- *Land use planners and legislators*
- *College students*
- *K-12 students and teachers*
- *Preservice students (teachers in training)*
- *Municipal land use staff*
- *Teachers/students: data in the classroom*
- *Municipal engineers*
- *Inner-city*
- *Alliance school districts*
- *Underserved Populations*
- *State agency managers*
- *Councils of Governments*
- *Municipal commissions*

- *General public*
- *Scouts*

15.2.5.3 Potential Focus Areas:

Habitats/ecosystems/biodiversity:

- *Life Cycles*
- *biotic and abiotic systems*
- *Estuarine Science*
- *Watersheds*
- *Taxonomic ID*
- *Restore healthy shellfish beds and reduce Prohibited areas*
- *Preserve land areas*
- *NGSS connections - meet school needs*
- *Place-based science - get kids and members of the community participating in real citizen science monitoring in their own communities*
- *Stewardship*
- *Preserve land areas to allow marsh migration and increased tidal areas due to sea level rise*
- *Endangered species*
- *Sentinel species*
- *Will towns/state be willing to protect more natural land to create migration corridors*
- *Plankton community*
- *Loss of critical habitat such as tidal marsh & inability to migrate*
- *Marsh migration areas*
- *Habitat connectivity*
- *Conservation planning and corridor connections*
- *Loss of habitat*
- *Ecosystem connections*
- *Citizen science based biodiversity study*
- *Salt marsh degradation*
- *Systems approach - how is everything interconnected?*
- *Impacts two ecosystem services with declining biodiversity*
- *Change in biodiversity over time*
- *Sea Level Rise*
- *Biodiversity*
- *Human connection to nature*
- *Migrating species (birds especially)*
- *Restore eelgrass and other SAV areas*
- *Seagrass and blue carbon*
- *eBird*

- *Human Impacts on Estuaries*
- *How will the region address invasive species realistically/affordably*
- *Shoreline terrestrial invasive plants, too*
- *Wetlands*
- *How to address invasive species: Hydrilla*
- *Subaqueous soils*
- *Economics of ecosystem services*

Understanding climate:

- *Living Shoreline*
- *Coastal resiliency*
- *Sea level rise*
- *Salt marsh migration*
- *Are towns willing to consider shoreline retreat?*
- *SLAMM model - how do we apply that to coastal planning / housing*
- *What local impacts can you expect?*
- *Sea level rise implications for communities and homeowners*
- *Adoption of living shorelines as alternatives to hardening*
- *Geological time scales and climate change*
- *Teak carbon inland wetlands*
- *Blue carbon - seagrass & salt marshes*
- *NGSS connections - meet school needs*
- *Coastal Acidification*
- *Impacts to shellfishing industry as waters acidify*
- *In general, "No tragedies before 4th grade" as stated by David Sobel - meaning ensure topics are developmentally appropriate*
- *Why and how climate change is affecting estuaries*
- *Ways to reduce climate impacts in our daily lives (Meatless Mondays, biking, etc.)*
- *Habitat loss*
- *How changing climate will impact energy/power grid*
- *Change in species diversity*
- *How changing climate will impact migratory species and why it matters.*
- *Biotic and abiotic systems & processes*
- *Will towns be strong enough to reconsider land use planning that enables greater equity/access to shoreline?*
- *How does climate inform conservation planning*
- *How to address changing climate: drought, storms with greater intensity duration*
- *CT info and comparing to regional/natl, global*
- *Overlay climate change on land protection efforts to determine parcels critical for resiliency*
- *Impacts to ecosystem services*

- *Solutions*
- *How will climate affect economics in local towns (i.e., mill rates and general affordability)*
- *Greater access to sustainable landscape information and incentives*
- *Breaking down the "existential crisis" barrier*
- *How changing climate will affect success of invasive species*

Water quality:

- *Coastal Restoration*
- *How will Hydrilla/aquatic invasive plants (and animals in future) impact water-reliant uses (fishing, boating, etc.)*
- *Stormwater runoff pollutants - E.coli & nutrients*
- *Shellfish restoration*
- *Ocean acidification*
- *Soil health*
- *Ways for residents to infiltrate stormwater such as rain gardens*
- *Estuaries as Nature's Water Filters*
- *Improved water quality in embayments and submerged lands areas*
- *Connections to inland/watershed*
- *Watersheds*
- *One Water /watersheds*
- *Bioextraction - demo projects, or very local efforts like the Billion Oyster Project*
- *Bioindication of Water Quality*
- *Salinity and tides*
- *Everyone lives in a watershed*
- *Use your data to support messages of steps property owners can take to reduce runoff pollution and its impacts in water ecosystems*
- *Warming ambient water temperatures*
- *Ecosystem Services*
- *Citizen science-based water quality monitoring*
- *Develop comparative WQ program at the 2 site areas*
- *Influence on economy*
- *Plastics, esp nano/micro impacts to wildlife and human consumption*
- *NGSS connections - meet school needs*
- *Boat based water sampling (depth profiles)*
- *Economics of maintaining water quality*

Application of data:

- *Introduce students to data sets (how to interpret, graph, answer questions)*
- *Open science*
- *Provide alternatives to nutrient and chemically intensive landscaping*

- *Accessible way to utilize data collected by community*
- *Access for students - real world uses*
- *Ways for students to access data that is collected in the NERR*
- *Tools based decision making for site selection*
- *NDDDB*
- *Universal database*
- *Use of SWMP Data*
- *Citizen science opportunities, and using citizen science data in the classroom*
- *Phenology/Nature's Notebook*
- *Mentored Research Projects*
- *The 'why' behind the data we collect - what's the value/importance of it?*
- *Site design*
- *Municipal commissions need to use data based decision making vs. gut/anecdotal*
- *NGSS connections - meet school needs*
- *Climatology modeling*
- *Ways to increase reach of Unified Water Study (UWS)*
- *Introducing data visualization - moving beyond bar charts and line plots*
- *Watershed group can use data to educate the public and inform plan of work*
- *Using tidal and stream gages for planning and emergency response*

15.2.5.4 Goals:

Consider the following question. The year is 2027. The headlines in the news praise your program for the impact you have had. What does the headline say?

Justice, Equity, Diversity, Inclusion (JEDI):

- *Diversity of undergraduate students enrolling in marine science increases by 25%*
- *The CT NERR is welcoming to all, with signage in multiple languages, gender neutral bathrooms, and more!*
- *Science, Technology, Engineering, and Math (STEM) Careers sees major increase in numbers as educational opportunity diversifies*
- *Inspiring love of science, nature in diverse groups*
- *New London youth reclaim their watershed*
- *CT NERR provides opportunities for previously incarcerated individuals to reclaim their coastal ecosystems*
- *Students adopt local pond/wetland/woods to monitor and keep clean. They present findings to parents and municipal officials resulting in restored natural area and more estuarine literate community as well as increased minority students entering STEM fields in college*
- *CT NERR works with HBCUs for expanded BIPOC representation within the coastal restoration community*
- *A place where everyone feels like they belong*

- *NERR tackles Environmental Justice and shoreline access in CT*
- *On the water opportunities provided for ALL*
- *CT NERR helps communities steward their coastal access points*
- *Local youth group speaks out in support of additional measures to restore water quality at municipal meeting*
- *WQ greatly increases at local beach due to green infrastructure project*

Protecting Places:

- *CT NEERS National model of how communities unite to protect a local landscape to the benefit of all*
- *Coastal habitat saved due to local involvement*
- *CT NERR helps communities steward their coastal access points*
- *National Green and blueway network becomes a reality in CT NERR*
- *CT NERR leads the way in coastal land protection*
- *If you never have seen a Leptocepholus now you can thanks to NERR, NOAA, and DEEP*
- *A significant amount of protected open space (marshes, species, and ecosystems) have been protected based on NERR's findings and community's use of that information.*
- *NERR programs spurs local effort to protect local marsh*
- *NERR research allows for purchase of land for marsh migration and habitat maintenance*

Applying Science:

- *Science is relevant when you visit the CT NERR*
- *CT NERR partners with local Aquariums and Nature Centers to provide technical support for outdoor education and field trips.*
- *Healthy soils, Healthy yards program reduces nutrient loading to LIS*
- *Examples of holistic, ecosystems research and changing practices that protect natural estuarine area, new practices, products, materials*
- *New Research on CT NERR's productive impact on state shellfish populations, industries, and communities*
- *Helped advance STEM education to underserved communities*
- *Thanks to the CT NERR in helping CT's people better understand climate - there is NO MORE arguing about climate change!*
- *Residents and students join together to plant 50 acres of submerged aquatic habitat*
- *CT NERR program provides important water quality data to local watershed group for community education*
- *Connecticut students use local marsh data to propose solutions to climate change and sea level rise*
- *Application of data collected through CT NERR saves local wetlands commission countless hours of discussion*
- *Greening on land blues the Sounds water*
- *CT NERR protects properties with living shorelines*

Educating Communities:

- *NERR hosts 5th Annual Source to Sound: from the Connecticut Lakes to Long Island Sound Tour*
- *Community leaders see the NERR from the water during a floating workshop*
- *Regional plans unveiled in CT NERRS towns benefit people and nature*
- *Became trusted source of education for communities and K-12 students*
- *Human behaviors have changed, we care about our tributaries and LI Sound, and here's what people do now to protect it*
- *Elementary school teachers now LOVE teaching science thanks to the CT NERR as a living laboratory*
- *Lessons from the NERR*
- *CT NERR partners with the LISS National Estuary Program on education and outreach to estuary communities.*
- *2,000 CT students get their feet wet in the third annual "Day in the Life of Coastal Connecticut"*
- *NERR shows how maintaining ecosystem services saves tax dollars*
- *All fourth graders in state of CT public schools will receive on the water experience*
- *CT NERR and CT Seafood Industries Pair Up for an Equitable, Sustainable, and Local food Opportunities*
- *Project O students plant rain gardens for healthy watersheds*
- *Community discussion on retreat fostered by NERR programs on salt marsh migration*
- *CT NERR leads effort to reduce marine plastics*

15.2.6 Stewardship, Resource Management, Visitor Access / Uses

Fri Feb 26, 2:30 - 5:00 PM (57 Attendees)

Overview: Good estuary health provides many benefits, not the least of which is the ability to act as an effective measure against rising seas and storm events. Reserves employ an active stewardship program to plan how to address site-specific coastal management issues. Similarly, all Reserves must plan for and balance the management and protection of resources with the need to encourage visitation and support human uses. This meeting will start with a short introduction to stewardship issues and our goals for the meeting. Attendees will actively participate in identifying and prioritizing the proposed CT NERR activities in this arena during our first five years.

15.2.6.1 Who is doing what:

Conservation:

- *LISS*
- *Florence Griswold Museum restoration of riparian area*
- *Residents and landowners at the home landscape scale*
- *CFPA*

- *CT RC&D*
- *RiverCOG*
- *CT DEEP Wildlife Div*
- *CT Waterfowl Assoc*
- *Local conservation commissions*
- *Project O*
- *CT College Arboretum - may have valuable lessons on forest conservation/mgmt.*
- *Conservation Districts*
- *Municipalities*
- *Nature Conservancy*
- *CT Council on Soil and Water Conservation*
- *Save the Sound*
- *Town of Groton*
- *Essex Land Trust*
- *Avalonia Land Conservancy*
- *CT Waterbird Alliance*
- *Ducks Unlimited*
- *Audubon alliance for coastal waterbirds*
- *Connecticut Audubon Society*
- *TPL*
- *CT River conservancy*
- *Connecticut DEEP*
- *NRCS*
- *Groton Open Space Association*
- *Audubon Connecticut, Connecticut Audubon, The Nature Conservancy*
- *McKinney NWR*
- *Conte NFWR*
- *Army Corps*
- *Roger Tory Peterson Estuary Center (part of Connecticut Audubon society)*
- *Friends of Conte*
- *Connecticut Ornithological Society*
- *Haddam neck spirit*
- *Potapaug and Menunkatuck Audubon Society*
- *Friends of McKinney*
- *Friends of whalebone cove*

Restoration:

- *GOSA, Avalonia, TNC, etc.*
- *Old Saybrook Founders Park Native Plant*
- *Ocean beach estuary walk was restored , not sure who was involved*

- *Land trusts mentioned*
- *CT Sea Grant*
- *NRCS*
- *East Lyme Oyster fisherman*
- *Conservation Districts*
- *Friends groups such as Friends of Whalebone Cove*
- *Save the Sound*
- *CT DEEP*
- *Project O*
- *Long Island Sound Study*
- *CT Council on Soil and Water Conservation*
- *Invasives removal in Lord Cove*
- *Ducks Unlimited*
- *Save the Sound*
- *TNC*
- *Connecticut Audubon*
- *Municipalities*
- *State*

Mapping

- *CT DEEP*
- *USFWS*
- *University of New Haven*
- *UCONN*
- *Mystic*
- *Connecticut Audubon Society*
- *TNC*
- *Water Quality Mapping - Save the Sound*
- *SECOG*
- *DEEP SLAM Model*
- *FEMA maps were being updated, but may have stalled for lack of funding*
- *USDA NRCS subaqueous soil mapping*
- *Audubon alliance for coastal waterbirds*
- *Audubon Connecticut/NY*
- *Avalonia Land Conservancy*
- *Town of Groton*
- *NAACC*
- *Local conservation commissions*
- *RiverCOG*
- *NEPA Assist tool provides a great summary of demographic and environmental constrain*

- *New England Mountain Bike Association*
- *Friends of Whalebone Cove*
- *Kayaking Clubs?/Create a Citizen Scientist project for these groups*
- *UCONN CLEAR*
- *MS4 documentation (stormwater permitting)*
- *NOAA*

Land acquisition for Conservation

- *Groton Open Space Association*
- *TPL*
- *Connecticut Audubon*
- *Land trusts including those listed and Old Saybrook Land Trust, Lynde Point Land Trust, Lower CT River Land Trust, CT River Gateway Commission*
- *Lyme Land Conservation Trust, Town of Lyme, Old Lyme Land Trust, Avalonia Land Trust, The Nature Conservancy*
- *Conte Fish and Wildlife Refuge*
- *RiverCOG*
- *Town of Groton, City of Groton*
- *Great Thicket*
- *Long Island Sound Study*
- *USFWS*
- *CT DEEP*
- *Ducks Unlimited*
- *USDA NRCS Conservation easements*
- *Local conservation commissions*

15.2.6.2 Stewardship Action Items

	Salt water Areas (including marshes)
Mapping / Land Use Analyses / Habitat surveys	<i>Identification of key areas for fish of conservation concern and forage fish</i>
	<i>Complete subaqueous soil survey</i>
	<i>Salt marsh migration areas</i>
	<i>Detailed map for long term monitoring of salt marsh /salt marsh retreat</i>
	<i>Invasive mapping</i>
	<i>Watershed planning-- impervious surface</i>
	<i>Marsh land area and height mapping</i>

	Salt water Areas (including marshes)
	<i>Potential living shoreline site analysis</i>
	<i>Biodiversity Mapping</i>
	<i>Important to get marsh transects in as soon as possible so that change assessments can be made.</i>
	<i>Habitat stewardship on beaches</i>
	<i>Assess the impacts of trail bikes on vegetation at Bluff Pt. These may be the primary route for invasive species to enter forest.</i>
	<i>ConnColl completed a vegetation analysis circa 2018. Should have a handle on the nature of invasive species.</i>
	<i>Limit public use/prevent negative human impacts</i>
Conservation / Restoration / Mitigation	<i>Limit public use/prevent negative human impacts</i>
	<i>Complete PL 566 (watershed operations) plan to secure additional USDA NRCS funding for mitigation of stormwater impacting shellfish beds and restoring salt marsh</i>
	<i>Protecting hard and quiniwue bottomlands</i>
	<i>Restoration/Invasives species removal</i>
	<i>CSO</i>
	<i>Beneficial use of dredge spoils</i>
	<i>Invasive removal</i>
	<i>Shoreline protection for property owners, do's and don'ts and why</i>
	<i>Watershed protection</i>
	<i>Beach stewardship</i>
	<i>Oyster and eelgrass restoration</i>
	<i>Head of tide dam/culvert removal/replacement</i>
	<i>Invasive Plant Control</i>
	<i>Removal of phragmites</i>
	<i>Nature is the only Restorer. Nurturing recovery is the best option in times of change</i>
	<i>Decrease impervious surface</i>
	<i>Using dredge material to create islands that would support beach and island nesting birds</i>
	<i>Thin layer deposition for marsh elevation</i>
	<i>Adaptation/restoration</i>
	<i>Control pedestrian traffic on the gravel beach east of Mumford Point to allow for recovery by Hudsonia</i>
	<i>Bold federal action on climate change mitigation and adaptation</i>
	<i>Determine the cause of the Zostera declines post 1990 in Poquonnock River</i>

	Salt water Areas (including marshes)
	<i>Mapping critical habitats</i>
	<i>Acquisition of 'future' salt water marshes</i>
	<i>Stormwater management and green infrastructure (All areas)</i>
	<i>Dunegrass restoration at Bushy Pt Spit</i>
	<i>Menhaden and herring harvest</i>
	<i>Mitigation - measure of last resort for all four habitats.</i>
	<i>Living Shorelines</i>
	<i>Eelgrass restoration</i>
	<i>Conservation of globally endangered fish species</i>
	<i>Dam Removal</i>
	<i>Thin-film sediment Deposition</i>
	<i>Education campaign about global conservation concern status of dogfish</i>

	Fresh/Brackish Water Areas (including marshes)
Mapping / Land Use Analyses/ Habitat surveys	<i>Marsh migration pathways</i>
	<i>Mapping water trails or potential water trails</i>
	<i>Mapping estuarine habitats, SAV, shellfish, etc. over time</i>
	<i>Dam and road-stream crossing prioritization</i>
	<i>Improving connectivity</i>
	<i>Assess human habitats i.e. diversity of people with access and understanding of NERRS</i>
	<i>Invasive mapping</i>
	<i>Biodiversity studies</i>
	<i>Possible "spillover" effects from/to neighboring productive ecosystems</i>
	<i>Ecological carrying capacity</i>
	<i>Potential living shoreline site analysis</i>
	<i>Shellfish reef habitat surveys</i>
	<i>Aquatic invasive monitoring, mitigation, and research</i>
	<i>Visual carrying capacity</i>
	<i>Habitat surveys: yes, all of them!</i>
	<i>Ecosystem services of shellfish beds</i>
	<i>Dam removal/fish passage upstream of NERR locations</i>
	<i>Limit public use/prevent negative human impacts</i>

	Fresh/Brackish Water Areas (including marshes)
Conservation / Restoration / Mitigation	<i>Limit public use/prevent negative human impacts</i>
	<i>Address/mitigate docks along tidal wetlands to protect SAV's</i>
	<i>Limit public use/prevent negative human impacts</i>
	<i>Land acquisition</i>
	<i>Habitat connectivity</i>
	<i>Buffer Enhancement</i>
	<i>Regional conservation plan that provides guidance for local organizations</i>
	<i>Brownfield mitigation and conversion to usable condition to take pressure off developing new sites in towns surrounding NERRS</i>
	<i>Conservation of nearshore submerged habitats</i>
	<i>Conservation buffers, riparian restoration and creation</i>
	<i>Creating migrant stopover habitats</i>
	<i>Invasive aquatic plants in FW/Brackish wetlands critical to health of salt marshes [connectivity, fish habitat, etc.]</i>
	<i>GOSA, Avalonia, TNC, etc.</i>
	<i>Manage for and monitor marsh migration</i>
	<i>Predator management</i>
	<i>Shellfish restoration for restoration and mitigation efforts</i>
	<i>Aquatic Connectivity (stream/river passage)</i>
	<i>Reduce disturbance of migrating shorebirds at high tide</i>
	<i>Beneficial use of dredge</i>
	<i>Culvert analysis and mitigation</i>
	<i>Recovering America's wildlife act</i>
	<i>Dam removal and migrating fish</i>
	<i>Shellfish can be a nature-based solution to rising seas and water quality issues</i>
	<i>Identification and protection of rare plants</i>
	<i>Habitat restoration</i>
	<i>Sedimentation studies. Is river deposition keeping up with sea level rise?</i>
	<i>Habitat management</i>
	<i>Coastal resilience</i>

	Land along CT River
Mapping / Land Use Analyses / Habitat surveys	<i>Mapping of inland/watershed areas important for connectivity to estuary (migratory species, biotic/abiotic interactions]</i>

	Land along CT River
	<i>Mapping for recreational opportunities but ALSO where not to direct public use to protect sensitive habitats</i>
	<i>Conte and TNC and Friends of Conte</i>
	<i>Land use analysis that anticipates to the extent possible future public uses as pressure points for natural resources and sensitive areas</i>
	<i>Dam and road-stream crossing prioritization</i>
	<i>IBA program</i>
	<i>Bird atlas</i>
	<i>Natural resource inventory and monitoring</i>
	<i>Mapping and understanding recreational opportunities and water trails</i>
	<i>Mapping critical habitats</i>
	<i>Potential living shoreline site analysis</i>
	<i>Importance of forest connections to wetland habitats</i>
	<i>Selden island inventory</i>
	<i>Mapping resilient habitats</i>
	<i>Habitat surveys: yes, all of them!</i>
	<i>Invasive mapping</i>
	<i>Conservation of half the landscape</i>
Conservation / Restoration / Mitigation	<i>Conservation of half the landscape</i>
	<i>Engaging visitors about reducing disturbance to beach-nesting birds</i>
	<i>Monitoring of beach-nesting birds</i>
	<i>Address the issue of aquatic invasive plants! Control/restoration</i>
	<i>Restore connectivity between uplands and wetlands/marshes</i>
	<i>Stewardship of Piping Plover and other beach-nesting birds at Bluff Point, Mumford Cove, Griswold Point, and possible offshore islands</i>
	<i>Conservation at local level: connecting habitats, including residential</i>
	<i>Conservation of intact landscapes - coastal forests, wildlife habitat for listed species</i>
	<i>Planting trees for climate change resilience and that support species habitat</i>
	<i>Install living shorelines</i>
	<i>Plan Oyster Farms to Increase Water Quality</i>
	<i>Forest management in Eight mile watershed/Lyme Forest Block</i>
	<i>Culvert assessment and replacement</i>
	<i>Develop main stem watershed management plan</i>
	<i>Improved signage in no wake zones</i>
	<i>Riparian Buffer Restoration</i>
	<i>Promote soil health/healthy yards program</i>

	Land along CT River
	<i>Coastal access - environmental justice lens</i>
	<i>Providing due diligence funding for conservation projects</i>
	<i>Watershed based acquisition planning and fund</i>

	Bluff Point/Haley Farm, Avery Point
Mapping / Land Use Analyses / Habitat surveys	<i>Same needs as CT River</i>
	<i>Single track trail locations and use patterns</i>
	<i>Airport use and tree management issue associated</i>
	<i>Habitat assessment</i>
	<i>Connected Trail Corridors and Recreational Uses and Opportunities</i>
	<i>Evaluate Trail Use Data currently being collected by SECOG/CTTC</i>
	<i>Invasive mapping</i>
Conservation / Restoration / Mitigation	<i>Monitoring of beach-nesting birds</i>
	<i>Fix the road into Bluff Point</i>
	<i>Establish designated mountain biking trails and close off trails through sensitive areas</i>
	<i>Stewardship of Piping Plover and other beach-nesting birds at Bluff Point, Mumford Cove, Griswold Point, and possible offshore islands</i>
	<i>Erosion control</i>
	<i>Blaze and Manage Single-track trails for multiple uses</i>
	<i>Restoration of Pine Island</i>
	<i>Land acquisition</i>
	<i>Invasive plant management at Bluff Point</i>
	<i>Revisit compatible use regs. to avoid overcrowding</i>
	<i>Understanding equity conflicts of restricting use</i>
	<i>Repair parking area at Bluff Point and launch areas</i>
	<i>Ocean acidification (oa)</i>
	<i>Flooding resilience, especially roads/access to Bluff Pt.</i>
	<i>Determine land use and plans with airport area</i>
	<i>Successional management</i>
	<i>Same as CT River</i>
	<i>Extending connected greenspace and review of use interest</i>

	Bluff Point/Haley Farm, Avery Point
	<i>Groton NL Airport tends to clear the upland forest to improve nightlines are airplanes. Should revisit the history of this!</i>
	<i>Enhance access</i>

15.2.6.3 Public Access Issues/Actions

	Salt water Areas (including marshes)
Concerns	<i>Trash</i>
	<i>Competition as SLR creates competition for shoreline sites needed by wildlife</i>
	<i>Oyster fisheries</i>
	<i>Protect eelgrass and marsh grass from personal watercraft</i>
	<i>Water quality</i>
	<i>Sea level rise</i>
	<i>Coastal Access for inland, low-income, and/or high-minority communities</i>
	<i>Managing high use areas</i>
	<i>Forage availability</i>
	<i>Manage fishing debris along Bluff Pt</i>
	<i>Increase handicap access</i>
	<i>Excessive osprey platform installation</i>
	<i>DEEP Wildlife Div should dictate access at WMAs and NAPs</i>
	<i>Stormwater contamination and coliform bacteria, dogs, loss of beach access</i>
	<i>Protect saltmarsh by not permitting access by walking or kayak trails</i>
	<i>Maintaining recreational and commercial fishing access</i>
	<i>Nitrogen loading and loss of access through red tide bloom</i>
	<i>Need for more recreational shellfishing</i>
	<i>Stewardship of access sites</i>
	<i>Wildlife disturbance esp at critical times</i>
	<i>Protect/maintain shellfish and seaweed aquaculture access to their leases/grounds</i>
	<i>There was a gent who would kayak to Great Island south end and then run. There must be a path there if he still does so.</i>
	<i>How might increasing public use add pressure to increase light pollution?</i>
Conservation / Restoration / Mitigation	<i>Small solar-powered boats for eco-tors</i>
	<i>Artificial reefs</i>
	<i>Engage K-12 students in marsh stewardship actions</i>
	<i>Collaborative relationships with fin and shellfish harvesters</i>

	Salt water Areas (including marshes)
	<i>Better maps of key underwater resources</i>
	<i>MS4 projects</i>
	<i>Manage access to salt marshes through an access plan and guidelines for education groups</i>
	<i>Thin layer sediment</i>
	<i>Buffers and migration corridors</i>
	<i>Sediment control</i>
	<i>Using West Haven model of retreat from shoreline by purchasing flood prone properties and converting to open space. Provides more access to all - e.g., USDA NRCS EWP project</i>

	Freshwater and Brackish Areas (including marshes)
Concerns	<i>Increased pressure for access to water and need for parking lots</i>
	<i>Trash</i>
	<i>Concern re. overuse too much traffic, especially by moto boats</i>
	<i>Maintaining recreational and open space</i>
	<i>Lack of scientific analysis in permitting projects</i>
	<i>Need to designate type of access in some areas (i.e., electric boats and hand powered only)</i>
	<i>Parking</i>
	<i>Habitat and species disturbance</i>
	<i>Need for language other than English to provide opportunities and warnings</i>
	<i>Presence and spread of hydrilla and Trapa natans</i>
	<i>Emerging contaminants from the next great recreational toy (whatever that is)</i>
	<i>Invasives</i>
	<i>Protect saltmarsh by not permitting access by walking or kayak trails</i>
	<i>Ecological disruption (dams, culverts) as barrier to recreation</i>
	<i>Maintaining access for recreational and commercial fishermen</i>
	<i>NIMBY syndrome by existing shoreline residents</i>
	<i>Disturbance</i>
	<i>Failure to consider visual carrying capacity</i>
	<i>Increase handicap access</i>
	<i>Loss of wetlands to rail project</i>
	<i>Stewardship of access sites</i>
	<i>Wildlife disturbance</i>
	<i>Traffic</i>
	<i>DEEP Wildlife Div should dictate access at WMAs and NAPs</i>

	Freshwater and Brackish Areas (including marshes)
	<i>Camping sites appearing on the rock islands in Great Island: fire pits, trash, even tents left up for extended periods</i>
	<i>Damage from pets: wildlife harassment, people not picking up poop</i>
	<i>Swallow congregation site good example of pressure building to level of disturbance</i>
	<i>How might increasing public use add pressure to increase light pollution?</i>
	<i>How to manage "cigarette" boasts disturbance to wildlife, increasing erosion from wakes</i>
Conservation / Restoration / Mitigation	<i>How might increasing public use add pressure to increase light pollution?</i>
	<i>How to manage "cigarette" boasts disturbance to wildlife, increasing erosion from wakes</i>
	<i>Concern: overuse and how that can compromise passive/quiet use of NERR natural resources</i>
	<i>Grade-school curriculum, University programs, Citizen Science programs to monitor estuarine health and engage local coastal communities</i>
	<i>Assess what humans communities (i.e. diversity) want/need from near. Many people of color/Asian use access to coast for food (crabs/fish)</i>
	<i>Engage K-12 students in marsh stewardship actions</i>
	<i>Conflicts between motorized and non-motorized uses, and safety as well as disturbance to wildlife</i>
	<i>Complementary research/data opportunities by NERR and shellfish restoration</i>
	<i>Co-benefits (for people and ecosystems) of NERR and CT shellfish restoration planning efforts</i>
	<i>Use small solar powered boats for eco-tours</i>
	<i>Find ways to directly connect underserved communities to the NERR</i>
	<i>Increased public use/negative impacts</i>
	<i>Dogs and nitrogen loading -across all areas</i>

	Land Along the Connecticut River
Concerns	<i>Increasing pressure for docks esp. in sensitive sites (SAV's and submerged habitat)</i>
	<i>Trash</i>
	<i>Coastal development</i>
	<i>Motorized equipment</i>
	<i>Land disturbance</i>
	<i>Connectivity/fragmentation</i>
	<i>Ecological disruption (dams, culverts) as barrier to recreation</i>

	Land Along the Connecticut River
	<i>Loss of foundational species, especially trees</i>
	<i>Diminishing natural cover</i>
	<i>Habitat management</i>
	<i>Plastics</i>
	<i>Habitat restoration</i>
	<i>Increase handicap access</i>
	<i>Environmental justice - coastal access is very limited for underserved communities in the NERR area</i>
	<i>Disturbance by boaters as well as walkers</i>
	<i>Threats to quiet, places important for solitude experiences</i>
	<i>Wildlife disturbance</i>
	<i>Parking</i>
	<i>Stewardship of access sites</i>
	<i>Mountain biking in uplands and erosion that can impact water quality in tributaries</i>
Conservation / Restoration / Mitigation	<i>Nurturing unavoidable change</i>
	<i>Ban motorized equipment</i>
	<i>ATV's a concern</i>
	<i>Need better handicap access</i>
	<i>Wildlife drives</i>
	<i>Car based viewing opportunities</i>
	<i>Small solar-powered boats for eco-tours</i>
	<i>Find ways to directly connect underserved communities to the NERR</i>
	<i>Link into the ecotourism on the CT River - eagle and seal watch; the fall swallow tornadoes</i>
	<i>Time scales for recovery</i>
	<i>Partner with tribes on coastal land use and access</i>
	<i>Oyster beds</i>

	Bluff Point/Haley Farm, Avery Point
Concerns	<i>Trash</i>
	<i>Extensively used single-track trail system in Bluff Point and Haley Farm that has not been recognized or managed</i>
	<i>Manage trail biking at Bluff Pt.</i>
	<i>Flooding resilience, especially roads/access to Bluff Pt.</i>
	<i>There is a historic round house in Bluff Pt State Parks - buried in the shrublands. The roundhouse at Saybrook Point is now a park.</i>

	Bluff Point/Haley Farm, Avery Point
	<i>Multiple user groups not engaged or directly recognized in planning process (Equestrian, Mountain Bikers, Trail Runners, Kayakers, Fishermen)</i>
	<i>Loss of foundational species, especially trees</i>
	<i>Environmental justice - coastal access is very limited for underserved communities in the NERR area</i>
	<i>Human use trade-offs carrying capacity</i>
	<i>Disturbance by boaters as well as walkers</i>
Conservation / Restoration / Mitigation	<i>Nurturing unavoidable change</i>
	<i>Provide access from NL train station to Bluff Pt. via water taxi</i>
	<i>Blaze and manage single-track trails at Bluff Point engaging User organizations, i.e., NEMBA</i>
	<i>Small solar-powered boats for eco-tours</i>
	<i>Universal access</i>
	<i>Repair parking areas in Bluff and boat launches</i>
	<i>Engage local native American tribes for guided walks highlighting their history and culture</i>
	<i>Vehicle based viewing opportunities</i>
	<i>Need to close many of the unauthorized bike trails at Bluff Pt.</i>
	<i>Management approach engaging users</i>
	<i>Terns and plovers once nested on the eastern beaches at Bluff Point</i>
	<i>Parks is mowing the freshwater wetland Panicum belt at Haley Farm</i>
	<i>Partner with tribes on coastal land use and access</i>

15.2.7 Partnerships, Friends group, NERR Advisory Board

Wed Mar 3, 2:30 - 5:00 PM (46 attendees)

Overview: Reserves are not intended to exist on their own, rather they are encouraged to seek input and engagement within the communities. Creating a plan for the formation of partnerships such as Advisory Boards and Friends groups can assist Reserves in areas such as general planning and implementation, program development and delivery, and securing external funding. This meeting will start with a short introduction to how partnerships are encouraged and incorporated in other Reserves and our goals for this meeting. Attendees will actively participate in identifying and prioritizing the proposed CT NERR activities in this arena during our first five years.

15.2.7.1 Roles & Responsibilities:

Friends Group:

- *Connect people with ecosystems for balanced social - ecological outcomes*
- *Develop a website*
- *Maintains a database*
- *Collects and shares photos and videos*
- *Assist with public engagement (walks, trips, etc.)*
- *Engage public schools- env. ed, research, restoration, env justice*
- *Broad engagement (reduce barriers to engagement)*
- *Consensus Building*
- *Makes it fun*
- *Tells stories*
- *Keeps it simple and understandable*
- *Identify priorities and opportunities for citizen science, then implement to deepen local community engagement*
- *Raise awareness of NERR and its unique characteristics, engage local community - identify values, hopes and concerns related to the NERR*
- *Help property owners protect the Environment*
- *Assist with the heavy lifting of community education/interaction*
- *Educate the public*
- *Recruit more friends*
- *Grassroots organizing*
- *Recruit local volunteers and stewards*
- *Local residents related to ongoing/new recreational activities*
- *Coordinate/engage volunteers*
- *Volunteers program*
- *Facilitate land acquisition*
- *THANKS the donors, volunteers, partners, electeds*
- *Political connections*
- *Provide training for community volunteers*
- *Connections with other groups*
- *Grow partnerships*
- *Advocacy for reserve: sales & marketing*
- *Advocate for NERR*
- *Financial support for education, research and capital projects*
- *Advocate for funding*
- *Work with advisory committee to prioritize funding and other projects*
- *Raise matching funds*
- *Create and manage an endowment*
- *Organize and participate in work parties for recreation& preservation projects*
- *Fundraising: membership, events, grant writing help, NEERA support*
- *Strategize funding plan and opportunities*

Advisory Committee:

- *Bring national connections and interface with National NERR leadership*
- *Connect people with ecosystems for balanced social - ecological outcomes*
- *Bring connections from many sectors*
- *Seek and vet staff*
- *Can be hiring committees*
- *Establish Adv. Cmte. charter with clear roles, responsibilities and decision making processes as early as possible in the committee formation*
- *Identify key user groups and organizations to represent local values, hopes and concerns about the NERR on the Advisory Committee - be sure to include some reps from the Friends group on the Adv. Committee*
- *Coordinate with local governmental organizations*
- *Contribute specific expertise*
- *Consensus Building*
- *Ensure Correct Strategy*
- *Multi-disciplinary and inclusive representation*
- *Advise land managers on management actions*
- *Ensure that the Strategic Plan is being efficiently implemented*
- *Provide connections to financial sector*
- *Changes to Reserve Management Plan*
- *Addition of monitoring protocols beyond SWMP*
- *Operational direction*
- *Connections with other monitoring efforts*
- *Development and selection of restoration projects*
- *Technical advisory services*
- *Reminds the NERR staff and other partners to stick to the plan, involve the disengaged, look for who is NOT at the table, and keep to the core mission*
- *Ensure engagement of current local stakeholders*
- *Ensure correct priorities*
- *Review technical reports for accuracy*
- *Review/weigh in on projects from the Management/Strategic Plan*
- *Lend expertise in specific areas (i.e., financial, research, personnel)*
- *Political connections*
- *Ensure abiding by the goals and "bylaws" of the NERR*
- *Resolve problems*
- *Develop management plans*
- *Communicate Information to the Public and Special Interest Groups; Solicit Feedback*
- *Develop, maintain & publish a scorecard of activity effectiveness*
- *Collaboration with other ongoing research, monitoring, restoration, conservation work on estuarine habitats/ecosystems*
- *Ensure financial sustainability*
- *Evaluate partnership effectiveness*

- *Guide overall policy and funding priorities*
- *Conduct stage-gate reviews: correct implementation*
- *Strategize funding plan and opportunities*

Other:

- *Generate related curriculum*
- *Collaboration with upper watershed partners important to wq protection such as Connecticut River Joint Commissions and Connecticut River Conservancy*
- *Utilize the arts to enhance programing and engage the public*
- *Cultural competency workshops*
- *Also consider coordination with Last Green Valley and Thames River Basin Partnership*
- *A "target" population is something shot at; how can you INVOLVE populations from inception?*

15.2.7.2 Partnership Opportunities:

Habitat/Ecosystems/Biodiversity

- *USFWS: habitat restoration / habitat assessment / monitoring (habitat and vegetative response to restoration) / species conservation*
- *Councils of Government*
- *CLCC*
- *CTDEEP*
- *Lyme, Old Lyme Essex land trusts*
- *Environmental Groups [USFWS, TNC, CAS, Audubon CT & NY] (Stewardship, Protection of Endangered Species)*
- *Save the Sound - Lands program for conservation/acquisition campaigns around critical or threatened habitat*
- *Thames R. Basin Partnership & ECCD*
- *Community foundations*
- *UCONN*
- *Other Reserve System (Science Collaborative Projects)*
- *DPNC*
- *NOAA Restoration Center*
- *Delta Waterfowl*
- *The Sound School Regional Vocational Aquaculture Center (support restoration, cleanups, data collection)*
- *Mystic Seaport & Aquarium*
- *Sierra Club*
- *Municipalities*
- *Audubon CT/NY*
- *Connecticut Audubon Society , including RTPEC*
- *Conte Lab*

- *RiverCOG*
- *Hunters*
- *US Coast Guard Acad Sci Dept*
- *Save the Sound - work with Ecological Restoration team on living shorelines, marsh restoration, and other restoration projects within the NERR*
- *Footprints In The Water: Sustainable Policy and Management Concepts for a Changing Environment...*
- *Birding tour operators*
- *Middlesex land trust*
- *TNC*
- *Groton Conserv Comm & Planning Dept*
- *Connecticut Ornithological association*
- *Fishers Island Seagrass Mgmt. Coalition*
- *CT River conservancy*
- *Trout unlimited*
- *Ducks unlimited*
- *CTLCV*
- *Avalonia & GOSA*
- *CFPA*
- *Other land trusts*
- *Atlantic Salmon Federation*
- *Rivers alliance*
- *SCHOOLS*
- *Project O*

Climate Science & Resilience

- *Groton Town Planning Dept*
- *Thames R Basin Partnership*
- *US Coast Guard Acad Sci Dept*
- *Community foundations*
- *Local citizen*
- *Army Corps of Engineers, CIRCA, USGS, Sea Grant, Conte Reserve, TNC (Sea Level Rise, Shore Erosion)*
- *Groton Town Resilience & Sust. Task Force*
- *USGS - Climate Science Center (@UMass)*
- *The Sound School Regional Vocational Aquaculture Center (living shorelines)*
- *CAES*
- *Local Sierra Club and League of Conservation Voters chapters*
- *Save the Sound - Ecological Restoration team on nature-based resilience projects*
- *USFWS*

- *UConn CLEAR*
- *Soundkeeper*
- *Connecticut Audubon Society*
- *Audubon CT/NY*
- *Footprints In The Water: Sustainable Policy and Management Concepts for a Changing Environment...*
- *CT Sea Grant*
- *FEMA and other emergency mgmt*
- *Project O*
- *UCONN*
- *DEEP*
- *TNC*
- *Circa*
- *LISS*
- *Councils of Governments*
- *CIRCA*
- *SCHOOLS*

Water Quality

- *Project O*
- *Fishing charter boats*
- *beach operators/lifeguards*
- *CT River conservancy*
- *National Parks Service - Wild and Scenic Watersheds*
- *Save the Sound - Coordinate with and participate in Unified Water Study*
- *USGS*
- *DEEP*
- *TNC - Advisory Committee*
- *Groton Public Works Dept.*
- *Conte lab*
- *Thames River Basin Partnership (water quality monitoring)*
- *Connecticut Audubon Society including RTPEC*
- *The Sound School Regional Vocational Aquaculture Center- (equipment and students for monitoring)*
- *UCONN*
- *Soundkeeper*
- *US EPA*
- *UConn CLEAR*
- *Soil and water districts?*
- *LISS*

- *CUSH (Clean Up Harbors and Sounds group in Stonington*
- *Community foundations*

Community Engagement

- *CIRCA*
- *Groton Conserv Com*
- *School Systems & Env. Educators [NESS, Project O, CAS, Mystic Aquarium, Museums, Libraries] (K-12)*
- *USFWS*
- *CAC of the LIS MC*
- *The Sound School Regional Vocational Aquaculture Center (representative for Friends group)*
- *AMC*
- *CTLCV*
- *Local citizen*
- *NERRA*
- *Connecticut Audubon Society including RTPEC*
- *CHURCHES*
- *Landscape painters*
- *Other Reserve System' Friends groups - always happy to share successes and failures*
- *Audubon Connecticut/New York*
- *Con Brio chorale*
- *Save the Sound - build into projects in the area*
- *Local newspapers*
- *New England Mountain Bike Association*
- *Transportation Districts (Low Cost Transportation*
- *Haddam neck spirit*
- *Friends of Whalebone*
- *Friends of Conte*
- *RiverCOG*
- *Coastal Residents -Friends Group Rep - help w/outreach, fundraising, programs, advocacy*
- *Environment CT*
- *CT River Museum*
- *Citizens Campaign*
- *ConPIRG*
- *Mystic Aquarium*
- *Community foundations*
- *Friends Group, Community Science Participants, Municipalities (Environmental Equity)*
- *LISS*
- *SECT NEMBA*
- *CT Sea Grant*

- CTDEEP
- MCCC, NESS, School Systems: Special Topics (Teaching Title 1 Students, Mentoring AmeriCorps Interns, Menorin Minority Students Data in the Classroom)
- *please consider Citizen-at-large representation who might not be associated with an organization*
- Denison Pequotsepos
- Arts organizations; Old Lyme Art Association, Flo Gris, Mystic art association, New London Arts Council.
- User groups - commercial and rec fishers, boaters (yacht clubs), paddlers, aquaculture businesses, ferry services out of New London, divers/dive shops
- UConn Extension CT Trails
- Mystic Aquarium & Seaport
- NAACP & El Centro
- Avalonia & GOSA
- Thames R Basin Partnership

Other

- *I've been adding somewhat oddball sticky notes, because the DEIJ conversations of the past year, if they've taught me anything, have convinced me that if we value biodiversity [in nature], we should also value it in our partnerships and advisors. Starting on a green field here, you've got a chance to bring in groups and ideas that more established places like us WISH we'd thought of decades ago. E.g., tribal lands resource managers, science teachers, hunters and anglers, clergy, the military. Oh, and hedge fund managers.*

15.2.8 Administration Plan, Volunteer Plan, Communication Plan

Friday, Mar 5, 2:30 - 5:00 PM (34 attendees)

Overview: All Reserves must have a plan for how they will be staffed and what the roles and responsibilities will be to carry out the aspects of training, education, research, monitoring, and stewardship activities. Additionally, the creation of a plan to help engage volunteers in Reserve programming and developing a plan to communicate - and seek feedback on - Reserve activities and initiatives will be discussed. This meeting will start with a short introduction to these issues and our goals for the meeting. Attendees will actively participate in identifying and prioritizing the proposed CT NERR activities in this arena during our first five years.

15.2.8.1 Staffing Needs:

Probing Question: Where do we hope the NERR will build capacity quickly during the first 5 years?

Education:

- *NGO partners acting as fiscal agents can be an efficient way to lower overhead*

- *Establish yourself as a valuable resource to local educators, both in terms of curriculum and field trips*
- *Immense regional capacity here too*
- *Integrated natural resource atlas and monitoring, including models.*
- *Train the Trainer type programs*
- *Partner w/groups working w/foster children and families*
- *Create opportunities for students from underserved communities on a regular basis*
- *Focus on TOTE - Lots of Partners Available (Hire Ed. Coordinator)*
- *Get Education Coordinator as soon as possible*
- *Find out what your education 'niche' should be and build that out.*
- *Develop monitoring structure*
- *Develop a citizen science program*
- *Volunteer Coordinator*
- *Partner with/utilize Project O & similar organizations already working with youth education*
- *Use the strength of local/partner orgs to leverage what you have (if only the EC for education staff, you can do so much more by partnering)*
- *Leverage partnerships to expand education programs across existing networks*

Research Monitoring

- *Real-time climate change impacts tracking - water temp., new species from southern climates, etc.*
- *Focus research on aquatic invasive mitigation in freshwater tidal wetlands*
- *Take advantage of extensive existing regional research and monitoring coordination efforts across Long Island Sound*
- *Focus on SWMP- Mandatory*
- *Collaborate with Project O and other local citizen science organizations to build on existing monitoring programs*
- *Identify and integrate with existing monitoring efforts*
- *Focus on universities for hard research, work within existing citizen science programs...e.g., 100 ton invasives, Audubon Alliance, Connecticut bird Atlas, BioBlitzes (iNaturalist), eBird, Christmas Bird Counts, Summer Bird Counts, Water quality monitoring or CRC and STS*
- *Get a Research Coordinator ASAP, followed by SWMP Coordinator*
- *Identify method to disseminate monitoring results/ information*
- *Research & Monitoring are natural fit w UConn - early win*
- *Volunteer Coordinator*
- *Ramp up quickly on long-term monitoring*
- *Research habitat links between upland forests and wetlands*

Stewardship

- *Focus on Starting a Friends Group w Volunteers*
- *Public communication to build support for stewardship programs*
- *Develop partnerships to identify, prioritize, and begin implementing habitat restoration and coastal resilience projects*

- *Recognize scientists and local citizens who were key in preservation of Great Island and Bluff Point*
- *Save the Sound (shore) & CT River Conservancy (Freshwater rivers) already run good cleanups, help them but don't reinvent the wheel. Go after aquatic invasives, emerging concern*
- *Need coordinator for a healthy yards program*
- *Aquatic Invasives mapping & removal - CT River, this is both education and Stewardship*
- *Engage Paddling, Fishing, Clamming interests and groups early on in monitoring & stewardship activities. They are your eyes and ears*
- *Volunteer Coordinator is essential*
- *Identify existing programs and coordinate therewith*
- *Recognize and build on current volunteer activities*
- *Volunteer Coordinator*
- *Make sure staff at all levels understand and appreciate the contributions of volunteers*
- *Help recruit volunteers for things like beach/shore cleanups*
- *Assess for gaps - what needs to be done*
- *Depending on need, Volunteer Coordinator and Stewardship Coordinator come after the core positions, SWMP, CTP*
- *Help provide volunteers for shorebird stewardship efforts*

Coastal Training

- *Appropriate siting of aquaculture*
- *Volunteer coordinator could do much of this*
- *Emphasize importance of coastal marshes to people and wildlife*
- *Volunteer Coordinator*
- *Develop partnership with organizations already doing this to streamline program develop*
- *opportunities for aquaculture as new industry in CT and public communication on benefits for water quality, coastal resilience*
- *Training of municipal officials*
- *Working waterfronts and climate change*
- *Partnership with other training organizations*
- *Science translation for decision makers - both local and state*
- *CTP is key to science communication and translation. After Manager, EC, RC, and SWMP Teach, hire this person*
- *Create a Pilot with One Municipality - Env. Equity (JEDI) Project*
- *Add a CTP Coordinator and quickly develop programs for local decision makers*
- *Emphasize programming about living shorelines*
- *Relationship between built and natural environment*
- *CIRCA - CT NERR partnership should be clarified early*
- *Capitalize on current strong levels of interest in this area*
- *Process training not just technical training (e.g. communication, facilitating local projects)*
- *Coordinate with CACIWC*
- *Training of law enforcement on wildlife/environmental laws*
- *Local conservation districts do a lot of training*
- *Coastal resilience*

15.2.8.2 Volunteer Focus Areas

Probing Question: What activities will be most exciting to people?

Educating Communities

- *Volunteers act as ambassadors at events like farmer's market or town fairs*
- *Docents leading programs/walks at Bluff Point/Haley Farm (bird walks, nature walks, etc.)*
- *Engage the arts*
- *Creating a photo database of species on Reserve property as a way to engage people on social media etc. Lots of local photographers out there who would probably love to contribute to some kind of project like this! Videos, too. Great way to get the NERR name out there on social media platforms.*
- *Citizen science*
- *Set up volunteer speakers bureau*
- *Touch tanks*
- *Become a quoted source in all of the good programs already ongoing - RTPEC, local libraries, CT River Museum, etc.*
- *Community (citizen) science programs are great mix of stewardship & education vol opps*
- *Volunteer outreach to schools or school groups visit areas of the Reserve - train volunteer docents!*
- *Partnering with conservation commissions for community presentations and workshops*
- *Trained vols to go into schools or other programs*
- *Leading environmental education programs fro the general public*
- *Copy Soundwaters program relating biodiversity to JEDI*
- *Find ways to expand to Hartford/Middletown*
- *Provide opportunities for people to see NERR from the water*

Applying science

- *Citizen science*
- *Tap into existing natural resource inventories to prioritize areas and actions*
- *Tying art and science together*
- *Stormwater outfall monitoring*
- *Opportunities for k-12 students to collect and contribute to long-term monitoring data set*
- *Volunteer water quality monitoring*

Justice Equity, Diversity, Inclusion

- *Project to improve access to the NERR for underserved communities*
- *Know the communities you serve and how community members can all be welcome*
- *Leadership training programs for underserved youth*
- *Partner with churches and other local organizations to connect to communities that are harder to reach*

- *Opportunities for repeated interactions with researchers doing field work at reserve - versus a one-shot experience*
- *This area should be integrated into the other areas, not a standalone component*
- *Get involved with Outdoor Afro and Latin Outdoors*
- *Reaching out and communicating with organizations that represent diverse groups such as the elderly, handicapped, minority and underserved organizations. Make sure they are invited and asked to participate.*
- *Expanding NERR upstream to CT River Head of Tide would capture Middletown and Hartford and metro area*
- *Volunteer materials in languages other than English*

Preserving Habitats

- *Develop proactive approach to identification of key assets to be protected and added to NERR*
- *Seek potential forest legacy landowners proximal to NERR*
- *Invasive species removal projects*
- *Environmental clean-ups*
- *Land stewardship programs (regular shore walks/marsh paddles, etc.)*
- *Plastic and trash clean up days*
- *Simplified aggregation of carbon credits*
- *Work with state on coordinating stateside LWCF*
- *Engage recreational users in understanding how to minimize their impacts*
- *Support a municipal option for land protection/management*
- *Natural Resources inventory to guide preservation*
- *Support passage of Recovering America's wildlife act*
- *Work with forestry/agriculture community to promote options for working undeveloped lands*

Other

- *While water quality monitoring is important, 1) we have a lot of it in LIS and 2) it's not very exciting. The public likes to touch things. the NERR will be more successful if volunteer opportunities are hands on and involve biology (e.g.)*

15.2.8.3 Communication

Probing question: How should we communicate about the NERR, its properties, work efforts, impacts, etc.

Years 1 & 2:

- *Logo, slogan, branding*
- *Hire staff that are social media-savvy*
- *Historical Land Uses*
- *JEDI Storytelling*
- *Video Publishing*

- *What makes the CT NERR unique and different from DEEP, Sea Grant, UConn, etc... and promote that*
- *Develop innovative media - 360 tours, underwater tours etc.*
- *The Green Gazette*
- *Piggy-back off of ongoing UWS, Coastal Cleanups, etc., have a display/volunteers at their events, partner w/them*
- *Identify the primary audiences, overlapping organizations, and consider the NERR niche*
- *Start with a really good website: set up a digital resource to all the NERR properties. Make the NERR a distinct resource to these locations, distinct from UCONN/DEEP. Include natural resource inventories*
- *Create a logo; have a contest w/local art colleges/programs for design*
- *Look at CT Heritage Corridors for ideas of sharing/featuring activities*
- *General promotion of outdoor recreational/access opportunities available at various sites*
- *mission*
- *Focus groups to ask communities how they want to be involved in CT NERR and how CT NERR supports them as a community and as individuals*
- *Highlight BIPOC in regard to how communities enjoy/use the CT NERR in all communications*
- *publicity blast - newspapers, radio, public radio, social media*
- *Local advertising*
- *Engage partners to publicize thru their networks*
- *Convey messages about the reserve that help the public see these well-known places with fresh eyes*
- *Gotta have that brown sign on the interstate!!*
- *Do cross-promotion with Thames River Heritage Park*
- *Ask local communities to put a link on their municipal websites to the NERR*
- *Engage with the Ct River Gateway Commission*
- *Consistency in whatever communication you choose - if you do a blog, do it regularly. If you use Insta and Facebook, post regularly*
- *Have a research webinar series or consider "lightning talks" to communicate possible research topics to the public*
- *Every community participates in community events magazine. Consistently enter articles about the goings on at the NERR*
- *Instagram for the under 30 audience, Facebook for the older audience*

Years 3-5:

- *Offer tours of the NERR to groups of teachers, informal educators, others who can become ambassadors*
- *Photo contests*
- *Art shows*
- *Outdoor sculptures*
- *Develop bird/wildlife viewing trail*
- *YouTube channel*

- *Capture oral histories of local communities*
- *Newsletter*
- *Tell stories about early successes. Build the reputation of the NERR by making sure people hear about what we are doing right*
- *Annual symposia focused on research, education arts and media*
- *ArcGIS StoryMap about the NERR landscape and ongoing work*
- *Write articles for Estuary Magazine*
- *Annual events - start having NERR traditions*
- *Annual award event*
- *Collaborative communications with partners*

Beyond year 5:

- *Massive citizen science natural resource inventory*
- *Extend paddlers trail to lower CT and sound sites within NERR*
- *Integrated mapping of Natural Resource inventories*
- *Easily searchable archive of projects, etc.*
- *Make data easily accessible and understandable to the public*
- *Collaborative communications with partners*
- *Focus on word of mouth and network-building, from the strong base that has been established*
- *Connect digital resources with long-term environmental monitoring. Databases for scientists and educators*
- *Build on established NERR traditions - get them to be institutionalized in stakeholder groups (scientists, communities, schools)*
- *Ongoing annual or periodic symposium*
- *Consider a NERR facility like Great Bay or WBNERR to raise visibility of reserve and have a central location for visitors and events with its own identify outside UConn*

15.2.9 Facilities and Properties Development and Improvement Plan

Wed Mar 10, 2:30 - 5:00 PM (35 attendees)

Overview: The facilities plan should discuss the Reserve’s philosophy on sustainable building, purpose and description of existing facilities, facility challenges and gaps, and plans for new facilities, facility upgrades, and exhibits. The properties development and improvement plan should identify ecologically key land and water areas to consider for future opportunities in improvement or acquisition. This meeting will start with a short introduction to this program and our goals for the meeting; please note, we will focus primarily on the facilities versus identifying future land acquisitions. Attendees will actively participate in identifying and prioritizing the proposed CT NERR activities in this arena during our first five years.

15.2.9.1 Organizations/Properties

Probing question: In the context of possible expansions after our first 5 years, are there organizations or properties we should be aware of?

Organizations:

- *CT River Gateway Commission & CT River Conservation Zone*
- *Chester, Deep River, Haddam, East Haddam Land Trusts*
- *Farms to Institutions New England*
- *Groton Open Space Association (GOSA)*
- *Old Saybrook and Old Lyme Land Trusts*
- *Essex Land Trust*
- *Deep River Land Trust*
- *East Haddam Land Trust*
- *Avalonia*
- *Eastern Pequot Tribal Nation*
- *Mashantucket Pequot Tribal Nation*
- *Lower CT River Land Trust, CT River COG,*
- *Friends of Conte*
- *Middlesex Land Trust*
- *Lyme Land Trust*
- *Thames River Basin Partnership*
- *CT Fund for the Environment*
- *NESS*
- *US Fish & Wildlife Service, Silvio Conte Preserve*
- *Friends of Whalebone Cove*
- *Save The Sound*
- *New London water taxi (they are looking for tour opportunities)*
- *The Nature Conservancy*
- *Local Conservation Commissions*
- *Eastern CT Conservation District*
- *Old Lyme Open Space Commission*
- *Rocky Neck State Park in fall, winter, and spring*

Properties:

- *Chester Land Trust Properties on Chester Creek and at the where the Deep River enters the CT below Saint John's school*
- *Machimoodus SP*
- *Great Meadow*
- *Selden Island State Park and the adjacent TNC property*
- *Poquetanuck Cove (Thames river)*
- *Plum bank Marsh*
- *Alewife Cove, New London*

- Ragged Rock Creek
- TNC Properties at Lord Cove and Great Island
- Thatched Island
- South Cove Wildlife Area
- Haddam Neck SP
- Mystic River past Mystic Seaport
- Denison Pequotsepos Nature Center
- Harkness State park and Goshen Cove Goshen Point complex?
- Selden Creek Preserve
- Watts Island

15.2.9.2 Facility Priorities

	High Priority	Medium Priority	Low Priority
Small Facility (e.g., 2 bedroom ranch)	<i>Lab space to maintain the SWMP</i>	<i>Mid level/early priority: Get some exhibit, kiosk, or dedicated space in CT DEEP, Old Lyme, so NERR has visibility in its western half. Also, whatever facilities researchers need to start working</i>	<i>Note that the Ct Science Center in Hartford is a massive drain on State and City tax dollars, yet what is really needed is funding for scientists, and support for youth to become involved in science. Rather than one big building, as there are other multiple purpose buildings along the Ct River - funding exhibits or mobile exhibits within existing locations. In addition there could be smaller scale fixed stations in remote locations that allow for science and observation + research data collection sites</i>
	<i>Visitor Center</i>	<i>Exhibit Areas</i>	<i>Classrooms and Teaching labs: low priority because education team could be integrated with Project O which already has great facilities</i>
	<i>Research Labs for staff, visiting researchers. Expect that to be on UConn Campus, they can deal with campus parking rules</i>	<i>Research space for NERR staff</i>	<i>Space for volunteers (likely as part of another facility)</i>
		<i>Outdoor Teaching Spaces</i>	
		<i>Wet lab facilities</i>	

	High Priority	Medium Priority	Low Priority
Large Facility (similar to Project O bldg)	<i>Research Labs for staff, visiting researchers. Expect that to be on UConn Campus, they can deal with campus parking rules</i>	<i>To Maintain NERR's Identity, the Center must be Standalone and NOT Shared by UConn</i>	
	<i>Outdoor teaching space</i>	<i>Dock space: I realize this is on the list above, but the existing dock space is maxed out. If the NERR will partner with Project O/UCONN for all research and education activities then no dock space needed, but if there will be a few dedicated skiffs, will need to find space</i>	
	<i>Location, location, location. Visitor Center and general public education needs to be where people have access and where they are. That's not on UConn Avery Point campus.</i>	<i>Laboratory space and equipment should complement other resources of UConn's</i>	
	<i>Visitor Center</i>	<i>Meeting space separate from Marine Sciences building</i>	
	<i>Planning for the Facility is High Priority Now -- Incl. in MP</i>	<i>Mid level/early priority: Get some exhibit, kiosk, or dedicated space in CT DEEP, Old Lyme, so NERR has visibility in its western half. Also, whatever facilities researchers need to start working</i>	
	<i>Reception office with classrooms meeting spaces Exhibit area and outdoor teaching spaces</i>		
	<i>5,000 ft sq</i>		
	<i>Dorms</i>		
	<i>Research labs for staff and guests</i>		
	<i>Lab space to maintain the SWMP</i>		
	<i>Class rooms</i>		
	<i>Ideally with access to adjacent nature area with trails in coastal forest, meadows and dune beach complexes</i>		

	High Priority	Medium Priority	Low Priority
	<i>Facility should have classrooms and exhibit area pls living quarters for visiting researchers</i>		
	<i>Satellite Classroom/meeting space for NERR at DEEP headquarters (so all spaces are not restricted to Avery Pt)</i>		
	<i>The research and teaching labs and docks access would ideally be a separate facility</i>		

15.2.9.3 Establishing a presence

At NERR locations:

- *NERR Signage on Port-o-lets*
- *Interpretive QR Codes that direct to NERR web site*
- *Signage created to posts on kiosks at state owned properties within the NERR*
- *Guided boat trips*
- *Book of trail maps and interesting sights/history*
- *Targeted outreach and ongoing interaction with multiple CT DEEP staff functions*
- *Parking at Transportation Center*
- *The CT NERR should have its own vessel*
- *Live camera feeds from above and below water to visitor center, Mystic Aquarium etc.*
- *DEEP property: dock space for NERR activities including public events*
- *Special events at all NERR locations - 'open house' for community*
- *Pamphlets/booklets left at areas; gift shops, schools, town buildings, rest stops, etc.*
- *Develop a CT NERR Story Map for distribution*
- *Advertise and post articles in local and statewide newspapers*
- *Use indigenous building materials - not pressure-treated wood that leaches toxins*

In the Community

- *Significant investment in outreach*
- *Displays on New London ferry boats*
- *NERR sponsored lecture series*
- *Rebranding New London as Renaissance City the Crossroads of Arts and Technology*
- *Kiosk or display in New London Train station*
- *Displays for libraries, schools, and town halls and community centers and senior centers senior living communities*

- *Ocean Beach Boardwalk*
- *Other state beaches along the coast*
- *Niantic Bay Boardwalk*
- *That brown sign on Interstate as is done in other states*
- *Rocky Neck State Park*
- *Harkness State Park*
- *Thimble Islands - tour boat*
- *Field Trips*
- *Kiosks or displays at Mystic Aquarium, the Maritime Aquarium and other Nature Centers and venues along the coast*
- *Eastern Point Beach*
- *Waterford Beach*
- *Dedicated Staff: people who are the 'face' of the reserve and are out there in the community*
- *Cooperative programs with municipal parks and rec departments*
- *Dedicated communications professional to manage messages & delivery to multiple communities served/covered by the NERR*
- *Guided Tours of Reserve's Features*
- *Host town meetings on conservation topics*
- *Events, presentations to town leaders, staffs, educators,*
- *Posts/Articles shared among different social medias; FB/Instagram shares from organizations involved; hashtags*
- *Reach out to local organizations and towns to post about the NERR*
- *Signs/displays in Providence & Hartford Airports (like tourist attractions/destinations, team up with Mystic Aquarium, other venues*
- *Transportation Center Thames St Exit 95 Train Station and Buss*

15.2.9.4 Parking – hopes for the future

- *Transportation Center at Thames St Exit 95 Bus/ Train and Parking*
- *Water Taxi from New London*
- *Underwater taxi!*
- *Shuttle bus or water taxi between Avery Point and Bluff Pt*
- *DEEP headquarters in Old Lyme has great meeting space and fairly ample parking.*
- *NERR mindset should not be that everything has to be at its HQ, need a presence in Lower CT River valley area*
- *Shuttle Buses from Larger Parking Areas*
- *Full Parking Lot Shuts Off Further Access to Area*
- *Permeable pavement and other sustainable features in any new parking area*
- *How can NERR partner w/new RTPEC Education Center in Old Lyme?*
- *The former Seaside Sanatorium facility (now a State Park site) might have good access and parking lot potential*
- *Use DOT traffic site to broadcast remaining capacity of parking lots*

- *New parking area at Avery Point to improve public access*
- *Digital access to NERR properties*
- *Addition of AP Campus on area public transportation routes*
- *Glass bottom monorail from larger parking areas to the NERR*
- *Water Taxi from Larger Parking Areas*
- *Adopt Disney/Universal Crowd Control Logistics*
- *Improve road access to Bluff Pt - partnership with state of CT. Possibly add parking inland of railroad and existing road becomes a hiking path*

15.2.10 Diversity, Equity, Inclusion, and Justice

Fri Mar 12, 2:30 - 5:00 PM (37 attendees)

Overview: As Reserves are committed to being engaged with their local communities, forming an understanding of the issues surrounding social equity and diversity and developing ways to address them across all aspects of Reserve operations will be necessary to collectively progress. Questions surrounding these issues will be raised during previous sessions, with this meeting devoted to hearing about others and to discuss how they can all affect Reserve programs and operations. This meeting will start with a short introduction to these issues and our goals for the meeting. Attendees will actively participate in identifying and prioritizing the proposed CT NERR activities in this arena during our first five years.

15.2.10.1 Who is working in this space in SE CT?

Justice:

- *Black lives matter*
- *We call it IDEA to put inclusivity first Inclusion diversity equity and Accessibility*
- *Accessibility critical missing component.*
- *Minority Inclusion Project*
- *Groups that have taken DEI trainings with Community Foundation of Eastern Connecticut (CFEC)*
- *Connecticut Land Conservation Council (CLCC)*
- *Connecticut Audubon Society all 4*
- *Community foundation of eastern CT (all)*
- *RiverCOG*
- *Basics: Is JEDI an offensive term?*
- *350CT*
- *CTDEEP*
- *Long Island Sound Study*
- *I think most of the groups I would put here work on all issues*
- *Public Art for Racial Justice Education (PARJE)*
- *FRESH New London*

- *SECT Coalition of Faith Leaders*
- *How do we increase various community participation in reserve mission-oriented conservation efforts and citizen science programs*
- *Hearing Youth Voices*

Equity:

- *Showing up in an underserved community to help fix an environmental problem is proactive demonstration of our intentions*
- *New London Public School System: "United in Excellence"*
- *CLCC*
- *Yale School of Forestry's Urban Resources Initiative*
- *Funding for participation (such as transportation and access to materials and equipment)?*
- *Union of Concerned Scientists: Successful Env. Equity Story*
- *Yale School of the Environment, Justice, equity, diversity and sustainability initiative*
<https://jeds.yale.edu/>
- *CT RC&D*
- *Sustainable CT*
- *Friends f CT State Parks*
- *CTDEEP*
- *Community Foundation of Eastern CT: Mentoring Program for Underserved Students*
- *Project O: Connecticut River Connections*
- *CT Sea Grant*
- *Sometimes equity means that you need to devote more time/resources to some groups; you just can't treat everyone the same*
- *RiverCOG*
- *How do we increase various community participation in reserve mission-oriented conservation efforts and citizen science programs*
- *Mashantucket Pequot Tribal Nation: All Areas (other tribes also)*

Diversity:

- *How do we increase various community participation in reserve mission-oriented conservation efforts and citizen science programs*
- *Hearing Youth Voices*
- *CT RC&D*
- *Project O: Connecticut River Connections Program*
- *CT Sea Grant*
- *Creating avenues/pipelines from predominantly black/brown schools to ongoing coastal field sciences opportunities*
- *Churches & Synagogues*
- *CLCC*
- *Friends f CT State Parks*

- *Green 2.0*
- *Can we engage in green infrastructure projects in underserved communities and further engage community members while assisting with coastal environmental solutions?*
- *Mashantucket Pequot Tribal and Museum*
- *Public Schools: all areas*
- *RiverCOG*

Inclusion:

- *How do we increase various community participation in reserve mission-oriented conservation efforts and citizen science programs*
- *Mashantucket Pequot Tribal Nation: All Areas (other tribes also)*
- *CT RC&D*
- *CT Sea Grant*
- *EMERGE CT*
- *Include business leaders*
- *NESS*
- *SECT Land Trust*
- *Friends f CT State Parks*
- *CLCC*
- *Avalonia Land Trust*
- *Mohegan Tribe*
- *RiverCOG*
- *CT College Arboretum*
- *Think outside the box on inclusivity. Make the NERR a safe space for everyone regardless of race and ethnicity*

Other?

- *Justice and Equity are Similar. CT Audubon Society has introduced Access in place of Justice. Acronym is now IDEA*
- *In many communities, Access is part of Equity. Justice is different -- words matter, something to think critically and with intention about while moving forward*
- *Most of the organizations mentioned here are not primarily focused on JEDI work - they are environmental or civic organizations that are trying to improve JEDI issues in their work. There is nothing wrong with this - it is laudable. However the NERR should be partnering with organizations that have JEDI issues at the heart of their organizational mission statements.*
- *Recognize when initiatives are performative*
- *CT roundtable on Climate and Jobs*

15.2.10.2 What should JEDI look like at the CT NERR?

Justice:

- *Working with municipal leaders to provide outreach to their ethnic underserved communities*
- *Access barriers removed*
- *Staff required JEDI training*
- *Free Transportation*
- *Not performative measures*
- *Extend the NERR to Holyoke to capture very economically depressed and diverse area, include Hartford and Middletown, Springfield*
- *Perhaps highlighting the need and benefit to engaging in solutions/conservation efforts as participating community members (reinforcing the idea that a person can help their community/participating in solutions to environmental community issues)*
- *Start with food security*
- *Marginalized communities have a seat on advisory boards/councils/friends groups*
- *Tribal involvement in drafting the management plan*
- *Include affected communities. What do they need?*
- *Are we even the group that should be asked?*

Equity:

- *Clean Air, Water and Soil for All Communities bordering the NERR*
- *Stories of environmental equity achieved by CT NERR's efforts*
- *Seeking to provide funding and opportunities in areas that have no access to programs*
- *Free Programs (subsidized by foundations)*
- *Actively promote access to the NERR in underserved communities*
- *Equitable education opportunities*
- *Redress of some historical inequities*
- *Paying enough for internships/seasonal positions so folks can afford to live and have this great experience*
- *Stipends are provided if guidance/consultation is being requested from BIPOC and other groups*
- *Include affected communities. What do they need?*
- *Are we even the group that should be asked?*
- *A safe space for all people regardless of race gender, gender identity, age, sexual preferences, religion, ethnicity, language preferences and differing abilities*
- *Universal Access!*
- *Wildlife drives for limited mobility folks*

Diversity:

- *Are we even the group that should be asked?*
- *Do not rely on black and brown voices to give answers, solutions to structural issues within environmental conservation*
- *Diverse leadership*
- *A commitment to diversity in terms of recruiting staff and stakeholders*

- *Mirror of the community*
- *Diverse friends group*
- *Provide stipends if we are requesting these answers*
- *Work with equity coaches*
- *Breaking down barriers (physical, financial, technical)*
- *Coordinating outreach and education to regional ethnic and racial underserved communities*
- *Staff are recruited from diverse backgrounds and levels of education/trades, not necessarily only marine science/conservation*
- *Reaching out to as many community members as possible*
- *Blend different cultural traditions into NERR outreach and research and with access to NERR resources*
- *Diverse advisory board needs to be used on a regular basis for major organizational decisions and not just for granting and program purposes*

Inclusion:

- *Paying enough for internships/seasonal positions so folks can afford to live and have this great experience*
- *Are we even the group that should be asked?*
- *A safe space for all people regardless of race gender, gender identity, age, sexual preferences, religion, ethnicity, language preferences and differing abilities*
- *Universal Access!*
- *Wildlife drives for limited mobility folks*
- *GLBT youth are particularly vulnerable*
- *Signage that can be read by all*
- *Bringing as many communities together as possible to increase awareness and participation in CT NERR's research /conservation efforts. This may help give them a sense of ownership of what is happening in their community by providing an outlet of participation and cohesive teamwork.*
- *Connecting non-coastal and/or city communities to NERR facilities, resources, jobs, opportunities*
- *Easy access (even without a car)*
- *Always invite all to attend with personal invitations to events and decision making*
- *Handicapped parking available*
- *Languages many*
- *Access to coastal resources*
- *Vehicle view spots for limited mobility*
- *Signs/materials not only in English*
- *Transportation*
- *Programs start with children and then attract parents*
- *Outreach/educational materials in multiple languages and plain English*
- *Accessible space without the need of personal transportation*
- *NERR is doing projects in underserved communities, e.g., community gardens*

- *Breaking down barriers (physical, financial, technical)*
- *The histories told on website and exhibit are representative of the histories of all cultures and populations, not just those that settled in the area / or are the majority population*
- *Engage BIPOC young scientists, artists and leaders*
- *Working with Local camps, summer/school programs already dedicated to serving underrepresented communities,*
- *Blend different cultural traditions into NERR outreach and research and with access to NERR resources.*
- *Lake Superior NERR has a Reserve Advisory Board member who works for Fond du Lac Natural Resources - the tribe located upstream in the estuary*
- *Inviting local racial and ethnic community groups and leaders to join NERR activities and public involvement and education activities*
- *These groups "see themselves" in the NERR, and therefore it makes sense for them to participate in public involvement and education activities*

15.2.10.3 What are other organizations doing in this arena?

Justice:

- *LISS includes Environmental Justice into its three principles of the CCMP - where it is intended to be an overarching theme in everything we do. Recently, we have started to emphasize on EJ initiatives to ultimately obtain the purpose of the principle. We have formalized our EJ Work Group (had our first meeting in February). We are currently working on building partnerships and relationships, develop objectives, actions, and desired outcomes. However, before we do this we want to make sure our process is inclusive. We are also focusing on trying to fund projects to support environmental justice initiatives (needs assessment, grants program, outreach positions) - this will be further discussed and decided upon by the Management Committee in April.*
- *Watershed-wide agreement between states and stakeholders to address DEIJ in all areas of watershed health, setting goals, benchmarks, tasks within those goals, and supporting each other as a whole system in successfully meeting those goals.*
- *Funders network to support training and strategic visioning for organizations in the region who work together to address DEIJ*
- *Prioritizing racial justice issues on grant applications being reviewed*
- *Story maps focused on environmental justice on NERR website*
- *Development of policies for awards and honors that consider the ethical standing of potential award recipients and not just their scientific merit.*
- *Reaching out to as many communities as possible, especially focusing on providing opportunities for those communities that have spoken out about lack of accessibility (holding stakeholder meetings to find out which communities don't have access).*
- *Recognizing and removing institutional barriers related to education and career development for underrepresented students and professional*

Equity:

- *If stakeholders from underserved and tribal communities participate in planning and development of this NERR, compensate them for their time. Underserved communities have less access to generational wealth and are more heavily impacted by demands of volunteer commitments*
- *<https://www.cfect.org/>*
- *Watershed-wide agreement between states and stakeholders to address DEIJ in all areas of watershed health, setting goals, benchmarks, tasks within those goals, and supporting each other as a whole system in successfully meeting those goals.*
- *Might seem small, but acquiring a beach wheelchair to make sure all students have access to field for field trips*
- *Seeking to provide funding when possible to increase attendance within underserved communities*
- *Empower learning experiences*
- *Translating materials in Spanish*
- *<https://ctmip.org/>*
- *Mentoring underprivileged students*
- *Recruiting review panels with diversity in mind*

Diversity:

- *DEI undergraduate internship to enhance experience and recruitment*
- *Seeking to increase community participation by highlighting the rich cultural history (associated within reserve boundaries) that will hopefully tie the past diverse cultures with the present ones. The idea being to gain interest by showing relevance and heritage.*
- *These should be equitably paid internships*
- *Conscious hiring*
- *Organizational commitment to staff diversity training*
- *Increase diversity on advisory board*
- *Diversity in all aspects (gender, race, background) is considered as a category when evaluating applicants for a position*
- *Diversity training focused on recognizing and overcoming unconscious bias*

Inclusion:

- *We plan to continue to offer the Coastal Perspectives lecture series online in addition to in-person, to allow greater access*
- *Providing scholarships to assist with financial needs*
- *Learning how to teach Title 1 students*
- *National DEI network visioning and ongoing conversations*
- *Staff commitment to learn about DEI with dedicated meetings (making it as important as staff meetings)*
- *Three of the New England NERRS wrote a grant to work with the schools for the deaf in each of our states (RI, MA and ME) that included teacher PD and student field trips to our sites. Funds provided for training, interpreters and field trip costs. We are now coordinating STEM virtual*

presentations, linking students with STEM professionals who are deaf for interested teachers at these schools.

- *Trying to make sure programs look like/align with the target audiences*
- *Working to meet students where they are instead of asking them to come to us both in terms of physical space and funding*
- *Organizational commitment to staff diversity training*
- *Stakeholder meetings to gauge community needs and increasing opportunities and access to current programs*
- *Inclusive citizen science activities build bridges across SECT*
- *A clear and visible DEI statement*
- *Engaging DEI experts in targeted conversations*
- *Quantifiable DEI goals*
- *Staff holding each other accountable to DEI principles*

Other:

- *Reaching out to other organizations that represent minority groups (income, race, age, handicapped, etc.) and inviting them to participate and asking for their opinions. It was also an important take away from a presentation given by one of these groups whose parting comment was just invite us with an open mindedness and heart - that's the most important thing.*
- *NESS - engages underrepresented communities (especially within New London county) with marine science and sailing educational opportunities both in the classroom and on the water. We have a scholarship fund to assist schools with financial need, an AmeriCorps programs that focuses on serving underrepresented student, and we have an active DEI team that plans workshops for staff and meaningful conversation on DEI topics*
- *The Connecticut Audubon Society is serious about diversifying our audiences, board, and staff. We have developed an IDEA action plan to help guide us.*
- *CFEC has great training in "DEI"*
- *Staff work plans and salary should reflect JEDI work*
- *Reach out to CFEC to see if some diversity plans could be shared?*

15.2.10.4 Goals:

Consider this question: The year is 2027. The news headlines praise your program for the impact you have had. What does the headline say?

Justice:

- *Urban parks included within NERR boundaries*
- *Mckinney partnership in New London benefits community and pollinators alike*
- *Estuary center hosts urban interns for summer experience of a lifetime*
- *New national park established in Hartford thanks to NERR*
- *NOAA's NERRs are place-based leaders in connecting communities to their special places*
- *Conte Refuge announces new Urban National Wildlife Refuge Partnership area in NERR*
- *Estuary Center partners for NERR and the Florence Griswold museum on traveling bird art exhibit*

- *NERR increases test scores in Title 1 schools*
- *CT NERR partners with tribes to improve youth access to Long Island Sound*
- *NERR provides more public access to CT's shoreline*
- *USFWS and Hartford announce new Conte division in Hartford floodplain*
- *Maromas Connecticut's First Urban National Wildlife Refuge*
- *Paddlers trail brings students from Holyoke to Old Lyme for Ultimate estuary experience*
- *21st Century Science, It's application locally, builds resilient coastal areas in vulnerable communities*
- *Citizen science projects changing community perspectives on effective environmental solutions*
- *Millions of people from around the world visit this thriving estuary*
- *Students bring parents along in Pride of the regional culture. Use Science to understand how to protect what they love.*

Equity:

- *CT NERR provides career training to underserved youth*
- *Resiliency to climate change significantly enhanced in underserved communities*
- *CT NERR provides estuary research opportunities to minority students in underserved communities*
- *NERR mobile learning center and touch tank visits k - 8 schools all over CT*
- *Green infrastructure in urban areas are proving valuable in reducing coastal flooding*
- *The CT NERR provides a pipeline to careers in environmental science and outreach.*

Diversity:

- *CT NERR provides career training to underserved youth*
- *Resiliency to climate change significantly enhanced in underserved communities*
- *CT NERR provides estuary research opportunities to minority students in underserved communities.*
- *NERR mobile learning center and touch tank visits k - 8 schools all over CT*
- *Green infrastructure in urban areas are proving valuable in reducing coastal flooding*
- *The CT NERR provides a pipeline to careers in environmental science and outreach*
- *High school students from around the region support the NERR's community-based monitoring program, building experience and claiming stewardship of their environment*
- *Cinco De Mayo celebrated at CT NERR with the arrival of river herring, horse shoe crabs, and shore birds*
- *The many faces of stewardship: tribal, faith-based, multi-generational, governmental, urban and coastal*
- *Increase in community participation directly correlating to reserve support as well as benefits to the community*
- *CT NERR interns/fellows have reunion panel to discuss their careers in environmental stewardship/STEM*

Inclusion:

- *CT's urban communities celebrate the CT NERR*

- *Paved pathways and beach boardwalks open the Connecticut River natural areas to all (specifically referring to mobility issues)*
- *Local faith groups participate in CT NERR programs*
- *Senior center sponsors NERR's community outreach program*
- *CT NERR CTP trainings have helped area environmental organizations meet their goals and increase staff knowledge/capacity*
- *By working with local partners, the CT NERR facilitates access to the shoreline and waters of LIS to thousands each year.*
- *Student and public participation (through citizen science and conservation projects) proving beneficial to estuarine science*

16 Appendix D: Frequently Asked Questions

Taken from material created in support of the CT NERR Site Nomination Public Meeting held on Tuesday November 13th, 2018 from 6:00 pm to 8:00 pm in the second floor Auditorium of the Academic Building at the University of Connecticut's Avery Point Campus in Groton CT

QUESTION: *What is the National Estuarine Research Reserve System?*

ANSWER: The National Estuarine Research Reserve System (<https://coast.noaa.gov/nerrs/>) is a network of protected areas representative of the various biogeographic regions and estuarine types in the United States. Reserves are established for long-term research, education, and interpretation to promote informed management of the nation's estuaries and coastal habitats.

QUESTION: *What programs and benefits do research reserves offer?*

ANSWER: Reserves apply science and education to improve the management of estuaries. They do this by working with communities to address natural resource management issues, such as nonpoint source pollution, habitat restoration and invasive species, on a local scale. Each reserve brings together local stakeholders, scientists, land management professionals, and educators to understand coastal management issues and generate local, integrated solutions.

In addition to collecting and disseminating nationally and locally relevant data, reserves also provide the trainers and educators needed to bring the reserve-generated data and information to local citizens and decision makers. Reserves further benefit their surrounding community by leveraging existing NOAA resources and bringing in additional federal funding that is only available to designated Reserves. Here are some key facts compiled in 2017 by the National Estuarine Research Reserve Association (www.nerra.org), a non-profit Reserve advocacy group:

- Reserves protect more than 1.3 million acres of coastal and estuarine lands that provide flood protection, keep water clean, sustain and create jobs, support fish and wildlife, and offer outdoor recreation.
- Every year, programs offered at reserves attract more than a half a million visitors, and educate approximately 85,000 students and 3,200 teachers.
- Decision makers from more than 2,500 cities and towns and 570 businesses benefit by reserve-based science and technical expertise nationwide each year.
- Reserves leverage additional funding for their surrounding communities. In some states, this can be as much as \$1.5 million.
- Reserve protection and management of estuaries keeps commercial and recreational fishermen successful. The national system contributes billions of dollars to the shellfish and seafood industry in states with a reserve, and tens of billions of dollars in ocean-dependent industries.

QUESTION: *How many reserves are in the national system, and where are they located?*

ANSWER: There are currently 29 reserves across 24 different U.S. states and territories. The most recent addition to the Reserve System was in January 2017, when the state of Hawaii designated the only reserve in the Pacific Islands. While all thirty-five coastal and Great Lakes states and U.S. territories are

eligible to designate a reserve, Connecticut and Louisiana are the only saltwater coastal states in the country lacking a National Estuarine Research Reserve.

QUESTION: *What is the difference between a National Estuarine Research Reserve and a National Marine Sanctuary?*

ANSWER:

- **Statutory Authority:** Reserves are established under the Coastal Zone Management Act, while Sanctuaries are established under the National Marine Sanctuaries Act.
- **Ecosystem Components:** Reserves generally consist of state lands and waters and may include uplands, beaches and dry land associated with the estuaries. Sanctuaries may include state and federal waters and the submerged lands under them but do not include any dry land.
- **Management:** Reserves are operated by a state in partnership with NOAA's Office for Coastal Management under a 70-30 federal-state funding match for annual operations support using cooperative agreements. Sanctuaries are managed by NOAA's Office of National Marine Sanctuaries under federal protection.
- **Regulations:** While Sanctuaries may establish new limitations on permissible activities within their boundaries (e.g. take limits, harvesting exclusions), the activities within a Reserve are governed by existing state laws and regulations. In short, the establishment of Reserve does not create federal prohibitions that overrule State control of land and water areas. For example, no one would need to obtain a new permit to fish within a site at the reserve; existing state-wide licenses and permits issued by CT DEEP would suffice.

Although the systems do defer in their underlying legislation and management structure, they serve similar goals of place-based conservation, fostering science-based management, and working on the ground with local communities. Both housed within NOAA's National Ocean Service, these programs are increasingly working together to share lessons across the two systems.

QUESTION: *What is the difference between the nomination and designation of a National Estuarine Research Reserve?*

ANSWER: Designation officially recognizes the site as a reserve in the National Estuarine Research Reserve System, while nomination simply starts the formal process to develop the information necessary for NOAA to make its decision regarding whether to designate this site as part of the System. Nomination of a reserve requires the governor of a state or territory submit a nomination of a proposed site to NOAA for consideration. The nomination package must include a detailed site selection process and a description of the public participation process used to support site selection. Designation of a reserve is only considered after an environmental review is completed under the National Environmental Protection Act, and a management plan is developed for the proposed site.

QUESTION: *Why is Connecticut nominating a reserve?*

ANSWER: Connecticut is one of only two salt-water states in the nation without a designated Reserve. A Connecticut-based Reserve could complement and extend the scientific, educational, and stewardship activities and needs of programs like the USEPA National Estuary Program (Long Island Sound Study), the

Connecticut Coastal Management Program, the Connecticut Sea Grant office, and various academic institutions through the addition of funding, resources, and expertise. Additionally, it could enable new directions and initiatives by leveraging nation-wide programs. The health of the Sound's ecosystem and the many human uses that depend on it would benefit from establishing a Reserve.

QUESTION: *Will the state have to purchase land for a Connecticut reserve?*

ANSWER: No. Connecticut is considering sites from existing publicly owned lands consisting of state owned property and adjacent public trust waters. Municipal and non-profit property may be considered, and could be part of a reserve through a cooperative agreement with the State.

QUESTION: *Will a new reserve involve NOAA taking land from the State?*

ANSWER: NOAA does not own or manage the land within a reserve, nor does the designation of a reserve add new state or federal regulations. Memoranda of Agreement are used to articulate roles and responsibilities between relevant partners and landowners in the state, and NOAA.

QUESTION: *If the reserve site is designated, will there be restrictions to the existing cultural, recreational or commercial activities that occur in the area?*

ANSWER: No. Designation of a research reserve site does not preclude existing uses and does not result in the total preservation of the area. Each reserve develops a management plan which takes into consideration the beneficial consumptive (resource harvesting such as hunting, fishing, shellfishing) and non-consumptive uses (recreational activities such as hiking, birdwatching, biking) and the compatibility with adjacent land uses.

QUESTION: *Will a reserve bring more federal rules and regulations?*

ANSWER: No. Reserve designation does not add any new regulations. As part of the site designation process, NOAA will examine whether a proposed site is adequately protected for long-term research and education by existing state authorities. There are no new federal regulations imposed as a result of reserve designation.

QUESTION: *What is the process for nominating a reserve in Connecticut?*

ANSWER: The process for nominating a National Estuarine Research Reserve involves several steps and many individuals and organizations. Reserves are based on partnerships, with NOAA serving as the lead federal partner. The Connecticut designation process is being led at the state level by the Connecticut Department of Energy and Environmental Protection (CTDEEP), working closely with the University of Connecticut and Connecticut Sea Grant. These partners formed several teams to support the designation process, which researched various sites to consider for nomination and then scored the sites based on identified criteria. After seeking input from affected landowners on the highest ranking sites, CTDEEP identified a final site and is coordinating a site selection package to submit to NOAA for review.

QUESTION: *Who is funding the nomination process?*

ANSWER: Once NOAA determines that it can accept a new nomination, the lead state agency may submit an application to NOAA for predesignation assistance funding (70 federal/30 state match requirement). A state is eligible for a total of \$100,000 in federal funds for predesignation activities, which include site selection, a limited basic characterization of the physical, chemical, and biological characteristics of the site, preparation of the required management plan, and providing data and

information to NOAA for development of the draft and final Environmental Impact Statements. To date, Connecticut has received \$48,000 of predesignation assistance. The state is using these funds to finalize its site selection process.

QUESTION: *Is there funding for the reserve program in the FY 2019 President's Budget?*

ANSWER: No, the FY 2019 President's Budget does not include funding for the National Estuarine Research Reserve System. However, the Reserve System continues to receive strong Congressional support. The FY 2019 House mark increased funding to \$27 million, and the Senate FY 2019 mark increased funding to \$27.5 million.

QUESTION: *What criteria must a proposed site meet to be eligible to nominated as a research reserve?*

ANSWER: Reserve sites are chosen to reflect regional variations and ecosystem types, termed "biogeographic regions," and unique estuarine habitat features within each biogeographic region. NOAA will give priority consideration to designation proposals that establish a reserve in a biogeographic region or sub-region that is not currently represented by the Reserve System or that incorporates unique habitat types that are not represented by the system. NOAA would also evaluate the site based on whether it would be adequately protected for long-term research, education, and stewardship.

QUESTION: *Where is the proposed site located in Connecticut, and what are the proposed boundaries?*

ANSWER: The proposed site is comprised of the following state-owned properties: Lord Cove Wildlife Management Area; Great Island Wildlife Management Area; Bluff Point State Park, Coastal Reserve and Natural Area Preserve; Haley Farm State Park; and the public trust portions of waterbodies defined by:

- (a) Long Island Sound ranging approximately west to east from the mouth of the Connecticut River to Mason's Island and north to south waterward of the mean high water shoreline to just shy of the Connecticut state boundary in Long Island Sound;
- (b) the area waterward of the mean high shoreline of the lower Thames River from approximately the Gold Star Bridge south to the area described in (a);
- (c) the area waterward of the mean high shoreline of the lower Connecticut River from approximately Lord Cove south to the area described in (a).

The proposed land and water boundaries are subject to input from the public and other stakeholders, and will be refined during the nomination and DEIS/DMP development phases.

QUESTION: *How can I learn more about this site and the nomination process?*

ANSWER: The state, in conjunction with NOAA, will hold a public meeting in the vicinity of the site being considered. The meeting will be publicized in a local newspaper and in the Federal Register at least fifteen (15) days before being held. More information on the Connecticut nomination process can be found on CTDEEP's website: www.ct.gov/deep/nerr

QUESTION: *If I am unable to attend the public meeting, can I submit a written comment on the proposed Reserve nomination?*

ANSWER: Written statements by interested persons and organizations on the proposed site may be sent to Kevin O'Brien, Connecticut Department of Energy and Environmental Protection - Land & Water Resources Division, 79 Elm Street, Hartford, CT 06106-5127 or to: kevin.obrien@ct.gov. The deadline is

no later than seven (7) days following the public meeting. All comments received will be considered by the State in formally nominating a site to NOAA.

QUESTION: *After the meeting, what are the next steps in the nomination process?*

ANSWER: After the meeting, the state would be expected to submit final site-selection documents. NOAA may request additional information or suggest changes to the nomination. The governor would submit to the NOAA Administrator a nomination letter identifying the proposed site and confirming the lead state agency. NOAA then reviews the site-selection document and sends a letter to the governor accepting or rejecting the nomination.

QUESTION: *If NOAA accepts the state's nomination, when could a reserve be designated?*

ANSWER: Should NOAA accept the State's nomination, it would kick off NOAA's development of an environmental impact statement to consider the State's recommended site and other options; the State's development of a *Draft Management Plan* for NOAA's review; and additional public meetings and opportunities for public comment. This could take 12 to 24-months.

QUESTION: *Does the NERR designation process relate to the Connecticut Blue Plan?*

ANSWER: The Connecticut "Blue Plan" (www.ct.gov/deep/lisblueplan) is a spatial plan to guide future use of Long Island Sound's waters and submerged lands, driven by state legislation that called on the Connecticut Department of Energy and Environmental Protection to inventory the Sound's natural resources and uses. Though separate processes, it is anticipated that the certain elements of Blue Plan and a reserve management plan could potentially benefit from and inform each other.

17 Appendix E: Evaluation of Objectives and Strategies for the CTP

Our process for determining goals, strategies, and actions for the proposed CT NERR CTP program was guided by the results of a listening session conducted with local and regional experts from academic, government, non-profit, and private sector organizations who are interested in and/or involved in this, or other nearby NERR programs (*see Appendix C*). The results of this listening session were distilled, and the emergent ideas captured to see how the CTP can best identify objectives to meet reserve goals.

The first step of this process was to identify which organizations working in the area already exist, and what these organizations are doing (Figure 16-1). Participants identified a wide range of organizations already offering some form of environmental training, ranging from local and municipal governments, to private agencies, but the most common types of organizations identified were non-profits; ranging from very large global organizations (e.g., The Nature Conservancy) to small local grassroots groups (e.g., CT River Conservancy, CT Audubon), academic or university sponsored organizations (e.g., Project Blue, CIRCA, CLEAR), and government organizations. Although some groups specialized in a specific form of training (e.g., field based, economic, or technical services) most groups were cross cutting, working across the disciplines. Many of these groups also participate in research and monitoring, and education related initiatives, and this, will be valuable partners to the proposed CT NERR. Given limited resources, it is important for proposed CT NERR, especially in early phases, to work closely with partner organizations to refine and amplify the work already being done, rather than duplicating established efforts.

The listening sessions also identified priority training topics within the broad focuses of climate change, habitat, and water quality, though here again, many of the identified topics are cross cutting (Figure 16-2). As the proposed CT NERR is ramping up activities, it is important to tie training back to these priority needs, in order to engage the local community in meaningful ways and encourage priority topics which center around the ideas of smart and sustainable growth, urban ecology, and community resilience.

Who is Doing What?

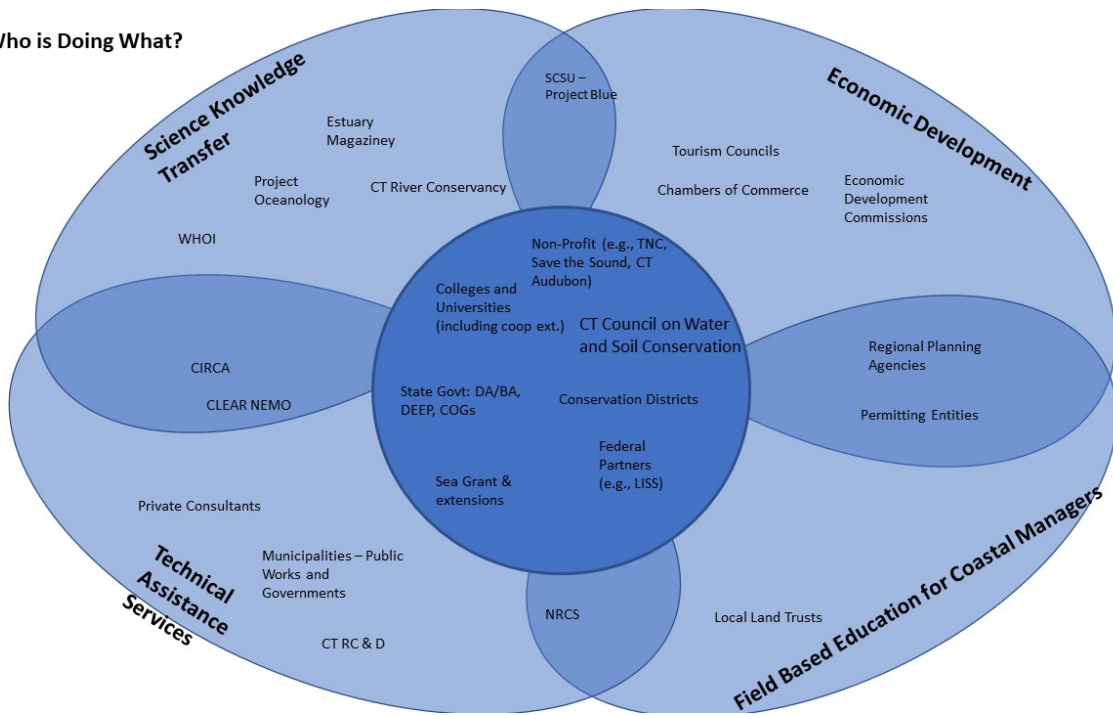


Figure 16-1: Who's doing What in the Proposed CT NERR
 Results captured on the Mural Board, during the listening sessions dedicated to CTP.

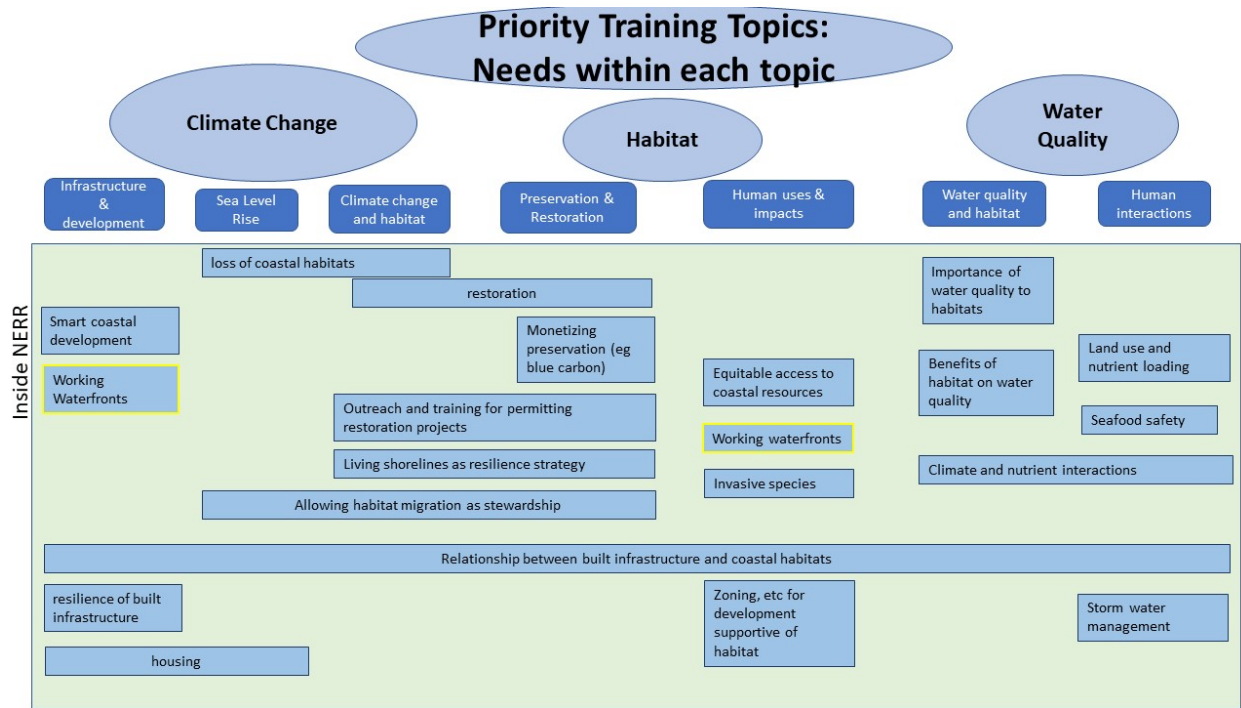


Figure 16-2: Priority Training Topics for Proposed CT NERR
Results captured on the Mural Board, during the listening sessions dedicated to CTP.

The information presented was synthesized into required elements for reserve success (Figure 16-3), and these elements were further subdivided by category and timeframe into required elements (e.g., forming an advisory committee, identifying and engaging partner organizations, engaging in NOAA required outreach), elements whose implementation would be desirable, but not compulsory within the first 5 years (e.g., multilingual training, designing field trips to improve the scope and reach of the NERR), and elements which are aspirational goals, unlikely to be accomplished within the 5 years of this strategic plan, but which guide the long term vision of the proposed CT NERR (e.g., constructing a visitors center, offering degree/certificate programs, etc.).

Using these brainstorming tools as guidance, we proceeded to distill this information into pertinent objectives, and the strategies and actions necessary to implement them for the proposed CT NERR.

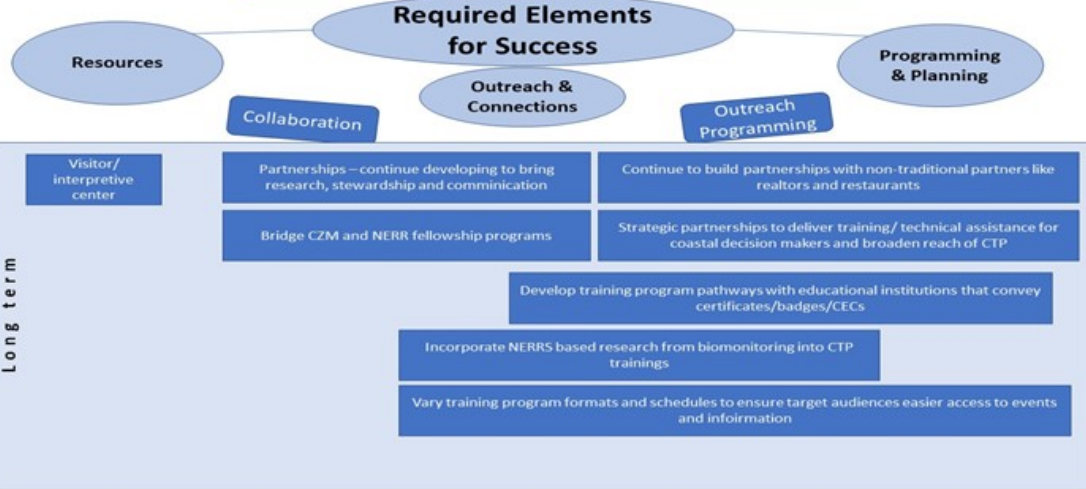
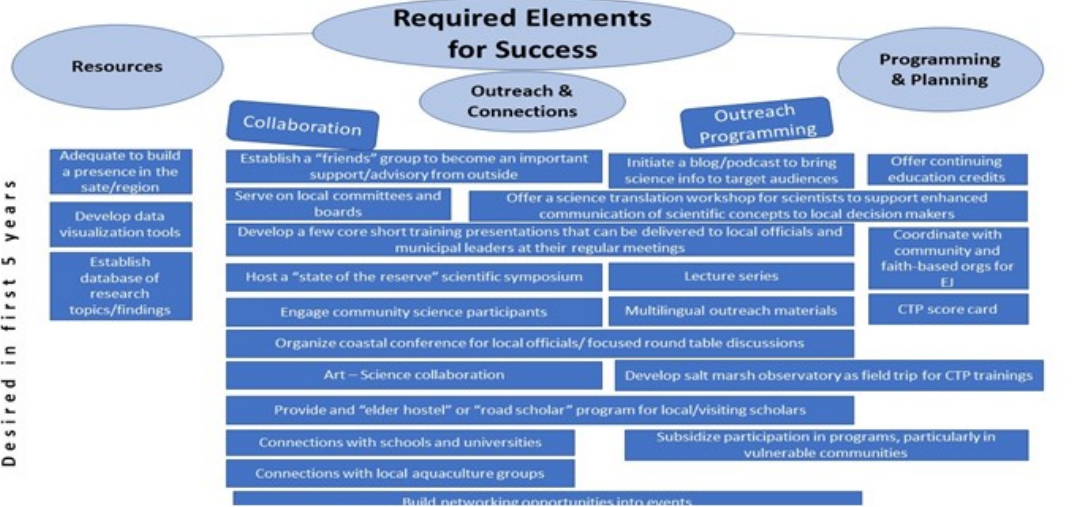
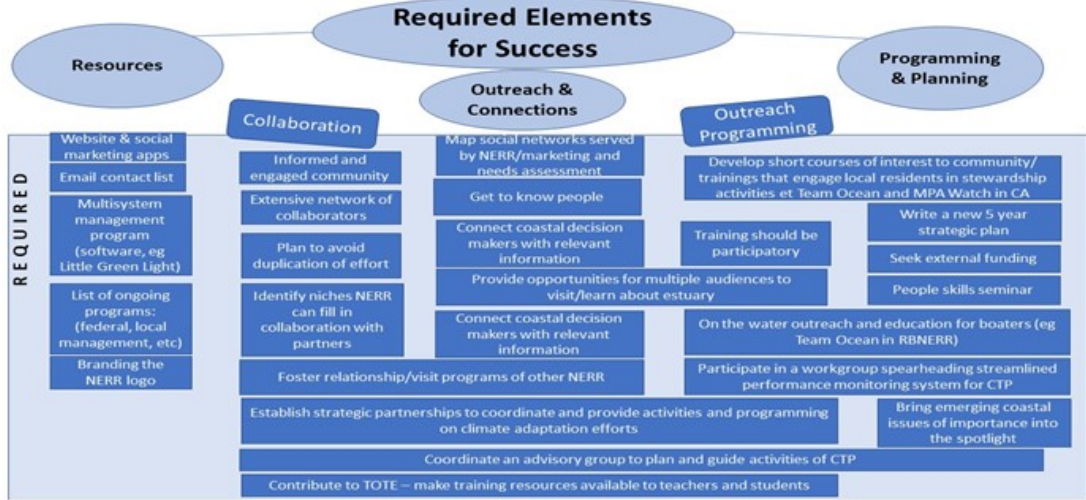


Figure 16-3: Required, Desired, and Long-term Elements for Reserve Success
 Results captured on the Mural Board, during the listening sessions dedicated to CTP.

18 Appendix F: Exploring Collaboration for the Proposed CT NERR

In the following non-exhaustive list of entities, a table indicating core competencies of each organization is included. While an organization may be involved in activities related to each of the four core areas identified, only activities that were sustained, substantial, and conducted by the organization (not through partnerships) were considered. This list is referenced in *Chapter 11*.

R	E
T	S

R = research and/or monitoring activities

E = education activities, both formal and informal, student and adult learners

T = coastal training activities targeted at municipal and political leaders and decision makers

S = stewardship activities, including resource manipulation and restoration, mapping activities, and work with species protection and rehabilitation

The following two entities are material partners in the proposed CT NERR, included in the MOA with NOAA and providing financial and material support for agreements covered by the MOA.

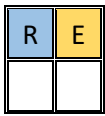
R	E
T	S

Connecticut Department of Energy and Environmental Protection (DEEP) as a key partner and landowner of most properties in the proposed CT NERR is critical in providing and regulating access to sites in addition to coordinating permitting and data consolidation efforts with ongoing efforts. Connecticut DEEP conducts Long Island Sound-wide monitoring, occurring on a monthly basis year-round and twice monthly during the summer periods of intense hypoxia. Connecticut DEEP also supports fresh water monitoring throughout the watershed, including running the Riffle Bioassessment by Volunteers (RBV) program. Connecticut DEEP supports wildlife habitat management and research, and where necessary resource restoration for tidal marshes, riverine migratory corridors and connections, and invasive species control. The Connecticut DEEP also hosts the Connecticut Coastal Management Program, which in addition to regulatory and restoration roles, also provides outreach, education, and training to coastal municipalities and other groups and organizations on coastal-related issues.

R	E
T	S

University of Connecticut (UConn) is a key partner that will administer the programmatic funds from NOAA to operate the proposed CT NERR and provide matching support. UConn will also provide facilities and access to support infrastructure. As a top-ranked research one (R1) university, UConn enrolls more than 32,000 students who seek answers to critical questions in classrooms, laboratories, and the community. A culture of innovation drives this pursuit of knowledge throughout the University's network of campuses. Several UConn Centers and Departments will be involved in the day-to-day activities of the proposed CT NERR (see below). By leveraging the talent of top-tier students and globally renowned faculty members the proposed CT NERR will be able to carry out its mission of research, education, training, and stewardship.

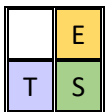
In alphabetical order, additional agencies and organizations actively participating in the designation process and potential partners in research, education, or training include:



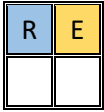
Avery Point Campus (AP, UConn) is one of four regional campuses of the University. Established in 1967 on Long Island Sound at the mouth of the Thames River, UConn AP inspires students with specialized programs that take advantage of the waterfront location and delivers an exceptional education in traditional areas of study. The campus is located at the heart of the proposed CT NERR and its proximity to Long Island Sound provides access to numerous coastal environments. The AP campus along with the Department of Marine Sciences (see below) will provide space for the proposed CT NERR and access to facilities and support infrastructure.



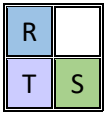
Center for Land Use and Education Research (CLEAR, UConn) is a UConn center that is aligned with proposed CT NERR goals in that it provides resources and outreach opportunities for informed land use planning and preservation. CLEAR has produced open-source CT GIS mapping resources that help inform planning, identify areas of risk, and span both the natural environment in addition to human demographics. This will be an important potential partner and resource for the proposed CT NERR mapping efforts both at the core sites and upstream from sites when evaluating indirect impacts. In addition, CLEAR offers training to coastal managers and broader local communities in support of management decisions and stewardship. This Center also hosts workshops and webinars on land use, water quality, and climate, reaching many of the traditionally targeted audiences and delivering material on topics included in the Education and CTP NERR programs



Connecticut Audubon Society (CAS) and Roger Tory Peterson Estuary Center (CAS-RTPEC) - The Connecticut Audubon Society conserves Connecticut’s environment through science-based education and advocacy focused on the State’s bird populations and habitats. Founded in 1898 as an independent organization, it operates nature facilities and centers across the State of Connecticut as well as managing 20 wildlife sanctuaries encompassing almost 3,300 acres of open space. In 2018, CAS received the 2018 Dr. Abeles Science Advocate award from the Connecticut Science Teachers Association and Supervisors for a long-term, outstanding commitment to science education in Connecticut. The Connecticut Audubon Society Roger Tory Peterson Estuary Center serves the region of Southeastern Connecticut including the Connecticut River Estuary, its shoreline, and the watershed. The Estuary Center is currently the primary organization operating programs in the salt marshes and adjacent upland habitats located along the lower Connecticut River watershed. It delivers environmental science programs to over 3,500 students annually, and it also offers professional learning experiences for teachers, some in collaboration with Project Oceanology. The Roger Tory Peterson Estuary Center currently provides both in-person and distance-learning environmental programs to over 5,000 youth and adults and conducts research on aquatic vegetation and invasive species in the CT River Watershed. The Estuary Center is the newest CAS center; it is planning to grow its programs in both audience and scope over the next five years.



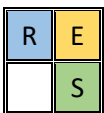
Connecticut College is a regional undergraduate and graduate higher education institution located in New London with educational and research programs involving marine and coastal environmental science. Researchers at Connecticut College have been active in development of management plans for Connecticut marshes and research in marshes, mapping of invasive species, eelgrass research, and shellfish research. The Connecticut College Arboretum is active in stewardship and educational programs targeted at general audiences.



Connecticut Institute for Resilience and Climate Adaptation (CIRCA, UConn), located on the Avery Point campus, is a UConn Center that offers both a focus on the vulnerability of coastal regions amidst a changing climate and rising sea levels in addition to providing funding and fellowship opportunities that may enhance proposed CT NERR research and educational opportunities. CIRCA has a strong focus on serving the training needs of local communities through direct consultation with land use managers and coastal policy makers, especially on topics related to climate impacts on local communities.



Connecticut Sea Grant (CTSG, UConn) is a state and federal partnership dedicated to achieving healthy coastal and marine ecosystems and consequent public benefits by supporting integrated locally and nationally relevant research, outreach, and education programs in partnership with stakeholders. Connecticut Sea Grant is headquartered at the University of Connecticut's Avery Point Campus and is already well established as a resource for local civic, business, and industry leaders interested in marine resources. Connecticut Sea Grant is strongly focused on stewardship and sustainable development of marine resources, and on building networks of stakeholders to support its work; these present potential points of synergy with the proposed CT NERR coastal training program. Connecticut Sea Grant supports coastal and marine research that include natural and social sciences through its biennial omnibus research competition, provides start-up funding to kick start good ideas through its program development funds, and jointly manages the biennial research competition of the Long Island Sound Study. The program maintains comprehensive email listservs to disseminate research and professional development opportunities to a diversity of researchers across the state. Connecticut Sea Grant programs which address environmental literacy “from K to Gray”, reached 1,951 K-12 students through hands on professional development opportunities for 52 teachers last year through its Long Island Sound Mentor Teacher program, and engaged 1,241 individuals through informal education opportunities.



Department of Marine Sciences (DMS, UConn) is located on the Avery Point campus, and is a leading resource for monitoring, analysis, and modelling of coastal environments. Within DMS, faculty, staff, and students carry out cutting-edge research using observations and numerical models to conduct cross-disciplinary investigations in biological, chemical, physical, and geological oceanography. The interdisciplinary nature of the department brings a wealth of resources to the proposed CT NERR, including ship operations, scientific diving and certification opportunities, a machine shop, and numerous seawater and dry

laboratory facilities. Additionally, DMS is home to the Long Island Sound Integrated Coastal Observing System (LISICOS) which is a series of buoys and sensors deployed at several locations throughout the Sound. The system continually monitors water quality parameters, weather, wave, and chlorophyll data. The department, along with the Avery Point campus, will provide space for the proposed CT NERR and access to facilities and support infrastructure.



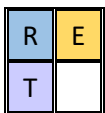
Long Island Sound Study – USEPA National Estuary Program a partnership formed in 1985 between USEPA, New York, and Connecticut consisting of federal and state agencies, user groups, concerned organizations, and individuals dedicated to restoring and protecting the Sound. Across the nation NEPs and NERRs often overlap geographically and in terms of their visions and missions and in Connecticut this no exception, with aligned interests in water quality and monitoring, protecting, and restoring habitats, and public engagement and education.



Mystic Aquarium is a partner in the UConn National Science Foundation’s Research for Undergraduate Students (REU) and has an ongoing research program committed to the knowledge and protection of aquatic species. The Aquarium conducts educational programming at Bluff Point State Park and provides educational opportunities, both formal and informal, to many aquarium visitors annually. The Aquarium runs a marine mammal stranding program, responding to calls along the Connecticut and Rhode Island coastline.



New England Science and Sailing (NESS) is a non-profit organization with a mission to empower students with a love of learning through ocean based experiential programs that serve schools, teachers, and families. NESS offers a unique education model that is structured around four core values – personal growth, inclusiveness, stewardship, and experiential learning. NESS is the first, and only, program of its kind to be accredited by New England Association of Schools and Colleges (NEASC). In addition to educating thousands of students per year through in-school, outdoor, and online lessons, NESS also hosts AmeriCorps members as part of the NESS-SEA AmeriCorps program which provides underrepresented youth in New London County with access to STEM-based education programming and classroom support. NESS is a participating organization in the Unified Water Study (UWS) and monitors the ecological health of Stonington Harbor and Alewife Cove. NESS also promotes environmental stewardship through community events and is an active member of nitrogen loading workshops. NESS and the CT NERR have many potential avenues of collaboration through education, research, and stewardship.



Project Oceanology is a year-round 501(c)3 nonprofit association of schools, colleges, and other educational institutions, and its core mission since 1972 has been to nurture interest and inspire enthusiasm for science and for our planet’s marine environment. It involves students, teachers, and members of the general public in long-term environmental monitoring projects, including water quality and trawl-based surveys in the Thames River mouth (Snyder et al. 2019), a harbor seal monitoring program, and a gull rookery monitoring program conducted in collaboration with Avalonia Land Trust. Project Oceanology offers

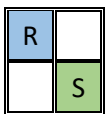
hands-on, inquiry-based marine science education to students, teachers, and the public aboard the R/V Envirolab, from a fleet of Carolina skiffs, on the shore, or in laboratories and classrooms. Project Oceanology regularly works in both the Thames River and Connecticut River portions of the proposed CT NERR, and serves more than 20,000 K-12 students, college students, and community members annually. In addition to K-12 and public education programs, it regularly holds CT Next Generation Science Standards (NGSS) focused professional learning opportunities for local teachers, alone or in collaboration with other local non-profits including the Roger Tory Peterson Estuary Center and New England Science and Sailing, and contributes regularly to floating workshops for environmental professionals and civic leaders through the Thames River Basin Partnership.



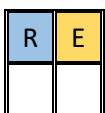
Save the Sound is a 501(c)3 organization whose mission is to protect and improve the land, air, and water of Connecticut and Long Island Sound through legal and scientific expertise that bring peoples together to achieve results that benefit our environment for current and future generations. Among many overlapping areas of addressing climate impacts and land conservation within the Long Island Sound watersheds, a notable nexus with the proposed CT NERR is the Unified Water Study (UWS), that is coordinated by Save the Sound and brings together dozens of monitoring groups in measuring the ecological health of their local bay, cove, or harbor.



The Nature Conservancy (TNC): The Nature Conservancy is a global environmental nonprofit working to create a world where people and nature can thrive by working to conserve the lands and waters on which all life depends. In Connecticut, TNC is a frequent collaborator in climate change related topics and along with DEEP, CT Sea Grant, and UConn, was instrumental in developing the Long Island Sound Blue Plan, Connecticut’s first marine spatial plan.



United State Geological Survey (USGS) through the New England Water Science Center located in Connecticut, is a scientific organization with neither regulatory nor developmental authority; their sole product is impartial, credible, relevant, and timely scientific information, equally accessible and available to all interested parties. They provide information about the occurrence, distribution, quantity, movement, and chemical and biological quality of New England’s surface water, groundwater, bays, and estuaries. Areas of focus for monitoring and studies include, but are not limited to: stream gaging, groundwater levels, surface-water hydraulics and flood inundation, surface-water quality, groundwater contamination, watershed dynamics, urban hydrology, integrated computational modeling, statistical hydrology, geospatial analysis, mapping terrestrial and subaqueous soils, and coastal studies.



University of Connecticut – Additional Centers, Programs, and Departments:

Center for Environmental Sciences and Engineering (CESE) supports multidisciplinary research that bridges the basic and applied sciences, including its Analytical Laboratories that provide a broad range of services for analyzing environmental organic and inorganic

materials, including metals and biocides, pesticides, herbicides, cyanotoxins, and pharmaceuticals.

Maritime Studies Program, located on the Avery Point campus, brings historical, social, and literary context to the proposed CT NERR. The opportunities within this interdisciplinary program will enhance the proposed CT NERR experience and generate educational opportunities for students and scholars.

Department of Geography provides resources and training for GIS and remote sensing applications. The program is broadly represented at both Avery Point and Storrs campuses.

Department of Ecology and Evolutionary Biology brings fundamental ecological and diversity principles and associated student and scholarly opportunities.

Department of Natural Resources and the Environment bring essential resources that include forest, wildlife, and fisheries management, water resources, tidal wetland research, micrometeorology, wetland conservation, soil, and aerial photographic imagery.

Department of Pathobiology and Veterinary Science brings expertise in aquatic animal health, including faculty research and the unique expertise of the Connecticut Veterinary Diagnostic Laboratory housed within the department.