

FY2018
ANNUAL ACCOMPLISHMENTS REPORT
FOR INVENTORIES AND VITAL SIGNS MONITORING
NORTHEAST COASTAL AND BARRIER NETWORK (NCBN)

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Northeast Coastal and Barrier Network FY 2018 Accomplishments Report

I. Overview

The Northeast Coastal and Barrier Network (NCBN) includes eight parks located along the Atlantic coast from Massachusetts to Virginia: Cape Cod National Seashore (CACO), Fire Island National Seashore (FIIS), Sagamore Hill National Historic Site (SAHI), Gateway National Recreation Area (GATE), Assateague Island National Seashore (ASIS), George Washington Birthplace National Monument (GEWA), Thomas Stone National Historic Site (THST), Colonial National Historical Park (COLO). These parks contain critical coastal habitat for many rare and endangered species, as well as migratory stopovers, acting as essential corridors for birds, sea turtles, and marine mammals. They also protect vital coastal wetlands, essential to water quality, fisheries, and the biological diversity of coastal, near shore, and terrestrial environments.

All NCBN parks continue to be pressured by encroaching development, intense recreational activity, and the results of climate change; sea level rise, increased storm intensity, amplified variability in surface and groundwater levels, and ocean acidification. These are expected to be among the most pressing natural resource management challenges in the near future. In addition, being within the urban sprawl of the Northeast creates additional pressure on these sensitive and often last remaining pristine ecosystems.

The NCBN Inventory and Monitoring Program, developed to provide parks with credible,

defensible scientific information, will help managers and scientists track the changes that occur in condition of their park's natural resources. As part of the National Park Service's original effort to "improve park management through greater reliance on scientific knowledge," the Cape Cod Ecosystem Monitoring (CCEM) program, an NCBN park, was established to develop and implement a long-term monitoring program that would serve to aid park managers in making sound stewardship decisions. The program at CACO was established in the early 1990's as one of the few "Prototype" parks tasked with developing a monitoring program for coastal parks. As part of this process, the CCEM program adopted an ecosystem-based, issue-oriented approach for monitoring ecosystem integrity, working closely in partnership with the USGS-Biological Resources Division. CCEM developed monitoring protocols based on the issues identified in Roman and Barrett's 1999 report *Conceptual Framework for the Development of Long-term Monitoring Protocols at Cape Cod National Seashore*. Not long after, in 2000-2001, the NCBN Monitoring Program was established as part of the newly formed and funded NPS Inventory and Monitoring Program (NPS I&M). The NCBN program extended the Cape Cod CCEM program by building the Network monitoring plan on the same approach for the additional seven network parks.

The following report provides a summary of accomplishments for FY18 on inventory and monitoring projects being developed and implemented by the NCBN program. In FY18, the network received a total of \$926,880; this includes \$814,580 in Vital Signs Monitoring funding, and \$82,300 from the NPS Water Resources Division, and \$30,000 in IMD funding to support collaboration.

FY18 Summary

Vital Signs Monitoring continued in FY18 with salt marsh vegetation and nekton monitoring occurring at Assateague (ASIS) and Gateway National Recreation Area (GATE-SHU). A four-person crew consisting of two Biological Science Technicians and two Geoscientists-in-the Park interns conducted the monitoring with logistical support from the park.

Surface Elevation Table (SET) data was collected at 139 SET sampling locations, two times at each location during the year by NCBN biologist, Jim Lynch, with the assistance of other NCBN and park staff. SET data was collected in nine parks, including 2 parks (ACAD, BOHA) in the Northeast Temperate Network and 2 parks (NACE, GWMP) in the National Capital Region Network.

The network also developed and/or continued cooperative efforts with the Virginia Institute of Marine Science (VIMS) and the Seagrass Ecology Lab at SUNY Stony Brook in New York for estuarine water quality and seagrass monitoring. Ocean shoreline position monitoring continued during both fall 2017 and spring 2018 at FIIS, GATE, ASIS, GEWA, SAHI and CACO, following the network's published protocol with the assistance of park staff, Rutgers University and Network staff.

The NCBN Program Manager continued the management of the remaining Hurricane Sandy projects for FIIS, ASIS, GATE and CACO.

II. Accomplishments

Inventories

- Amphibian and Reptile Inventories (Dr. Nancy Karraker, URI). One report was published with the research results on the phenology of eastern box turtles at the William Floyd Estate, Fire Island NS.
- Submerged Habitat Maps and Reports (FIIS, GATE, CACO, ASIS). This year the Network received the final reports and data for these four projects from Rutgers University, the Center for Coastal Studies, the University of Delaware, and the University of Rhode Island. All four reports were peer reviewed and comments have been addressed by each PI. Each of the extensive datasets have been reviewed and QA'd. Currently the network is working on report technical report formatting issues that has taken extensive time working with each group of PIs. We hopefully will have the reports published in FY19.

Inventories 2.0

- Substantial planning and scoping has occurred for Inventories 2.0 with information available through WASO IMD: <https://sites.google.com/a/nps.gov/in2-imd-inventory/?pli=1>

Vital Signs Monitoring

Salt marsh nekton and vegetation monitoring (ASIS, SHU-GATE)

- Two Biological Science Technicians (Daniel Cole and Rachel Delany) and two GIP interns (Krista Noe and Caitlyn Sutherlin) were hired and stationed at ASIS this year. They completed the sampling under the supervision of NCBN staff (Sara Stevens and Robin Baranowski), but with additional help from park staff (Casey Nolan) this year due to the loss of the NCBN Salt Marsh Protocol Lead, Erika Rocks, who resigned from the NPS in January 2018. The crew collected data at ASIS and the Sandy Hook Unit of GATE.

Salt marsh surface elevation monitoring (NCBN Parks CACO, GATE, FIIS, ASIS, COLO; NETN Parks ACAD, BOHA; NCRN Parks NACE, GWMP)

Sediment Elevation (SET protocol) data continues to be collected at 136 SET sampling stations in the northeast and capital regions. SET sampling stations are visited twice a year by NCBN biologist, Jim Lynch, with the assistance of other NCBN, NCRN and park staff. Data was collected in nine parks, including 2 parks (ACAD, BOHA) in the Northeast Temperate Network and 2 parks (NACE, GWMP) in the National Capital Region Network.

- 95 SET monitoring stations at five NCBN parks (GATE, FIIS, CACO, ASIS, COLO) were sampled in the fall and spring of FY18.
- 19 SET stations at two NCRN parks (NACE, GWMP) were sampled in the fall and spring of FY18 in collaboration with the NCRN.
- 22 SET stations at two NETN parks (BOHA, ACAD) were sampled in the fall and spring of FY18.

- Measurements commenced at 6 new SET sampling stations in FY18 in a marsh in Wellfleet, MA (CACO) in collaboration with the Friends of Herring River.
- Measurements commenced at 6 new SET monitoring stations in FY18 in two marshes in the Jamaica Bay Unit of GATE.
- At ASIS, SETs were sampled and elevation measurements collected with a digital level and total station. This is the continuation of a five year project comparing the measurement of elevation change in a salt marsh using different techniques.
- Water level recorders were monitored at GWMP, COLO, ASIS, GATE, FIIS and ACAD during FY18. These are being used to characterize the tidal patterns and differences in marsh flooding at the various SET sampling stations within each park.
- Conducted static and RTK surveys of the SETs and other infrastructure at COLO, ASIS, CACO. Finished surveying all SET monitoring stations using the guidelines and SOPs in the NCBN SET protocol.
- Permanent 1m² vegetation plots, co-located at the SET sampling stations, were sampled at ASIS, GATE, FIIS, CACO, BOHA and ACAD.

Ocean shoreline position monitoring (FIIS, ASIS, CACO, GATE, GEWA, SAHI)

- Shoreline monitoring (1D) continued to be collected by NCBN and Park Staff for fall and spring shorelines at ASIS, CACO, GATE, SAHI, GEWA, and FIIS. Rutgers' scientists under an NCBN/CESU task agreement continued to conduct the monitoring for the Network at GATE.
- A GIP Intern, Glenn Liu, was hired by the NCBN for a 24 week position and was stationed at Sandy Hook, GATE. Glenn was supervised by Dr. Norb Psuty from Rutgers University to assist with collecting data, analyzing and writing reports for all of our parks.

Coastal topography monitoring (GATE, ASIS)

- Rutgers University collected data following the NCBN 2D monitoring protocol at GATE funded by NCBN, and park staff collected the data at ASIS.

Marsh bird monitoring

- Marsh bird data was not collected at NCBN parks again this year due to the lack of staff and funding for the program. This program was developed and funded originally through IMD climate change funds that was made available to the Network for only a few years.

Forest health monitoring (GEWA, THST, COLO, SAHI)

- In a collaborative effort with the NETN and MIDN, the NCBN annually supports one full time seasonal employee who is stationed with the Northeast Temperate and Mid-Atlantic network's traveling, forest health field crew. In return for the seasonal salary support, the full crew then collects data for the NCBN in NCBN parks.
- Forest health monitoring was completed for three NCBN parks this year (GEWA, THST,

COLO).

Water Quality Monitoring

Estuarine nutrient enrichment (ENE) monitoring

- This year the Network hired Holly Plaisted to be the NCBN protocol lead for the ENE and seagrass monitoring programs. This is a permanent Biologist position with the Network, stationed at the University of Rhode Island. Although the NCBN ENE data is collected by cooperators from VIMS and Stony Brook University, we have always relied on either existing NCBN and/or additional cooperative agreements to manage the data, reporting and overall management of the program. With this new position we will be able to report out to the parks more often and provide this important support to parks.

ENE water quality component (CACO, GATE, ASIS, COLO)

- Data were collected at four parks: CACO, GATE, ASIS, and COLO. CACO data was collected primarily by park staff with assistance from NCBN protocol lead. GATE data were collected through our cooperative agreement with Dr. Brad Peterson from SUNY Stony Brook. ASIS and COLO through an agreement with Dr. Ken Moore, Virginia Institute of Marine Science (VIMS).
- To adhere to IMD water quality laboratory accreditation requirements, NCBN procured a contract for chlorophyll a samples to be analyzed by an NELAP accredited lab. The Virginia Institute of Marine Science Analytical Service Center was selected through the competitive bid process. They successfully analyzed 329 samples. In the past, samples were analyzed by park staff at CACO (the CACO laboratory is not accredited). To account for potential effects of changing laboratories (i.e. changes in instrumentation and/or methodology) on chl a results, a subset of duplicate samples were analyzed at both VIMS and CACO. These sample results will be compared to identify, document, and account for discrepancies.
- New PAR (photosynthetically available radiation) instrumentation was piloted at CACO's three continuous logging stations. The pilot was successful and the sensors will replace obsolete instruments developed by YSI.
- Initiated the first steps towards implementing the sediment organic carbon monitoring component of the ENE protocol. Completed a cost estimate and sampling plan for field work and laboratory analysis in FY2019 and 2020.

ENE seagrass condition component (CACO, FIIS, ASIS)

- With assistance from park staff, the ENE protocol lead and USGS scientist, Hilary Neckles collected monitoring data at CACO's two sites: Duck Harbor, Wellfleet and Hog Island, Orleans.
- Seagrass data was collected at FIIS by Stony Brook University and at ASIS by VIMS. Both were funded through cooperative agreements with NCBN.
- New PAR sensors were also successfully piloted at all seagrass monitoring sites. Sensors were deployed for 2 – 4 weeks at each park's seagrass monitoring site.

- Preliminary R code for analyzing trends in seagrass monitoring data was developed with the assistance of the IMD quantitative ecologist.

ENE Monitoring Data Status

Status of water quality data, QA/QC and dissemination:

- 2017 spatial water quality data have been certified and uploaded to EQuIS
- 2017 seagrass data have been uploaded to SeagrassNet
- 2018 water data entry is underway

Monitoring products

- All monitoring data is uploaded to the Data Store on an annual basis.
- References for all reports and publications have been added the NPS Data Store and are also accessible from the NCBN website under each monitoring protocol page:

<https://www.nps.gov/im/ncbn/>

Protocol Development and Review

- This year the NCBN Program Manager completed a Salt Marsh Monitoring Protocol Implementation Plan (PIP). This plan is based on the original salt marsh monitoring protocol developed for the CACO prototype monitoring program in 2001.
- Annual protocol review for the NCBN ENE protocol was initiated and will be completed in FY2019
- Rutgers collaborators completed the 3D monitoring protocol following peer review and the protocol was published in 2018 following revisions. This protocol however will not be implemented by the Network, but can be used by parks and the Network when additional information is needed within critical management areas, or areas of concern.

Data Management

- IRMA Updates--Provided significant aid this year to parks and cooperators in utilizing IRMA components. Assisted COLO, FIIS, GATE, and SAHI by adding or editing over 100 entries in NPSpecies. Trained and advised park (ASIS, FIIS) and NCBN staff in the use of advanced features of the NPS Data Store. Worked with IMD to obtain IRMA publishing access for Hurricane Sandy project cooperators, and provided initial training.
- QAQC of the 2017 salt marsh vegetation and nekton data is complete and the data has been uploaded to the Data Store. The 2018 data have been entered into the database and QA/QC'd and are now ready for verification.
- All NER and NCR SET data through 2017 were entered and validated in the SET enterprise database.
- NCBN SET protocol lead continued collaboration with SECN, NCRN, FWS, and other partners on the development of a similar SQL Server database for the shared Salt Marsh Sediment Elevation Monitoring program.

- NCBN water level data from ASIS, COLO, CACO, FIIS and GATE were uploaded to Aquarius and made available to the public through the IRMA Portal (<https://irma.nps.gov/aqwebportal/>).
- 2017 ENE spatial water quality data have been certified and uploaded to EQuIS, 2017 seagrass data have been uploaded to SeagrassNet, 2018 ENE data entry is underway.
- NCBN water level data from ASIS, COLO, CACO, FIIS and GATE that were collected and archived in FY17 as part of the NCBN SET monitoring program. Data is in the process of being uploaded to the IRMA Portal (<https://irma.nps.gov/aqwebportal/>) and will be made available to the public.
- This year, Data Manager, Dennis Skidds researched and coordinated the purchase of a network-attached storage system to replace aging NCBN NAS devices and hard drives. The new hardware configuration greatly enhances the NCBN's data stewardship capabilities by increasing data storage capacity, data access speeds, and backup capabilities.
- NCBN data manager continued collaboration with GULN, ASIS, and IMD staff on a new SQL Server database for the Network's Coastal Topography Monitoring program, expected to be completed in the calendar year.
- The NCBN Data Manager became a member of the IMD Metadata Working Group, working to establish recommendations to the IMD Long-term Data Management Governance Board regarding standards and tools for creating and managing spatial and non-spatial metadata.

Data Management Innovations

- Beginning in the 2018 field season, the NCBN Salt Marsh Vegetation Monitoring program adopted a fully-randomized sampling design for establishing plots at marsh sites, with plots re-randomized for each new sampling year. Previous sampling designs utilized regularly spaced, parallel transects for plot placement, which field staff could utilize to guide them to their destinations. Without these transect features, crews potentially faced a dramatic increase in time expended to locate plots in the field. Using a combination of Python scripts and Network Analyst tools traditionally used for roads datasets, the NCBN Data Manager, Dennis Skidds researched and developed a methodology in ESRI ArcGIS that identified the most efficient travel routes for field crew members. The optimized routes can be easily uploaded to the crew's GPS receivers and used for navigation in the field.

Science Communication

- Robin Baranowski, NCBN Term Biotech, received a training certificate for Basic Web Course that taught the fundamentals of web design and development. This allowed her to create and assisted in the design of the new CMS website for NCBN. Tasks included: documenting all past website content, creating new web pages (adding text, photos, dynamic lists, etc), keeping track of old website addresses to redirect to new addresses in order to facilitate a smooth crossover, working with web specialists to document and resolve any issues the new CMS platform was experiencing.

- Sara Stevens revised and wrote all content for the new NCBN website and worked closely with Robin Baranowski and Margaret Beer (IMD) in transitioning the old NCBN website to CMS.
- Robin Baranowski, NCBN term Biotech, received online training in 508 Compliance of Adobe Acrobat (pdf) accessibility to ensure that science communication products such as reports and resource briefs are accessible to readers with disabilities. Robin made all NCBN RB's and those developed as part of the Hurricane Sandy work 508 compliant so that both the NCBN and parks can easily share them and make available on their websites.

The following Resource Briefs have been received and reviewed by NCBN staff and are waiting on final formatting. They were written by staff from the URI SciComm Lab under a Hurricane Sandy funded task agreement:

- Documenting the Toll of Coastal Storms — with Smartphone
- Keys to tomorrow: Chris Gobler studies storm impacts, resilience, and restoration opportunities in coastal parks
- More Impact for More People: GeoCorps internship program advances park science, promotes stewardship, and launches careers
- Mapping your way to Successful Science Communication: How story maps can effectively engage NPS audiences
- From Pure Science to Park Science: How One Geomorphologist Re-invented his Research to Help Protect Coastal Communities
- True to Her Roots: One Woman's Passion for Conservation Becomes a Reality in her Native Rhode Island
- Storymap: Jamaica Bay: Past, Present and Future
<https://edc.maps.arcgis.com/apps/MapJournal/index.html?appid=ea227243c4b14f92a6906edbea65bcc5>

Park and Regional Integration and Collaborations

Park Support and collaborations

- NCBN program manager supported the FIIS Vulnerability Assessment by meeting with the PIs on the project to review all data available to the park through NCBN monitoring and Hurricane Sandy project work.
- NCBN data manager continued to represent the NCBN on the Resource Stewardship Strategy (RSS) Working Group for GEWA.
- NCBN ENE Monitoring Lead developed a statement of need and submitted it to FY2019 NRPP – Title: Vulnerability assessment of seagrass communities of Northeast Coastal and Barrier

parks: Assateague Island, Cape Cod, and Fire Island National Seashores.

- NCBN SET project lead, gave presentations to park staff at BOHA, ASIS and COLO. These presentations were given to provide an overview of the data collection occurring at these parks as well as a look at the preliminary trends in elevation and accretion and how they relate to current rates of sea level rise.
- NCBN staff, Robin Baranowski, entered three years of forest bird monitoring data (not an NCBN protocol) for Colonial National Historical Park to assist the park with data management. Data was entered into an Access database, and QA/QC quality was performed.
- NCBN staff member, Jim Lynch, assisted Fire Island National Seashore staff with the installation of three new benchmarks adjacent to the Sunken Forest. These benchmarks are to be used in support of elevation surveys of the forest that were conducted in the summer and fall of 2018. Static survey data was collected on each of these new benchmarks to accurately determine their coordinates. FIIS staff were also trained on the operation of the Trimble Total Station being used for the Sunken Forest surveys. This surveying will be used to generate a detailed elevation map of the Sunken Forest habitat.

Regional Support

- NCBN staff, Robin Baranowski, participated on a technical review panel for the Service-wide Comprehensive Call (SCC) project proposals. This included reading and reviewing 14 Northeast Region Regional Block Allocation Proposals from various parks in the NER that were requesting natural resources funding, rating and commenting on them based on criteria provided, and 2 conference calls with the review panel sharing these comments and rankings.
- NCBN staff, Robin Baranowski supported regional programs in editorial, formatting and report publication work. She formatted and published the following in FY18: 6 Northeast Region Natural Resource Condition Assessment reports, 5 Protocols/Quality Assurance Plan reports for the Eastern Rivers and Mountains Network, 2 Protocol/Data Quality Standards reports for the Northeast Temperate Network, 1 trend report on forest health monitoring for Cape Cod National Seashore.
- NCBN Program Manager was on the selection committee for the Northeast Region Coastal Ecologist position when it was first advertised.

Regional Support-Hurricane Sandy Project Management

NCBN Program Manager, Sara Stevens, manages over \$21,000,000 in Hurricane Sandy funded projects for the Northeast Region. Tasks Accomplished in FY18:

- 13 Hurricane Sandy project Task Agreement Modifications completed to deobligate and close out agreements.
- 4 Hurricane Sandy project Task Agreement Modifications completed providing project extensions and updated work plans
- Developed new Task Agreement and received DOI approval for one Hurricane Sandy project to

support data management and archiving of HS data, with Colorado State University

- 11 Hurricane Sandy project reports returned to cooperators after peer review along with comments. All received back and reviewed by Stevens before publication.
- All quarterly progress reports reviewed for HS projects and uploaded to NER HS google site and CESU tracking sheet: <https://sites.google.com/a/uri.edu/nps-hurricanesandy-science/>
- NAC CESU FY17 Annual Report Update for Sandy projects.
- Directed and Supported the following research assistants working on NER Hurricane Sandy data and project management:
 - 2 URI Research Assistants – providing data review and support for NER submerged mapping projects and science communication material
 - 1 CO State University Research Assistant-providing data management review of HS data and development of science communication and data management SOPs.
- Reviewed and commented on six Resource Briefs and one Storymap developed by URI SeaComm lab
- Managed and tracked six Hurricane Sandy accounts in AFS
- Represented the NPS on a DOI executive calls related to Hurricane Sandy, and fulfilled requests for NPS Hurricane Sandy budget and information as needed.

Other Partner Collaborations

- NCBN SET project lead, Jim Lynch, travelled to Naples, Florida in October 2017 to re-sample SET sites at Rookery Bay NERR and 10000 Islands National Wildlife Refuge that were impacted by Hurricane Irma in September. These sites were started in the early 1990s and were read after a ten year gap in May of 2017. The October trip was to re-measure the SETs and capture any hurricane related impacts at the SETs study sites. Collaborators from the University of South Florida, and staff at Rookery Bay NERR and 10,000 Islands National Wildlife Refuge were also involved in this sampling trip. Data collected during these trips resulted in the below presentations at scientific conferences in FY18.
- | ▪ NCBN SET project lead, Jim Lynch, along with NCBN, NCRN-, and USFWS staff have been collaborating on a shared enterprise database to be used to for storing and processing all SET data collected by NPS and USFWS inventory and monitoring programs. The database came online in FY18 and is currently being used by both NPS and USFWS SET users. All NPS SET data (through 2017) collected in the northeast and capital region is now in this new database.
- NCBN Staff member, Jim Lynch, collaborated with NPS and USFWS National Conservation Training Center (NCTC) staff in West Virginia to install two benchmarks on the grounds in support of GPS training classes that are frequently taught there. Collected static GPS data on these benchmarks as well as RTK surveying data on other structures at NCTC.

- NCBN staff member, Jim Lynch, assisted NPS colleagues from ASIS at a three day training class held at the NASA's facility in Wallops Island, VA. The class provided surveying instruction and support to NASA. In addition, NPS participants were trained by NASA personnel on using kites to carry cameras and collect detailed aerial photography. NPS staff intends to test these techniques for shoreline and wetland surveys.
- NCBN staff member, Jim Lynch attended a two day "Thin Layer Placement" workshop at the Delaware NERR in Dover, Delaware. Workshop was organized by the NOAA, NERR program and attended by various groups in the mid-Atlantic interested in learning more about using thin layer placement of dredged material to restore, augment or create wetland habitat.

Safety

- In consultation with CACO and NER safety staff, NCBN altered seagrass monitoring procedures to minimize potential encounters with white sharks.
- The salt marsh field crew reviewed and discussed the salt marsh safety SOPs, and JHAs with the NCBN staff prior to conducting fieldwork during the 2018 season. This included discussions about the hazards of working in the salt marsh, checking in and out each day, driving while on official travel, and ensuring that they had emergency contact numbers saved to their phones. In addition, the use of appropriate PPE when working in areas with dense tick populations was discussed. The field crew maintained contact with park staff regarding any change in logistics (site accessibility, weather, boating conditions, and site hazards) and informed the Project Leader of any changes in sampling schedule. Park staff provided required ATV training.

III. Public Interest Highlights

Direct education and interpretation outreach to the public

Youth Supported by NCBN

- 2-12 week GIP Interns- NCBN salt marsh monitoring program
- 1-24 week GIP Intern- NCBN Geomorphological monitoring program at GATE, stationed at Sandy Hook
- 1 University of Rhode Island Research Assistant-working on NCBN science communication materials
- 2 University of Rhode Island graduate students working on Hurricane Sandy funded projects.

Teaching and Advising Students

- NCBN Program Manager, Sara Stevens, was a guest lecturer for the Natural Resources Science Department Senior Colloquium at the University of RI. The colloquium includes ethics in science and developing a professional resume and cover letter, and interviewing techniques.
- NCBN Program Manager, Sara Stevens, was a guest lecturer for the Natural Resource Science

Department at URI to present the I&M program, and future NPS opportunities and employment.

- NCBN Data Manager taught a graduate-level course (Advanced Spatial Analysis: GNSS Data Acquisition and Processing in Support of Resource Management) for the URI Natural Resources Science Department. The course offered a hands-on introduction to the use of GPS for navigation and data-collection and culminated with a multi-day “SWAT Team” event at CACO, during which the class collected data in support of the park’s natural and cultural resource monitoring programs.
- NCBN staff, Robin Baranowski, taught Field Botany and Taxonomy for the URI Biological Sciences Dept., a course for seniors and graduate students, summer 2018.
- NCBN staff, Robin Baranowski, substitute taught Field Botany and Taxonomy for the URI Biological Sciences Dept., a course for undergrads, during the fall 2018 semester. She also provided assistance in teaching practicums, and review sessions for the students.
- NCBN staff, Robin Baranowski provided support in plant identification to five graduate student research projects at the University of Rhode Island working on a wetland restoration project.
- All NCBN staff mentor both undergraduate and graduate students in the Department of Natural Resources Science at the University of Rhode Island on an ongoing basis. This includes writing recommendations for graduate students who have worked on NPS projects, assisting with resumes, and general support with data management, plant taxonomy, database development and federal job applications.

Publications

Peer Reviewed Journals

- Cahoon, D. R., Lynch, J.C., Roman, C., Schmit, J.P., Skidds, D. 2018. Evaluating the relationship among wetland vertical development, elevation capital, sea-level rise and tidal marsh sustainability. *Estuaries and Coasts*.
<https://link.springer.com/article/10.1007%2Fs12237-018-0448-x>
- Nagel, J.L., H.A. Neckles, G.R. Guntenspergen, E.N. Rocks, D.R. Schoolmaster Jr., J.B. Grace, D. Skidds, and S. Stevens. 2018. Development of a Multimetric Index for Integrated Assessment of Salt Marsh Ecosystem Condition. *Estuaries and Coasts*, 41(2):334-338.

NPS Technical Reports

- Cochran, J. K., Q. Zhu, C. Heilbrun, J. Tamborski, H. Yin, P. Fitzgerald, J. Perez-Tuero, and H. Feng. 2018. Health and resilience of salt marshes in Jamaica Bay, NY: Geochemical and dynamical perspectives. Natural Resource Report NPS/NCBN/NRR—2018/1643. National Park Service, Fort Collins, Colorado. <https://irma.nps.gov/DataStore/Reference/Profile/2253220>
- Gobler, C. J., and R. A. Wallace. 2018. Acidification, hypoxia, and algal blooms: Barriers to current and future ecosystem restoration and climate change resilience in Jamaica Bay. Natural Resource Report NPS/NCBN/NRR—2018/1625. National Park Service, Fort Collins, Colorado.

<https://irma.nps.gov/DataStore/Reference/Profile/2252950>

- Nye, J. A., M. G. Frisk, R. M. Cerrato, M. Sclafani, C. N. Flagg, S. R. Sagarese, and J. A. Olin. 2018. Effects of a storm-induced barrier breach on community assemblages and ecosystem structure within a temperate lagoonal estuary: A post Hurricane Sandy analysis. Natural Resource Report NPS/NCBN/NRR—2018/1702. National Park Service, Fort Collins, Colorado. <https://irma.nps.gov/DataStore/Reference/Profile/2254675>
- Psuty, N. P., K. Ames, K. Butler, A. Habeck, and J. Raphael. Shoreline position (1D) change monitoring at Fire Island National Seashore: 2012-2017 trend report. Natural Resource Report NPS/NCBN/NRR—2018/1724. National Park Service, Fort Collins, Colorado. <https://irma.nps.gov/DataStore/Reference/Profile/2255965>
- Psuty, N. P., K. Ames, A. Habeck, E. Haussner, W. J. Schmelz, J. Blum, K. Butler, and J. Greenberg. 2017. Metrics of resilience and recovery in Floyd Bennett Field West, 2014-2016: Jamaica Bay Unit, Gateway National Recreation Area. Natural Resource Report NPS/NCBN/NRR—2017/1557. National Park Service, Fort Collins, Colorado. <https://irma.nps.gov/DataStore/Reference/Profile/2247810>
- Psuty, N. P., K. Ames, A. Habeck, E. Haussner, W. J. Schmelz, K. Butler, and J. Greenberg. 2017. Metrics of resilience and recovery in Roxbury Cove, 2015-2016: Jamaica Bay Unit, Gateway National Recreation Area. Natural Resource Report NPS/NCBN/NRR—2017/1560. National Park Service, Fort Collins, Colorado. <https://irma.nps.gov/DataStore/Reference/Profile/2247862>
- Psuty, N. P., K. Ames, A. Habeck, E. Haussner, W. J. Schmelz, K. Butler, and J. Greenberg. 2017. Metrics of resilience and recovery in Plumb Beach, 2013-2016: Jamaica Bay Unit, Gateway National Recreation Area. Natural Resource Report NPS/NCBN/NRR—2017/1559. National Park Service, Fort Collins, Colorado. <https://irma.nps.gov/DataStore/Reference/Profile/2247842>
- Psuty, N. P., K. Ames, A. Habeck, E. Haussner, W. J. Schmelz, and J. Greenberg. 2017. Metrics of resilience and recovery in Fort Tilden, 2014-2016: Jamaica Bay Unit, Gateway National Recreation Area. Natural Resource Report NPS/NCBN/NRR—2017/1527. National Park Service, Fort Collins, Colorado. <https://irma.nps.gov/DataStore/Reference/Profile/2244423>
- Psuty, N. P., K. Butler, K. Ames, and A. Habeck. Shoreline position (1D) and coastal topographical (2D) change monitoring at Gateway National Recreation Area: 2012-2017 trend report. Natural Resource Report NPS/NCBN/NRR—2018/1739. National Park Service, Fort Collins, Colorado. <https://irma.nps.gov/DataStore/Reference/Profile/2256441>
- Psuty, N. P., G. Liu, and A. Habeck. 2018. Northeast Coastal and Barrier Network monitoring of shoreline position (1D) and coastal topographical (2D) change: 2017-2018 annual summary report for Gateway National Recreation Area. Natural Resource Data Series NPS/NCBN/NRDS—2018/1181. National Park Service, Fort Collins, Colorado. <https://irma.nps.gov/DataStore/Reference/Profile/2254745>

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- Wang, Y.Q., and A. Campbell. 2018. Monitoring salt marshes using high spatial resolution satellite imagery for mapping and change detection: Protocol development for northeast coastal parks. Natural Resource Report NPS/NCBN/NRR—2018/1717. National Park Service, Fort Collins, Colorado. <https://irma.nps.gov/DataStore/Reference/Profile/2254876>
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Presentations

- A Storm of Ecological Research and Monitoring following Hurricane Sandy. Sara Stevens. Fire Island National Seashore Science Conference, April 27, 2018.
- The National Park Service Inventory & Monitoring Program and Student Opportunities. Sara Stevens. University of Rhode Island, October 2018.
- Climate Change Impacts at GEWA and THST: Northeast Coastal Barrier Network Potomac

River Erosion Study, context and status. Skidds, D.E. Climate Friendly Parks workshop, George Washington Birthplace National Monument and Thomas Stone National Historic Site. October 11, 2017.

- GPS/GNSS Fundamentals and Field Mapping for Resource Management. Skidds, D.E. Training workshop, George Washington Birthplace National Monument and Thomas Stone National Historic Site. July 2, 2018.
- IMD Scientists Training, Grand Canyon, NM (January 2018). Holly K Plaisted, Erin C Shields, Jillian Carr, N. Tay Evans, Sophia E Fox, Stephen M Heck, Robbie Hudson, Kenneth A Moore, Hilary A Neckles, Betty NeikirK, Alyssa B Novak, David B Parrish, Bradley J Peterson, Amanda I Tinoco, Frederick T Short. Examining long-term seagrass monitoring data and factors affecting species distribution and abundance in the Northeast.
- EPA Zosterapalooza Boston, MA (March 2018) Plaisted et al. Examining long-term seagrass monitoring data and factors affecting species distribution and abundance in the Northeast.
- FIIS Science Symposium (April 2018) Holly Plaisted, Katherine A. Renken, and James T. Morris. Modeling Salt Marsh Response to Sea-level Rise in four National Parks.
- URI Grad seminar (March 2018) Plaisted et al. Examining long-term seagrass monitoring data and factors affecting species distribution and abundance in the Northeast.
- American Geophysical Union conference in New Orleans, LA (Dec 2017): Moyer, Ryan P., N.S. Khan , K.R. Radabaugh , S.E. Engelhart , J.M. Smoak , B.P. Horton , B.E. Rosenheim , A.C. Kemp , A.R. Chappel ,J. Jacobs , C. Schafer , E.E. Dontis, J.C. Lynch, K. Joyse, J. Walker, B. Halavik and M. Bownik; Sedimentary and Vegetative Impacts of Hurricane Irma to Coastal Wetland Ecosystems across Southwest Florida.
- Estuarine & Coastal Sciences meeting in Perth, Australia (Sept 2018): Smoak, J.M., Moyer, R.P., Radabaugh, K.R., Lagomasino, D., Rosenheim, B.E., Schafer, C., Chambers, L.G., Harttung, S., Breithaupt, J.L., Lynch, J.C., Cahoon, D.R., Joyce, K., Cook, B., Fatoyinbo, L. and C.J. Sanders; Tropical cyclone impact on mangrove forest of southwest Florida, USA.

Budget FY18

Account	Description	Authorized	Expended	Balance
PPNENEIM1C/ PPMRSNR1Y.AM0000	Vital Signs	\$814, 580	\$814,481	\$99.00
PPNENEIM1C/ PPMRSNR1Y.AM0000	IMD-Collaboration	\$30,000	\$30,000	0.00
PPNENEIM1C/ PPMRSNR1N.NR0000	WRD	\$82,300	\$82,300	0.00
TOTAL		\$926,880		

Expenditures FY18

Vital Signs Funding: \$814,580

Personnel

- \$610,721

Cooperative Agreements

- \$19,796 Stony Brook University Water quality and Seagrass monitoring-FIIS
- \$63,224 Virginia Institute of Marine Science (VIMS) FY19 Water quality and Seagrass monitoring-ASIS, COLO, GEWA
- \$11,205 Conservation Legacy, GIP Intern Program

Equipment and Operations

- \$67,859 Equipment and Operations
- \$24,244 Vehicle Purchase

Travel

- \$17,432

Unexpended Funds

- \$99.00

Collaboration Funding: \$30,000

- \$13,857 Forest Health Monitoring Shared Field Technician with NETN and MIDN
- \$13,625 Schoodic Institute TA—FY19 Forest Health Monitoring, GEWA, THST, SAHI, COLO Shared Crew with NETN and MIDN
- \$2,518 Travel

WRD Funding: \$82,300

- \$61,897 Virginia Institute of Marine Science (VIMS) Water quality and Seagrass monitoring-ASIS, COLO, GEWA
- \$20,403 Stony Brook University Water quality and Seagrass monitoring-GATE/FIIS