

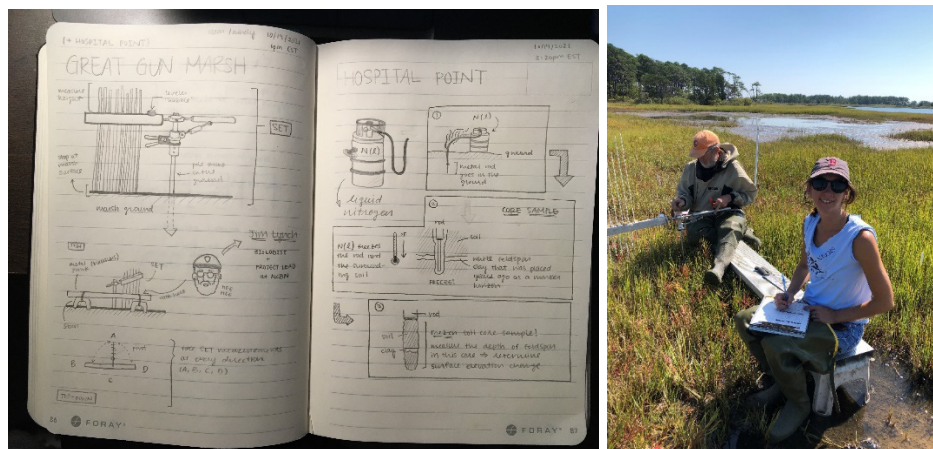
NORTHEAST COASTAL AND BARRIER NETWORK (NCBN)

FY2022 Annual Report



NCBN Parks:

Assateague Island National Seashore (ASIS), Cape Cod National Seashore (CACO), Colonial National Historical Park (COLO), Fire Island National Seashore (FIIS), Gateway National Recreation Area (GATE), George Washington Birthplace National Monument (GEWA), Sagamore Hill National Historic Site (SAHI), and Thomas Stone National Historic Site (THST)



(NCBN Staff Photos: Bridget Ye, Holly Plaisted and Jim Lynch and Bridget's handwritten field book!)

Application of the Northeast Coastal and Barrier Network's long-term monitoring datasets consistently provides the basis for new and ongoing research, revealing evidence of both biological and physical change in coastal ecosystems, not only in the parks but in resources at the local, state, national, and international levels. Our valuable long-term datasets continue to aid scientists and managers in understanding coastal park systems and how they are changing.

NCBN FY2022 Highlights

1. The following two papers are a result of the application of our long-term data related to tidal marsh elevation change and seagrass loss, and their applicability to understanding change and conditions across multiple scales.
 - NCBN monitoring protocol lead, Jim Lynch, co-authored a manuscript with colleagues using sediment elevation table (SET) data from coastal worldwide, including NPS Inventory and Monitoring Program data on global trends in marsh elevation change in relation to sea-level rise. The work was accepted and published in the journal Science. Constraints on the adjustment of tidal marshes to accelerating sea level rise. <https://pubmed.ncbi.nlm.nih.gov/35901146/>
 - NCBN monitoring protocol lead, Holly Plaisted, is the lead author on a recently published paper in the journal, Frontiers in Marine Science. The paper is titled, Influence of Rising Water Temperature on the Temperate Seagrass Species Eelgrass (*Zostera marina* L.) in the Northeast USA. The paper's authors provide findings that suggest vulnerability in eelgrass meadows of the Northeast USA and emphasize the value of unified approaches to seagrass monitoring, conservation, and management at the seascape scale. <https://www.frontiersin.org/articles/10.3389/fmars.2022.920699/full>
2. Robin Baranowski was the recipient of the 2022 IMD Safety Award! Robin developed a new and improved NCBN Safety SharePoint site. The site is a one stop shop for everything safety related for each of the protocols executed by NCBN staff, including the most recent forms and lists, safety plans, park contacts, and other important resources and links.
3. An updated version of the NCBN Shoreline Change Protocol was published along with its companion SOP document.
4. Monitoring was back on track after the pandemic slowed us down in 2020-2021!

NCBN Monitoring Activity (FY2022)

Monitoring Protocol	ASIS	FIIS	GATE	GEWA	SAHI	COLO	CACO	THST
Coastal Shoreline	X	X	X	X	X			
Coastal Topography	X	X	X	X	X			
Marsh Elevations (SET)	X	X	X			X	X	
Marsh Veg/Nekton	*	*	*	*	*	*		
Estuarine Water Quality	X	(2023)	X	(2023)		X		
Seagrass	X	X					X	
Forest Health	X					X		
Weather and Climate	X	X	X	X	X	X	X	X

*Marsh Vegetation and Nekton Monitoring, on hold. Unable to afford a protocol lead or conduct the extensive surveys that we once did that required a 2-3 person crew. A trend report and power analysis was completed in 2022. The report can be found here: <https://irma.nps.gov/DataStore/Reference/Profile/2287704>

Inventories

1. NCBN staff participated in start-up meetings along with the IMD inventory coordinators, cooperators and parks for two new inventories. These include: FIIS-SAHI-GATE-Nesting Diamondback Terrapin inventory and CACO, E-DNA Coyote inventory. NCBN staff attended start-up calls and provided support reviewing proposals and identifying potential cooperators.
2. A professional services contract was completed in FY22 with Neptune and Company. All existing 2014-2015 herp data for COLO, GATE, FIIS and SAHI were reviewed and summarized. Currently the NCBN staff are working to be able to provide these data to each of the parks, but many discrepancies in the data have required the input of the original cooperator, and staff time to complete park-specific outputs.

Vital Signs Monitoring

Tidal Wetland Elevation monitoring (SET)

1. **Description:** Wetlands exist within a narrow range of elevation which is influenced by local hydrologic conditions. The monitoring of wetland elevation and other processes are important for determining the resilience of these wetland communities in the face of changing climate. Elevation monitoring normally occurs twice a year once in the fall and spring. Sampling trips consist of Surface Elevation Table (SET) and marker horizon measurements. Water level data loggers are typically serviced during these trips.
2. **Data Collection:** Sampling trips consist of Surface Elevation Table (SET) and marker horizon measurements, and water level data loggers are typically serviced during these trips. COVID-19 and travel related issues in the fall of FY22 did not allow for any SET or marker horizon sampling to occur at ACAD, BOHA and COLO. Spring sampling occurred at all sites, including the first measurements at a new SET site at NACE (Kenilworth Gardens). New water level recorders were also installed at ACAD.
3. **Data Management:**
 - All SET and marker horizon data collected through 2019 have been entered into the NPS SET database and checked for errors (QA/QC), and water level data have been checked, loaded into Aquarius and approved. Datasets containing SET and Marker horizon data up to 2019 are available at the links below:
 - NCBN Data – all NCBN park data (through 2019)
 - CACO – 2019 data
 - FIIS – 2019 data
 - GATE – 2019 data
 - ASIS – 2021 data
 - COLO - 2019 data
 - Staff from several networks implementing Sediment Elevation Table (SET) monitoring – including NCBN, NETN, NCRN, SECN, and SFAN – met weekly to define and automate the production of a common dataset standard to allow for multi-park

annual reporting. The group also worked together closely to develop a suite of quality-control and visualization tools in R for use by SET Project Leads.

4. **Analyses:** Western Ecosystems Technology Inc. completed a multi-park trend analysis of SET and marker horizon data for NCBN, NETN and NCRN Networks. Data collected as part of a study being conducted by NCBN and ASIS staff related to the use of a total station and/or digital level to collect elevation data to compare with SET data, was completed and prepared for publication.
5. **Reporting and Publications:** Western Ecosystems Technology Inc. submitted a final report, Jan. 2022, this report has yet to be formatted and published to IRMA.
6. **Protocol Changes:** No protocol changes were made in FY22.
7. **Protocol Reviews:** The Annual Operational Review Meeting was held in May 2022.

Salt Marsh Vegetation and Nekton Monitoring

1. **Description:** The NCBN vegetation and nekton monitoring programs are designed to detect shifts in species composition and abundance to provide an early warning to larger ecosystem threats or alterations and to inform sound management decisions.
2. **Data Collection:** Due to an ongoing flat budget, the Network no longer has funding to hire a protocol lead or summer field staff for this monitoring program.
3. **Data management:** All data for the previous field seasons are entered/verified/validated/accepted and posted to IRMA.
4. **Analyses:** In 2021 the NCBN contracted with Neptune, Inc. to analyze all the Network's existing salt marsh vegetation and nekton data. The project attempted to evaluate salt marsh condition through the application of a multimeric index developed by USGS for evaluating salt marsh health, as well as conduct simulations and power analyses to determine the monitoring program's ability to detect ecologically important changes over time and to help the NCBN evaluate whether current sampling methods are sufficient. The final report was completed and posted to IRMA in 2022 and the results indicate that further evaluation of the use of these two protocols is necessary. This includes an analysis of the financial sustainability of the use of these two protocols. At this time, power analyses indicate a need for increasing the sampling frequency for all parks in order to address the current monitoring questions. At this time, we do not have the funding to continue monitoring vegetation and nekton, even at the biennial frequency that we have been.
5. **Reporting/presentations/brief:** The following trend report was completed:
Peck, C., P. Duffy, and K. Broms. 2021. Application of multimetric index, and trend & power analysis for salt marsh monitoring: Northeast Coastal and Barrier Network. Natural Resource Report NPS/NCBN/NRR-2021/2316. National Park Service, Fort Collins, Colorado.
<https://doi.org/10.36967/nrr-2287704>

6. **Protocol changes/deviations:** No changes were made to either protocol in FY2022. The NCBN Program Manager and Data Manager researched multiple options for revising and enhancing the network's Salt Marsh Monitoring program. The Data Manager explored potential remote-sensing options for monitoring vegetation extent and change, including the possibility of developing UAS capabilities at the network or regional level and using numerous potential satellite imagery sources. NCBN staff is currently working with SECN physical scientists to explore the possible use of satellite imagery available freely through the NASA CSDM.
7. **Protocol reviews:** The first step in reviewing both protocols was to complete the trend report and power analyses for all parks. This was completed in 2022.

Shoreline Change and Coastal Topography Monitoring

1. **Description:** Position and Coastal Topography. An essential question in all coastal parks is the magnitude and rate of shoreline change. The Ocean Shoreline Position Protocol is implemented at GATE, FIIS, ASIS, SAHI, and GEWA. With Mark Adam's retirement, the monitoring at CACO is on hold.

Dune, cliff, and bluff erosion and migration often involve direct threats to resources, infrastructure, and human safety and are major management issues in many parks. Our Coastal Topography monitoring protocol is currently implemented at GATE and ASIS and is used to describe the beach-dune-bluff system. These data provide information about the temporal and spatial changes in beach-dune-bluff morphologies in the parks. We are discussing a potential partnership with the Army Corp as part of FIMP to assist in collecting this monitoring data for FIIS.

2. **Data Collection:** Shoreline Position was monitored in the fall of 2021 and spring 2022 at FIIS, GATE and ASIS. Park staff continued to collect these data for the Network at ASIS and FIIS, while the team at Rutgers University, funded by NCBN, collected the data at GATE. Spring 2022 shorelines were collected at both GEWA and SAHI by NCBN staff, but fall 2021 data was not collected because of travel restrictions. Coastal topography monitoring occurred at both ASIS (collected by park staff spring 2022 only) and GATE (collected by Rutgers, both fall 2021 and spring 2022).
3. **Data management:** The spring 2022 survey data for ASIS has been received, entered and certified. GATE shoreline data for fall 2021 and spring 2022 has been received from Rutgers, but we have not received the coastal topography data for fall or spring. All legacy shoreline position change monitoring data underwent extensive review and was migrated to our SQL Server database.
4. **Analysis:** Trend analysis was completed through a Task Agreement with Rutgers University for GATE and FIIS. Reports are being developed. Peer-review and publication will be completed in FY23.
5. **Reporting/presentations/brief:** No reports were published in FY2022.

6. **Protocol changes/deviations:** A new version of the NCBN Shoreline Change Monitoring Protocol was published in FY2022. The SOPs are now a separate document from the main protocol document. See links below.
 - Psuty NP, Duffy M, Skidds DE, Silveira TM, Habeck A, Ames K, Liu G. 2022. Northeast Coastal and Barrier Network Geomorphological Monitoring Protocol: Part I-Ocean Shoreline Position, Version 2. Natural Resource Report. NPS/NCBN/NRR-2022/2415. National Park Service. Fort Collins, Colorado. <https://doi.org/10.36967/2293713>
 - Psuty NP, Duffy M, Skidds DE, Silveira TM, Habeck A, Ames K, Liu G. 2022. Northeast Coastal and Barrier Network Geomorphological Monitoring Protocol: Part I-Ocean Shoreline Position Standard Operating Procedures, Version 2. Natural Resource Report. NPS/NCBN/NRR-2022/2415. National Park Service. Fort Collins, Colorado. <https://irma.nps.gov/DataStore/DownloadFile/673249>
7. **Protocol reviews:** The annual operational review for both the Ocean Shoreline Position and Coastal Topography Protocols was completed in February 2022.

Estuarine Nutrient Enrichment Monitoring (Water Quality and Seagrass)

1. **Description:** Nutrient enrichment of the coastal zone is a worldwide consequence of human population growth. To assess how estuarine natural resources are affected by changing nutrient inputs, NCBN implements long-term systematic monitoring of estuarine nutrient enrichment within six parks (CACO, FIIS, GATE, ASIS, GEWA, COLO). Monitoring began in the mid- 2000's following the development of the Network's monitoring plan (Stevens et al. 2005). Seagrass condition and distribution in parks with significant seagrass resources (CACO, FIIS, ASIS) was also selected as "vital signs" or indicators of estuarine nutrient enrichment condition. Water quality is monitored at each of the six parks on a biennial basis and seagrass is monitored annually at the three parks.
2. **Data Collection:** (ENE water quality component) Water quality data was collected on schedule in 2022 at three parks: ASIS, COLO, and GATE. CACO data was collected by NCBN protocol lead, Holly Plaisted, with assistance from park staff and our summer NCBN SIP intern, Maeve Noone-Price. GATE data was collected through our cooperative agreement with Dr. Brad Peterson from SUNY Stony Brook, and at ASIS through an agreement with Betty Niekirk, Virginia Institute of Marine Science (VIMS).

Seagrass condition data was collected at ASIS, CACO and FIIS. CACO by Holly Plaisted and Maeve Noone-Price with additional assistance from Agnes Mittermayr through a services contract with the Center for Coastal Studies, FIIS by Stony Brook University and ASIS by VIMS. Both were funded through cooperative agreements with NCBN.

3. **Data management:** All 2021 monitoring data has been certified and published.
4. **Analyses:** Trend analysis of all years (2006-2020) and components (water quality and seagrass condition) of the ENE protocol were completed in early 2022 by Neptune and Company.

5. **Reporting/presentations/brief:** The compressive trend report developed by Neptune and Company as well as park-specific summaries were planned to be produced in FY2022 but have been moved to 2023.

Plaisted HK, Shields EC, Novak AB, Peck CP, Schenck F, Carr J, Duffy PA, Evans NT, Fox SE, Heck SM, Hudson R, Mattera T, Moore KA, Neikirk B, Parrish DB, Peterson BJ, Short FT and Tinoco AI (2022) Influence of Rising Water Temperature on the Temperate Seagrass Species Eelgrass (*Zostera marina* L.) in the Northeast USA. *Front. Mar. Sci.* 9:920699. doi: <https://www.frontiersin.org/articles/10.3389/fmars.2022.920699/full>

6. **Protocol changes/deviations:** No changes were made to the protocol or SOPs.
7. **Protocol reviews:** The ENE technical steering committee reviewed the draft trend report from Neptune. The annual operational review for the NCBN ENE protocol was conducted in March 2022.

Forest Health Monitoring (GEWA, THST, COLO, SAHI, ASIS) This monitoring is in collaboration with NETN and MIDN

1. **Description:** Monitoring trends in forest condition and health among five network parks. Schoodic Institute interns are hired to serve on the forest crew.
2. **Data collection:** Data collection occurred at COLO and ASIS in 2022. (Note: ASIS funds the implementation of this protocol in their park). Two panels were completed at COLO, but only one completed at ASIS.
3. **Data management:** All previous data has been verified and certified. All final datasets associated with this protocol are posted to Data Store and are publicly accessible. In addition, this year the following quality assurance plan was published for the Forest Health Protocol: Miller, K. M., A. S. Weed, C. E. Seirup, A. J. Kozlowski, and M. J. Johnson. 2022. Quality assurance plan for the Northeast Temperate Network and Mid-Atlantic Network long-term forest monitoring protocol. Natural Resource Report NPS/NETN/NRR—2022/2430. National Park Service, Fort Collins, Colorado. <https://doi.org/10.36967/2293862>
4. **Analyses:** All analyses are up-to-date.
5. **Reporting and outreach:** The second multi-network trend analysis of forest data, which included 12 years of regeneration and forest structure data from 39 parks, was submitted to Ecological Applications, and draft park-level summaries of the results from this paper were distributed to parks. The paper will be resubmitted early in FY2023.
6. **Protocol changes/deviations:** Annually, the Forest Health Protocol Leads review and revise the NETN Forest Health Protocol. A summary of changes is published in the following document: Miller, K.M., and Seirup, C.E. 2022. Summary of Major Protocol Changes and Deviations for the Northeast Temperate Network Long-term Forest Monitoring Protocol.

Northeast Temperate Network. National Park Service, Woodstock, Vermont.
<https://irma.nps.gov/DataStore/DownloadFile/674279>

In 2022 the NETN also revised and the Long-Term Forest Monitoring Protocol to include the new QAP and other minor changes: Tierney, G., B. Mitchell, K. Miller, J. Comiskey, A. Kozlowski, and D. Faber-Langendoen. 2022. Northeast Temperate Network long-term forest monitoring protocol: 2022 revision. Natural Resource Report NPS/NETN/NRR—2022/2434. National Park Service, Fort Collins, Colorado.

Main Protocol 2022 Revision: <https://doi.org/10.36967/2293861>.

SOP Document 2022 Revision: <https://irma.nps.gov/DataStore/DownloadFile/674278>

7. **Protocol Reviews:** Annual operational review for MIDN/NCBN/NETN was completed 3/6/2022.

Weather and Climate Monitoring

1. **Description:** Weather and climate play significant roles in driving both physical and ecological processes. For example, the active processes that shape the North Atlantic coastline are largely the result of meteorological events such as wind-driven waves. For research and long-term ecological monitoring, weather and climate data provide the potential for correlations to be made with observed physical and ecological pattern data.
2. **Data Collection:** Temperature, precipitation, wind, and tidal data downloaded from the NOAA National Centers for Environmental Information website for each of the parks and park-based tables and figures created. (<https://www.ncei.noaa.gov/>).
3. **Data Management:** The previous year's data for the area each NCBN park resides in will be downloaded yearly in January, and made available to NCBN parks and the public through resource briefs (available on NCBN website and IRMA) and nps.gov shared articles.
4. **Analyses:** Weather data summaries were created for each park.
5. **Reporting and Publications:** The data were presented in the form of resource briefs and the nps.gov shared articles listed below:

Northeast Coastal and Barrier Network. 2022. 2021 Weather in Review: Assateague Island National Seashore. <https://irma.nps.gov/DataStore/Reference/Profile/2291501>
Article: [2021 Weather in Review: Assateague Island National Seashore](#)

Northeast Coastal and Barrier Network. 2022. 2021 Weather in Review: Cape Cod National Seashore. <https://irma.nps.gov/DataStore/Reference/Profile/2291502>
Article: [2021 Weather in Review: Cape Cod National Seashore](#)

Northeast Coastal and Barrier Network. 2022. 2021 Weather in Review: Colonial National Historical Park. <https://irma.nps.gov/DataStore/Reference/Profile/2291503>
Article: [2021 Weather in Review: Colonial National Historical Park](#)

Northeast Coastal and Barrier Network. 2022. 2021 Weather in Review: Fire Island National Seashore. <https://irma.nps.gov/DataStore/Reference/Profile/2291504>
Article: [2021 Weather in Review: Fire Island National Seashore](#)

Northeast Coastal and Barrier Network. 2022. 2021 Weather in Review: Gateway National Recreation Area. <https://irma.nps.gov/DataStore/Reference/Profile/2291505>
Article: [2021 Weather in Review: Gateway National Recreation Area](#)

Northeast Coastal and Barrier Network. 2022. 2021 Weather in Review: George Washington Birthplace National Monument. <https://irma.nps.gov/DataStore/Reference/Profile/2291506>
Article: [2021 Weather in Review: George Washington Birthplace National Monument](#)

Northeast Coastal and Barrier Network. 2022. 2021 Weather in Review: Sagamore Hill National Historic Site. <https://irma.nps.gov/DataStore/Reference/Profile/2291507>
Article: [2021 Weather in Review: Sagamore Hill National Historic Site](#)

Northeast Coastal and Barrier Network. 2022. 2021 Weather in Review: Thomas Stone National Historic Site. <https://irma.nps.gov/DataStore/Reference/Profile/2291508>
Article: [2021 Weather in Review: Thomas Stone National Historic Site](#)

6. **Protocol Changes:** No changes were made to the protocol.

7. **Protocol Reviews:** no reviews were necessary

Additional Data Management Activities

- The four NER network Data Managers continued to explore options for migrating Network files from on-premises servers to more secure and less resource-intensive solutions. After reviewing the possibility of using Microsoft SharePoint and Azure /Amazon Web Services options, the Data Managers began working with Regional and National IT staff to stand up shared network drives with the DOI Data Center in Reston, VA. Data Managers will be able to manage server access using staff Active Directory credentials. This project will serve as a template for subsequent migrations.
- NCBN Data Management staff identified all NCBN ArcGIS Online StoryMaps to be converted to the newest template to meet accessibility requirements. They worked closely with cooperators to transfer ownership of all sites and hosted datasets to NCBN before making all required updates.
- The NCBN Data Manager continued to support COLO land bird monitoring efforts by performing significant QC work on all existing data before submitting it for inclusion in the recently-developed MIDN SQL Server database.

Science Integration into Management

1. **Direct support of park planning:**
 - NCBN staff member, Dennis Skidds, participated in the GEWA Climate Change Vulnerability Assessment.
2. **Regional support:**

- NCBN Staff continue to provide publication formatting and support on Interior Region 1 NRCAs, RSS, and Vulnerability Assessments and other documents for publication.

Partnerships and Collaboration

1. Other activities that support parks, regions, and I&M (multi-network or national)

- This year the NCBN, through the support of park and regional tribal liaisons, engaged Mashpee Wampanoag, Shinnecock, and Unkechaug nations in both SCC funded projects and future I&M work. These three tribal groups have land that fall within close proximity to Cape Cod and Fire Island National Seashores, sharing important coastal waters and resources, including important seagrass beds and other estuarine resources. Meetings were held with tribal representatives to discuss the types of data collected by the NCBN, and its value to local tribal lands. We also discussed incorporating tribal student interns through the SIP program to provide learning opportunities for young students to learn about the NCBN protocols, and how they might be implemented on tribal lands in the future.
- In 2019-2021, the NCBN in collaboration with USGS scientists received NRPP funding to use NCBN seagrass monitoring data collected as part of our estuarine nutrient enrichment monitoring program, to look at seagrass vulnerability related to changing temperature regimes. The project incorporated the Network's long-term datasets from Cape Cod, Fire Island, and Assateague Island National Seashores. Final products are currently being completed.
- The Cape Cod Pleasant Bay Alliance, the Center for Coastal Studies, Boston University and the NCBN developed a proposal for Massachusetts Municipal Vulnerability Preparedness: Community Climate Adaptation Plan for Pleasant Bay Ecosystem and Infrastructure. This work was based on the results of the NRPP project, and the Climate Adaptation Plan development has been funded.
- The Northeast Coastal and Barrier Network, the Center for Coastal Studies, Boston University, and Mass Bays Program, also developed an SCC proposal: Identifying factors preventing recovery of eelgrass from large declines to inform management actions at Cape Cod National Seashore. This proposal has been awarded funding for FY24-27.
- NCBN SET Protocol lead is a member and co-leader of the NPS I&M SET database group. This collaborative effort includes five I&M Networks working together on the development of a SET monitoring database as well as the procedures for processing SET and Marker Horizon data. Work continued on this shared database project throughout FY2022 with the latest version (1.52) released in June 2022.
- The NCBN Ocean Shoreline Position monitoring protocol database has been converted to a SQL server database, with the web-based front-end application hosted on the NPS IRMA. Currently, three networks utilize this new database, Northeast Coastal and Barrier, Southeast Coast, and Gulf Coast Networks. In addition, NCBN has been working on improving metadata for shoreline position datasets that were collected in our parks prior to the establishment of the I&M Program.

- NCBN Biotech, Robin Baranowski, developed a new and improved NCBN Safety SharePoint site. The site is a one stop shop for everything safety related for each of the NCBN monitoring protocols, including the most recent forms and lists, safety plans, park contacts, and other important resources and links. Robin was also the recipient of the I&M Safety Award this year. At the national level, Robin was recently selected to serve on the NPS National Safety Leadership Council participating in the annual week-long meeting at Shenandoah National Park in July.

2. Region 1 Planning:

- NCBN Program Manager participated in ongoing discussions among Region 1 networks (NER and NCR) on areas of collaboration and cost sharing. Discussions included evaluations of various program areas including forest monitoring, birds, water quality, data management, science communication.

3. Other NPS, federal, and external partnership activities (with state agencies, universities, etc.)

- The NCBN continues to be a member of the Chesapeake Bay Sentinel Site Cooperative which is a collaborative group of SET users in the Chesapeake Bay region.
- The NCBN Tidal Wetland Elevation Monitoring Lead, is also a member of the SET metadata standardization group which is overseen by the US Global Climate Change Program and is working on standardizing metadata for SET users in the US and abroad.
- The NCBN continues to be a member of the SET cross-collaboration group of government and academic SET users which met throughout the year to discuss and share analytical methods being used for trend analyses of SET data. The group was started by NPS quantitative ecologist Dr. Ellen Cheng and has participants from the NPS, USFWS, NOAA, EPA, The Smithsonian Institution, Clemson University and The University of Delaware.
- NCBN Staff maintain close working relationships with many coastal ecosystem scientists, including USGS scientists, Boston University professors and students working on coastal ecosystem science, Seagrass scientists from Mass. Division of Marine Fisheries, Cape Cod Center for Coastal Studies, and actively maintain close working relationship with EPA REGION 1 - New England marine scientists. The network is newly collaborating with the Piscataqua Region Estuaries Partnership (PREP) as well.
- NCBN continues to be an active and long-term member of the SeagrassNet global program: participating in long-term program sustainability.
- This year, Seagrass Lead, Holly Plaisted, shared CACO and FIIS monitoring results with the MA Seagrass Workgroup in response to large-scale losses observed throughout MA.
- NCBN Staff stationed at the University of Rhode Island continue to provide teaching support and mentoring opportunities to students.

4. Workgroups and Task Force Engagement

- Chesapeake Bay Sentinel Site Cooperative (Jim Lynch, NCBN)

- Cartography & Web Mapping Subcommittee and sub workgroup, Cartography Working Group (Scott Rasmussen, NCBN)
- GIS Council Subcommittee, GNSS Position and Navigation (Dennis Skidds, NCBN)
- IR-1 GIS Steering Committee (Dennis Skidds, NCBN)
- NPS National Safety Leadership Council (Robin Baranowski, NCBN)
- NPS Women's Employee Resource Group, Working Mothers Subcommittee (Sara Stevens, NCBN)
- Northeast Region Salt Marsh SDM Workgroup. (Sara Stevens, NCBN)
- Massachusetts Seagrass Workgroup (Holly Plaisted, NCBN)
- New England Estuarine Research Society (NEERS) Meeting Program Committee Co-chair - Fall 2022 and Spring 2023. (Holly Plaisted, NCBN)
- Pleasant Bay Climate Adaptation Action Plan (work group w/Pleasant Bay Alliance). (Holly Plaisted, NCBN)

Communication

1. Reports and Publications

- Neil Saintilan, Katya E. Kovalenko, Glenn Guntenspergen, Kerrylee Rogers, James C. Lynch, Donald R. Cahoon, Catherine E. Lovelock, Daniel A. Friess, Erica Ashe, Ken W. Krauss, Nicole Cormier, Tom Spencer, Janine Adams, Jacqueline Raw, Carles Ibanez, Francesco Scarton, Stijn Temmerman, Patrick Meire, Tom Maris, Karen Thorne, John Brazner, Gail L. Chmura, Tony Bowron, Vishmie P. Gamage, Kimberly Cressman, Charlie Endris, Christina Marconi, Pamela Marcum, Kari St. Laurent, William Reay, Kenneth B. Raposa, Jason A. Garwood, Nicole Khan (2022) Constraints on the adjustment of tidal marshes to accelerating sea level rise.
<https://www.science.org/doi/10.1126/science.abo7872>
- Plaisted HK, Shields EC, Novak AB, Peck CP, Schenck F, Carr J, Duffy PA, Evans NT, Fox SE, Heck SM, Hudson R, Mattera T, Moore KA, Neikirk B, Parrish DB, Peterson BJ, Short FT and Tinoco AI (2022) Influence of Rising Water Temperature on the Temperate Seagrass Species Eelgrass (*Zostera marina* L.) in the Northeast USA. *Front. Mar. Sci.* 9:920699. doi:
<https://www.frontiersin.org/articles/10.3389/fmars.2022.920699/full>
- Northeast Coastal and Barrier Network. 2022. Northeast Coastal and Barrier Network Estuarine Water Quality and Seagrass Monitoring Program Safety Plan. Northeast Coastal and Barrier Network, National Park Service, Kingston, RI. Self published: <https://irma.nps.gov/DataStore/DownloadFile/672099>
- Northeast Coastal and Barrier Network. 2022. Northeast Coastal and Barrier Network Coastal Geomorphological Monitoring Program Safety Plan. Northeast Coastal and Barrier Network, National Park Service, Kingston, RI. Self published: <https://irma.nps.gov/DataStore/Reference/Profile/2291854>
- Northeast Coastal and Barrier Network. 2022. Northeast Coastal and Barrier Network Salt Marsh Vegetation Monitoring Safety Plan. Northeast Coastal and

Barrier Network, National Park Service, Kingston, RI. Self published:

<https://irma.nps.gov/DataStore/Reference/Profile/2291857>

- Northeast Coastal and Barrier Network. 2022. Northeast Coastal and Barrier Network Tidal Wetland Elevation Monitoring Program Safety Plan. Northeast Coastal and Barrier Network, National Park Service, Kingston, RI. Self published: <https://irma.nps.gov/DataStore/Reference/Profile/2291792>
- Peck, C., P. Duffy, and K. Broms. 2022. Application of multimetric index, and trend & power analysis for salt marsh monitoring: Northeast Coastal and Barrier Network. Natural Resource Report NPS/NCBN/NRR—2021/2316. National Park Service, Fort Collins, Colorado. <https://doi.org/10.36967/nrr-2287704>
<https://irma.nps.gov/DataStore/Reference/Profile/2287704>
- Psuty, N. P., C. Menke, K. Ames, A. Habeck, and C. Jones. 2022. Shoreline position and coastal topographical change monitoring at Assateague Island National Seashore: 2005–2020 trend report. Natural Resource Report NPS/NCBN/NRR—2022/2375. National Park Service, Fort Collins, Colorado.
<https://doi.org/10.36967/nrr-2293154>.
<https://irma.nps.gov/DataStore/Reference/Profile/2293154>
- Psuty, N. P., M. Duffy, D. E. Skidds, T. M. Silveira, A. Habeck, K. Ames, and G. Liu. 2022. Northeast Coastal and Barrier Network geomorphological monitoring protocol: Part I—ocean shoreline position, version 2. Natural Resource Report NPS/NCBN/NRR—2022/2415. National Park Service, Fort Collins, Colorado.
<https://doi.org/10.36967/2293713>.
<https://irma.nps.gov/DataStore/Reference/Profile/2293713>
- Psuty, N. P., M. Duffy, D. E. Skidds, T. M. Silveira, A. Habeck, K. Ames, and G. Liu. 2022. Northeast Coastal and Barrier Network Geomorphological Monitoring Protocol: Part I—Ocean Shoreline Position, Standard Operating Procedures Version 2.00. Northeast Coastal and Barrier Network, National Park Service, Kingston, RI. Self published: <https://irma.nps.gov/DataStore/Reference/Profile/2293010>

2. Outreach products

The NCBN website was revised and reorganized in 2022 by NCBN SIP intern, Bridget Ye.

<https://www.nps.gov/im/ncbn/index.htm> Each of the park pages have been reformatted and updated.

Organizational Excellence

1. Safety

Annually, NCBN Biotech, Robin Baranowski updates and manages the Network’s safety plans, safety site and related documents. Robin updates all five safety plans for the Network monitoring protocols. She has also created sharepoint site to house all of the NCBN safety plans and documents and updates the site as annually and as needed throughout the year. Robin also holds the annual NCBN safety training for NCBN staff to go over all updates and review safety

procedures for the Network. The following are the links to the safety site and safety plans for each protocol:

- [NCBN Safety SharePoint Site](#)
- [Coastal Geomorphology](#)
- [Salt Marsh Vegetation](#)
- [Tidal Wetland Elevation](#)
- [Water Quality and Seagrass](#)

Staffing

- NCBN Program Manager, Sara Stevens (Nerone)
- NCBN Data Manager, Dennis Skidds
- Biologist/Tidal Wetland Elevation Monitoring Lead, Jim Lynch
- Biologist/Estuarine Monitoring Lead, Holly Plaisted
- Assistant Data Manager/Geomorphological Monitoring Biotech, Scott Rasmussen
- Biotech, Science Communication/Botanist, Robin Baranowski
- Interns- SIP Science Interns, Maeve Noone-Price, summer 2022 (12 weeks) and Bridget Ye, fall/winter 2021-22 (26 weeks).

NCBN board members and technical/steering committees:

Park Name	Board Member
Cape Cod NS	Brian Carlstrom
Fire Island NS	Alexcy Romero
Gateway NRA	Jen Nersesian
Sagamore Hill NHS	Jonathan Parker
Assateague Island NS	Hugh Hawthorne
George Washington Birthplace NM/THST	Melissa Coburn
Colonial NHP	Jerri Marr

Technical Steering Committees	
Coastal Geomorphology (Dennis Skidds and Scott Rasmussen)	
Dr. Norb Psuty	Rutgers University
Andrea Habeck	Rutgers University
Neil Winn	NPS Deputy GNSS PosNav Coord.
Possibly Claire (Elizabeth) Schmidt	Southeast Coast Network
Jeffrey Bracewell	Gulf Coast Network GIS
Estuarine Nutrient Enrichment/Seagrass (Holly Plaisted)	
Betty Neikirk	Virginia Institute of Marine Science
Erin Shields	Virginia Institute of Marine Science
Bradley Peterson	Stony Brook University
Stephen Heck	Stony Brook University
Sophia Fox	Cape Cod NS
Kelly Medeiros	Cape Cod NS

Salt Marsh SETs (Jim Lynch)	
Philippe Hensel	NOAA
Don Cahoon	USGS
Kelly Medeiros	Cape Cod NS
William Vervaeke (Ches)	Southeast Coast Network
Geoff Sanders	Cape Cod NS
Sue Adamowicz	USFWS
Laura Mitchell	USFWS
Aaron Weed	Northeast Temperate Network
Salt Marsh Vegetation and Nekton (Sara Stevens and Dennis Skidds)	
TBD	

Budget

In FY22 three NCBN employees were due for step increases which contributed to a substantial increase in permanent staff salary charges to the program, along with the COLA increase we received in January 2022. Throughout the history of the I&M program, networks have never received any annual cost of living increases to our budgets forcing us to draw on base funding and the ability of the network to keep up with rising costs in salaries, benefit rates, equipment and travel.

Category	Amount
INCOME	
Vital Signs Monitoring (base)	\$886,100
WRD	\$82,300
TOTAL INCOME	\$968,400
EXPENDITURES	
Personnel (BOC 11 & 12)	\$686,402 (\$778,623)
Travel (BOC 21)	\$25,000
Transportation (BOC 22)	
Rent, communication, utilities (BOC 23)	\$0
Services and contracts (BOC 25)	\$4778
Supplies and materials (BOC 26)	\$24,053
Equipment (BOC 31)	\$13,033
Agreements (BOC 411c)	\$122,913
Other (BOC 24, 99, or not included in above BOCs)	\$0
TOTAL EXPENDITURES	\$948,400
TOTAL FIXED COSTS*	\$778,623
TOTAL WATER MONITORING EXPENDITURES**	\$254,087
% BUDGET FIXED (total fixed/total income)	81%

*Fixed costs: permanent, utilities, leases, mandatory training, mandatory equipment service contracts, uniforms.

**Annual WRD Funding (\$82,300), covers approximately 32% of total NCBN WQ monitoring costs.