

**ANNUAL ADMINISTRATIVE REPORT (FY2005) AND
WORK PLAN (FY 2006) FOR INVENTORIES AND VITAL SIGNS MONITORING**

FY2005-FY2006

NORTHEAST COASTAL AND BARRIER NETWORK (NCBN)

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's Birthplace National Monument (GEWA), Sagamore Hill National Historic Site (SAHI), and Thomas Stone National Historic Site (THST)

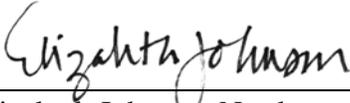
Northeast Coastal and Barrier Network Approval Signatures



George Price, Superintendent, Cape Cod National Seashore,
Representative-Network Board of Directors

January 24, 2006

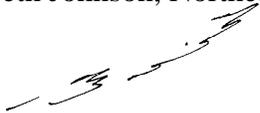
Date



Elizabeth Johnson, Northeast Region Inventory and Monitoring Coordinator,

January 24, 2006

Date



Prepared by: Sara Stevens and Bryan Milstead, Network staff,

January 24, 2006

Date

| <u>Budget program (MS Access, aarwp_budget.mdb)</u> | |
|--|---|
| v | The income amounts entered for Biological Inventories, Vital Signs Monitoring, Prototype \$\$ - Annual Transfer, Water Quality Monitoring and other sources matches the dollar amounts from the memos sent to the regions/networks by WASO (have you used the correct income amounts?). |
| v | In the Add/Edit Budget Records form, the amount shown for Total Expenses matches that for Total Income. (If it doesn't, enter a record under Expenses in the 7_Other category to make it balance; use an entry such as 'Unexpended funds' or 'Overspent Funds' in the Description column to explain the amount.) |
| v | For all Expense records, the Description field includes the name of the university, agency, company, or other vendor to help us document our outsourcing efforts. (If this expense involved a contract, cooperative agreement, interagency agreement, or other partnership, is it clear where the money went?) |
| v | For all Expense records, the correct item from the picklist for 'Where \$\$ Went' has been entered. [Think about who the check was written to; e.g., enter 'Other Non-Federal' for funding that went directly to the private sector, such as for purchases (computers, supplies, etc.), travel (airlines, rental cars, hotels).] |
| v | On the Status of Biological Inventories form, there is one record for each inventory that is described in the text section of the AARWP or in the budget program. Be sure to list each park that was involved in the particular inventory. |
| v | Each year's budget has been exported as an .rtf file (one for FY 2005 and one for FY 2006), and both files have been inserted into MS Word at the end of the AARWP document. |
| v | The file aarwp_budget.mdb has been renamed to include the 4-character network alpha code and the years, as shown in this example: NCCN_FY0506_aarwp.mdb |
| <u>Annual Report and Work Plan (MS Word)</u> | |
| v | I have carefully read the guidance for the AARWP and followed it. |
| v | A header or footer with the date that the aarwp was last revised has been included. |
| v | I gave special attention to the 'Summary of Major Accomplishments' and 'Public Interest Highlights' sections of the report, following this years' guidance and example. (We need good examples of the successes, applications, and highlights of the program to help us obtain funding for all 32 networks! Your 'Summary of Major Accomplishments' section at the beginning of your annual report is what we'll use for the I&M Program's annual Report to Congress to justify the funding spent by your network.) |
| v | In the 'Status of Park Vital Signs Monitoring' table, all entries are equal to or greater than the entries in last year's report. |
| v | Photographs that might be included in one of the reports to Congress, brochures, websites, or other materials that help the program have been submitted by the network. (See the photo database and guidelines for submitting photographs.) |
| v | The aarwp file has been renamed using the network's 4-character alpha code and the years (FY0506) as in the example NCCN_ FY0506_aarwp.doc |
| v | The annual report has been approved by the appropriate individuals, per my region's procedures. (If you cannot get electronic signatures, it is okay to submit a hard copy with signatures after November 4.) |
| v | I have followed my region's procedures for submitting the two files (e.g., NCCN_ FY0506_aarwp.doc and NCCN_ FY0506_aarwp.mdb). (Most regions require you to submit the files through the regional office. The files may be zipped into a zip file if desired, and then submitted to Steven Fancy via either email or ftp). |
| <u>Review of FY 2006 Work Plan by WASO</u> | |
| v | [Enter Yes or No]: Has the FY 2006 workplan been approved by the network Board of Directors, and therefore ready for the full WASO review? (If you enter No, the WASO I&M and WRD offices will only briefly review the work plan for 'red flags'. |

Summary of Major Network Accomplishments and Public Interest Highlights for FY2005

Northeast Coastal and Barrier Network - This network of eight parks includes Cape Cod NS (CACO), Assateague Island NS (ASIS), Colonial NHP (COLO), Fire Island NS (FIIS), Gateway NRA (GATE), George Washington Birthplace NM (GEWA), Sagamore Hill NHS (SAHI), and Thomas Stone NHS (THST). In FY 2005 the Network made substantial progress on completing draft monitoring protocols for monitoring shoreline position, estuarine eutrophication, salt marsh vegetation, and nekton. These protocols are currently in the peer review phase, and revisions will be completed in FY2006. Pilot sampling using these draft protocols continued in selected parks. In addition, the Network's first database template was completed and adapted to each project. Cooperators tested the database and revisions are being made. In addition, some initial inventory field work began on bats and dragonflies and butterflies, while other inventory projects submitted their final products.

Biological Inventories

Network Objectives for Biological Inventories:

- Locate, catalog and archive park natural resource documents, data sets, and spatial information and ensure such information is accurate, in useable formats and readily available.
- Conduct inventories targeted at vertebrate and vascular plant species in the Network parks and conduct quality assurance and review of all inventory products.
- Conduct investigations on species and species assemblages that are of special concern to network parks and conduct quality assurance and review of all inventory products.
- Conduct other baseline natural resource inventories identified as important to Network parks and the Network Vital Signs program and conduct quality assurance and review of all inventory products.

In FY 2005, Network cooperators from the University of Maryland conducted the first year of a two year project to *inventory bats on Assateague Island NS*. This first year of this inventory has produced the first record of Seminole bats in the state of Maryland. More survey effort is needed to determine if the Seminole bat captures represent incidental occurrences or a geographic range extension. Additionally, autonomous bat monitoring stations were established on the island to continuously collect bat echolocation calls throughout the year. These data will be used to examine bat migration on the island.

Mammal Surveys conducted by Frostburg University at Colonial National Historical Park, George Washington Birthplace NM, and Thomas Stone NHS were completed. Databases for all three parks were submitted to the Network for review and reports are due in FY2006. Thirteen species of nonchiropteran mammals were recorded at Thomas Stone NHS. Prior to this survey, no mammal records existed for the park. At George

Washington Birthplace NM, 17 of the 20 species previously recorded for the park were confirmed and 7 new species were detected, including this year's confirmation of the Southeastern Shrew, *Sorex longirostris*. At Colonial NHP, 4 individuals of the cotton rat, *Sigmodon hispidus*, were captured for which there had been only one previous record in the park.

Herpetological inventories at Assateague Island NS through a cooperative agreement with the Wildlife Conservation Society, documented eighteen species in the park. Previously unknown to park staff and absent from the literature, the gray treefrog was found in many ponds in the northern end of the park, and an eastern gartersnake was observed in the southern end. Staff from the Maryland Coastal Bays Program observed, and photographed the gray treefrog once in a pond on Assateague in July 2003. This was the first known observation of the gray treefrog on Assateague Island or any barrier island off the Delmarva coast. The Network inventory confirmed this previous report extending the known range of this species.

Field work was also extended this year at Assateague Island by the Wildlife Conservation Society to examine habitat use by spotted turtles in the park. Radio telemetry was used to track and monitor individual turtles. The spotted turtle is uncommon on the Coastal Plain, though widely distributed on Delmarva. This species has experienced considerable decline throughout its range due to loss of freshwater habitat and over-collecting for the pet trade, and is listed as a protected species in some states. Previously, this species was observed in only one area of the park, and was considered to be rare at ASIS. Extensive searches, trapping, and tracking in 2004 and 2005 confirmed the spotted turtle's restriction within the park as well as its rarity. All data were submitted to the Network as well as a draft report in FY2005.

This year an Odonate (Dragonfly and Damselfly) and butterfly survey was initiated at Assateague Island National Seashore. Network cooperators, Rhode Island Natural History Survey contracted Dr. Richard Orr, an entomologist with USDA to complete the surveys. At the end of this year's field season, 23 species of odonates, 27 species of butterflies, and 33 species of orthopterans were identified by Dr. Orr in the park. For these three taxa their ecological significance and function in the park's ecosystems were examined. In addition, extensive aquatic insect samples were taken and identified from six selected freshwater ponds. Selected terrestrial arthropods outside of the three main taxa, which also appear to have a significant presence on the island, have also been identified. Field work will continue on this project in FY2006. Because of Dr. Orr's interest in orthopterans (grasshoppers, crickets, locusts and katydids), he collected additional information on them, while surveying in the park. He has discovered that they are "unexpectedly diverse" within Assateague Island NS, finding that their assemblage changes considerably across the park from secondary dunes, brushlands, pine forest, and salt marsh.

Products from all of the inventory projects are beginning to be submitted to the Network. These exceptional products; maps, reports, databases, metadata, photographs, voucher specimens are already being used by those parks in the Network scheduled for GMP

(General Management Plan) development. The Network has compiled inventory results for Sagamore Hill NHS and recently for George Washington Birthplace NM. These data are also being used in pilot data and information synthesis projects for GMP parks.

Vital Signs Monitoring

Network Objectives for Vital Signs Monitoring:

- Hire and retain professional staff and provide a safe, healthy, and productive work environment.
- Develop and maintain working and decision-making processes that engage the network board of directors, technical staff, cooperators and managers of network parks.
- Develop, implement, and maintain a Network data management program. (Note: this objective is placed under Vital Signs monitoring, however, it is equally important and integrated with the Biological Inventories portion of the program.).
- Identify and prioritize Network Vital Signs, develop protocols and implement programs to monitor these Vital Signs in Network parks.
- Integrate water quality monitoring in the Network Vital Signs monitoring program.

Two significant accomplishments were completed by the Network in FY2005, the *Northeast Coastal and Barrier Network Vital Signs Monitoring Plan* and the *Northeast Coastal and Barrier Network Information Management Plan*. Both plans were drafted and reviewed early in FY2005 and revised and completed in September 2005. The monitoring plan describes how the Network identified and prioritized vital signs, developed protocols for vital signs monitoring and plans for staffing, budgeting and full implementation. The Information Management Plan provides data management guidelines and standard operating procedures for the successful implementation of all vital signs monitoring protocols by the Network.

Other accomplishments in FY2005 included significant work on the *coastal geomorphology* monitoring program including the development of a draft protocol for monitoring shoreline change in four coastal Network parks. Implementation of this monitoring protocol will provide parks with valuable maps and information about the change in position of these ocean shorelines over time.

Also part of the Network's *coastal geomorphology* monitoring program, Network-wide LIDAR (LIght Detection And Ranging) and imagery surveys continued in FY2005. In FY2005, NASA, through an inter-agency agreement with the Northeast Coastal and Barrier Network and USGS, conducted LIDAR surveys in all eight network parks. Realizing the importance of this information to the National Park Service, NASA surpassed the number of originally agreed upon flight days, flying thirteen days instead of eight. Of particular note were the extra flying days at COLO that allowed the capture of topographic survey data and imagery of the entire park. In addition to the high resolution topographic data collected in these surveys, NASA also employed for the first

time Network-wide, a high resolution multi-spectral digital imaging system that captured over 100,000 aerial images of network parks. Again recognizing the value of imagery to the NPS, the USGS worked with the Network to create an easy to use naming and indexing system which facilitated delivery of the imagery to the Network providing easier access and use of the images. The Network then used existing GIS software (ESRI ArcGIS) to hyperlink the images to their corresponding coordinates along the NASA flight-lines.

USGS scientists developing the Network's estuarine eutrophication monitoring program produced a draft protocol to monitor indicators of estuarine water quality and seagrass distribution and condition this year. External peer review of this protocol is complete. The Network is working closely with Cape Cod National Seashore Prototype Monitoring Program staff and the USGS cooperators to incorporate revisions to the protocol. A revised version will be completed in FY2006. Field testing continued in FY2005 in selected Network parks.

The initial draft of a second protocol, developed by scientists at the University of Rhode Island as part of the Network's estuarine eutrophication monitoring program, has been completed. This protocol will be used to model groundwater nitrogen loading to the coastal embayments of five of the Network's parks. Groundwater loading estimates are calculated in a consistent manner from various nitrogen sources within each park to provide a comparison of nutrient enrichment to park marine resources.

Pilot sampling continued as part of the Network's salt marsh monitoring program, including both nekton and salt marsh vegetation. Draft protocols for both nekton and vegetation monitoring were complete in FY2005 and are in the process of external peer review. Implementation of these protocols in NCBN parks will bring the Network into a larger regional salt marsh monitoring effort that includes parks from the NPS Northeast Temperate Network as well as several National Wildlife Refuges along the North Atlantic coast. Cape Cod NS and Network staff will be working closely to address any issues identified during the protocol pilot testing related to field sampling methods and/or operating procedures.

Draft products for the Landscape Change project being developed in collaboration with remote sensing scientists at the University of Rhode Island were submitted to the Network in FY2005. All products were based on Fire Island National Seashore which served as the pilot park for this project. Based upon the vegetation map developed in 2002, exploration of new data and approaches that could efficiently update the vegetation map for the park on a regular basis and evaluate vegetation change, were tested. In August 2005, Fire Island NS and Network staff held a two day meeting at the University of Rhode Island to carefully review and comment on draft products completed as part of this project. The University of Rhode Island cooperators presented the process used to classify terrestrial vegetation using remote sensing data, and methods they developed to map SAV (Submerged Aquatic Vegetation) around Fire Island National Seashore. Final products for this project will be completed in FY2006. These products will be presented to the Network's Technical Steering Committee for review and recommendations on full

protocol development for monitoring landscape change in all Network parks using the methods developed as part of this cooperative agreement.

In FY2005, the network organized and held a two day workshop at Gateway National Recreation Area on monitoring Visitor Use and Impact Monitoring in Network parks. Well known recreation ecologists attended the meeting along with USGS scientists, and Park and Network staff. Potential monitoring objectives for the Network's vital signs program, as well as measures and sampling designs were discussed and prioritized. Following this workshop, Network staff and cooperators jointly held a breakout session at the 2005 George Wright Society meeting in Philadelphia. The Network plans to continue work towards protocol development in FY2006.

Finally, another major accomplishment in terms of data management for the Network included development of an draft MS Access database template for the Network, that will provide an easy-to-use, menu driven interface to help researchers and staff from all NCBN projects and parks understand, access, and utilize information from the monitoring projects. Network staff played a key role in developing a new version of the National NPS Natural Resource Database Template (NRDTv3) by actively taking part in a workgroup organized to develop this new template.

Water Quality

The Network's water quality monitoring component, funded by the NPS Water Resources Division, is fully integrated with the design and implementation of the network-based vital signs program. The Northeast Coastal and Barrier Network Vital Signs Monitoring Plan, completed in September 2005, is a single, integrated monitoring plan that incorporates the "core vital signs" and water quality components.

In FY 2005 an interagency agreement with USGS was modified to incorporate the development of a protocol for monitoring estuarine eutrophication in Network parks. A draft protocol was completed and submitted to the Network in December 2004. This protocol was peer reviewed both by outside NPS reviewers and NPS Water Resources division staff. The Network staff, Cape Cod National Seashore Monitoring Program staff and the USGS cooperators have planned a meeting to discuss the reviews and revisions that will be made to this protocol in FY2006. Initial implementation of the protocol occurred in FY2005 and details of the implementation will be discuss and incorporated in the review and revision process, including initial analyses of collected data.

NCBN and Cape Cod NS data management staff will be working jointly in assuring conversion and upload of all water quality data collected as part of this protocol to NPSTORET. A standard operating procedure will be developed and incorporated into the protocol.

In addition to direct sampling of indicators of estuarine eutrophication, the Network has continued to work through a cooperative agreement with University of Rhode Island

scientists to develop a protocol to track *sources of nitrogen* to park estuaries. The draft report submitted to the Network in FY2005 demonstrates through example the application of a simple mathematical export model in order to calculate groundwater nitrogen loading to the coastal embayments of Network parks. Groundwater loading estimates were calculated in a consistent manner from various nitrogen sources within each park to provide a first-order; network-wide comparison of nutrient enrichment to each park's marine resources. By simultaneously monitoring stressors (nitrogen loading) and ecological response (estuarine eutrophication), the Network will be able to assist park managers in identifying potential changes in land use, that may be effecting the vitality of park estuarine resources. Additionally, management efforts designed to protect park resources by reducing nitrogen sources within the jurisdictional boundaries of a park can evaluate and prioritize which sources potentially pose the greatest threat.

The Network has received a draft final report from the University of Rhode Island cooperators. This draft is currently being reviewed by Network staff, and once revised in FY2006, will be submitted for external peer review.

Public Interest Highlights

Species Inventories document first time records in Network Parks

Surveys in FY 2005 resulted in the first recorded occurrences of many species in parks of the Northeast Coastal and Barrier Network, including mammals, dragonflies and damselflies and bats. Cooperators from the University of Maryland completed the first field season of a breeding and migratory bat inventory at Assateague Island National Seashore. This inventory has documented the first record of Seminole bats (*Lasiurus seminolus*) for the state of Maryland, an exciting find. Autonomous bat monitoring stations were established on the island to continuously collect bat echolocation calls throughout the year. These data will be used to examine bat migration patterns, the first ever collected for Assateague and surrounding areas.

Thirty-six dragonfly and damselfly species have documented at thirty-seven sites at Gateway National Recreation Area by Rhode Island Natural History Survey cooperators. Three new species were collected in 2005 at Gateway this year; the Slaty Skimmer (*Libellula incesta*), the Great Blue Skimmer (*Libellula vibrans*), the Variegated Meadowhawk, (*Sympetrum corruptum*). The Variegated Meadowhawk is a vagrant from the west and was taken at the Sandy Hook unit of the park. It hasn't been seen in New Jersey since 1994.

Investigators from Frostburg State University have recorded 13 species of nonchiropteran mammals at Thomas Stone NHS, and 17 out of 20 species previously recorded in 2004 for George Washington Birthplace NM were documented again this year. In addition, this year's field season added 7 new species, including the confirmation of the southeastern shrew, *Sorex longirostris* for the George Washington Birthplace NM species list. Frostburg State University cooperators also captured 4 individuals of the cotton rat,

Sigmodon hispidus, at Colonial NHP that had only been previously recorded in the park once.

Network-wide LIDAR and imagery survey conducted by NPS, USGS and NASA

In FY2005, NASA, through an inter-agency agreement with NPS NCBN and USGS, conducted LIDAR surveys in all eight network parks. Realizing the importance of this information to the NPS, NASA surpassed the number of originally agreed upon flight days, flying thirteen days instead of eight. Of particular note were the extra flying days at COLO that allowed the capture of topographic survey data and imagery of the entire park. In addition to the high resolution topographic data collected in these surveys, NASA also employed for the first time network-wide, a high resolution multi-spectral digital imaging system that captured over 100,000 aerial images of network parks. Again recognizing the value of imagery to the NPS, the USGS worked with the network to create an easy to use naming and indexing system which facilitated delivery of the imagery to the network and to allow easier access and use of the images.

I. Overview and Objectives

Ecological context

The Northeast Coastal and Barrier Network (NCBN) includes eight parks stretching along the coastline of the northeastern United States from Massachusetts to Virginia. These parks represent some of the most ecologically similar collections of lands within the National Park Service. They consist of critical coastal habitat for many rare and endangered species, as well as migratory 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. These parks represent islands of protected lands within the urban sprawl of the Northeast. Census estimates indicate that populations residing within this zone are growing three times the rate of the total United States population. Without scientifically based knowledge and information on the effects of urban pressure on the health of these park ecosystems, it is uncertain that management decisions are being made that can maintain or can restore ecosystem health.

Program overview

In December 2001, the Northeast Coastal and Barrier Network (NCBN) Inventory Study Plan was submitted to WASO. Vertebrate and vascular plant inventories were implemented in the network in FY2002 and will continue over the next few years. The network continues to work cooperatively with scientists from the Wildlife Conservation Society, the College of William and Mary, Frostburg University, the University of Richmond, the University of Maryland, and the New Jersey Audubon Society to complete these baseline inventories. In addition to inventorying vertebrate species, the network has begun to review existing park invertebrate species data. Odonates (dragonflies and damselflies), considered indicators of wetland ecosystem health by scientists, and a taxonomic group of high public interest along the coast, are being inventoried in network parks through a

cooperative agreements with the Rhode Island Natural History Survey (RINHS) and the Virginia Natural Heritage Program (VANHP). Reports and data have been submitted to the Network in 2005 and from these projects, some of the first data on migratory dragonflies are being collected. As part of the inventory program, compilation and cataloging of existing data into the national I&M databases, NPSpecies and NatureBib continues, and newly acquired I&M data and information have been used in park GMP planning processes for three of the Network parks.

Developing Network park vegetation maps continues. The NY Natural Heritage Program is currently developing maps for GATE and SAHI and the Virginia Division of Natural Heritage is conducting the field classification portions of the mapping for COLO and GEWA. Review of existing vegetation mapping products for ASIS and THST are being compiled and reviewed through a cooperative agreement with NatureServe.

The Northeast Coastal and Barrier Network Vital Signs Monitoring Program is in its fifth year of development. The Network's final vital signs monitoring plan was published in September 2005. The network continues to work with cooperators from the University of Rhode Island, USGS, and Rutgers University to develop monitoring protocols to assess estuarine eutrophication, nitrogen inputs to park estuaries, salt marsh ecosystem dynamics, visitor use and impacts, and geomorphological change.

A draft NCBN data management plan was completed in December 2004, providing guidance and standards on all aspects of managing both the network's inventory and long-term monitoring data. This plan describes how the network will collect, store, QA/QC, archive and make available the information developed by the network's I&M Program.

The Network continues to work closely with Cape Cod National Seashore (CACO), a prototype monitoring program for the North Atlantic Coast and also part of the Northeast Coastal and Barrier Network. Park and Network staff have continued to collaborate closely on protocol development and review, as well as data management projects.

Objectives

Biological Inventories

1. Locate, catalog and archive park natural resource documents, data sets, and spatial information and ensure such information is accurate, in useable formats and readily available.
2. Conduct inventories targeted at vertebrate and vascular plant species in the network parks and conduct quality assurance and review of all inventory products.
3. Conduct investigations on species and species assemblages that are of special concern to network parks and conduct quality assurance and review of all inventory products.
4. Conduct other baseline inventories identified as important to network parks and the Network Vital Signs program and conduct quality assurance and review of all

inventory products.

Vital Signs Monitoring

5. Hire and retain professional staff and provide a safe, healthy, and productive work environment.
6. Develop and maintain working and decision-making processes that engage the network board of directors, technical staff, cooperators and managers of network parks.
7. Develop, implement, and maintain a network data management program. (Note: this objective is placed under Vital Signs monitoring, however, it is equally important and integrated with the Biological Inventories portion of the program.).
8. Identify and prioritize Network Vital Signs, develop protocols and implement programs to monitor these vital signs in network parks.
9. Integrate water quality monitoring into the Network Vital Signs monitoring plan.

II. Accomplishments (FY2005) and Scheduled Activities (FY2006)

A. Biological Inventories

Objective 1: Locate, catalog and archive park natural resource documents, data sets, and spatial information and ensure such information is accurate, in useable formats and readily available. (all parks).

Task 1.1. The NPSpecies Database.

- FY2005 Accomplishments: **(1)** A cooperative agreement was established with the University of Rhode Island for the ongoing maintenance, update and verification of the NPS NPSpecies database. Linda Fabre, a URI Research Associate was contracted to complete this work beginning in June 2003. This work entails data entry, conversion and verification as well as the training of NPS park staff and cooperators in the use of NPSpecies; coordinating the review of datasets by taxa experts and developing a system to consistently and accurately populate each park's database with new data. Ms. Fabre prepared THST, GEWA, COLO and CACO Vascular Plant, GEWA, THST, COLO and GATE Amphibian, and THST, COLO, and GATE Reptile databases for taxa expert review and certification; instructed and reviewed work by taxa experts on these databases; submitted the completed databases for THST, GEWA, ASIS, Vascular Plants and GATE, FIIS Birds for upload to NPSpecies online; completed major updates to SAHI, GATE Vascular Plants; GATE Mammal and SAHI Bird databases; extracted data from the NPSpecies Biodiversity Data Store and entered this data into CACO, GATE, ASIS, THST, COLO and GEWA databases; presented a talk to NPS Natural Resource Staff (GATE) on Uses of NPSpecies; trained biologists (GATE, CACO) on using NPSpecies; wrote procedures for converting data from database template and entering into NPSpecies. **(2)** Helen Hamilton, a contract botanist for the Network, certified the existing NPSpecies Vascular Plant database for ASIS, THST, GEWA and COLO. This work entailed reviewing each vascular plant record, creating a Plant Species Local List, certifying the Local List and writing a final report.

- Scheduled FY2006 activities and products: **(1)** The cooperator, Linda Fabre, will maintain, update and verify the NPSpecies database for the Northeast Coastal and Barrier Network as needed; ensure that changes to the database are noted and entered into the database tracking system; prepare and review the databases for taxa expert certification; coordinate the certification of datasets by taxa experts; provide training to NPS personnel and Cooperators regarding the use of NPSpecies as needed.

Task 1.2. The NatureBib Database.

- FY2005 Accomplishments: **(1)** Scott Tiffney, Penn State University cooperator, has assessed the overall status of Network park's NatureBib databases and has begun detailed editing of park databases. Park NatureBib database records are being assessed and edited for duplication, spelling, authority control, data integrity and data comprehensiveness. To date, 19 records and 3 NCBN park databases have been or are near completion. Scott completed a draft Northeast Region NatureBib Data Management Plan and a draft Northeast Region NatureBib Data Entry Manual. Scott has also begun scanning and digitizing select NatureBib documents for NCBN parks. Digital versions of NatureBib documents are also being collected from a variety of online sources. To date, 6 documents have been scanned and converted to pdf format (final pdf documents: ASIS - 1, CACO - 1, GATE - 3, and GEWA - 1); 496 documents for a variety of networks have been scanned and converted to pdf format, or, have been located in pdf format and need to be identified in the NatureBib database online; and finally, 49 documents for a variety of networks have been scanned and still need to be converted to pdf.
- Scheduled FY2006 Activities and Products: **(1)** NatureBib database data requests will continue to be fulfilled as they are received. Quarterly e-mail progress reports will be sent to detail task progress. NatureBib database assessment and editing will continue for ASIS, CACO, COLO, FIIS, GATE, GEWA, SAHI, and THST NatureBib databases. Scanning and digitizing of NCBN NatureBib documents will continue and a web page will be created for digital document storage as needed. Quarterly e-mail progress reports will be sent to detail task progress.

Objective 2: Conduct inventories targeted at vertebrate and vascular plants in the Network parks and conduct quality assurance and review of all inventory products. (all parks)

Task 2.1. Mammal inventories (COLO, THST, GEWA, SAHI, ASIS)

- FY2005 Accomplishments: **(1)** Thirty-six voucher specimens representing 9 species were prepared from individuals collected at THST and GEWA and accessioned into the mammal museum at Frostburg State University. As a result of this activity the Frostburg State University cooperators (Dr. Ron Barry) produced an additional record (*Sorex longirostris*, the southeastern shrew) for GEWA. The MS Access electronic database for THST/GEWA was completed and submitted to the Data Manager for the Northeast Coastal and Barrier Network. Identification of specimens collected at COLO was completed and preparation of skins and skulls begun for deposition in the mammal museum at Frostburg State University. As a result of this activity we revised our confirmed species for the park to exclude the southern short-tailed shrew

(*Blarina carolinensis*). The MS Access electronic database for THST/GEWA was completed. A progress report on inventorying activities at GEWA/THST and COLO was submitted in January 2005. (2) USGS cooperater Allan O'Connell, conducted mammalian surveys at SAHI during the 2004 field season. (3) A cooperative agreement was established with Dr. Edward Gates from the Appalachian Lab, University of Maryland, Center for Environmental Science, to inventory bats on ASIS, as well as complete reconnaissance surveys for bats at THST, GEWA and COLO. Assateague Island National Seashore (ASIS) was surveyed for bats via acoustic and capture techniques during the summer 2005. A summary report was submitted to the Network. Cooperators acoustically monitored bat activity at 35 locations among 5 cover types on ASIS. The used mist nets at 11 locations for 19 nights to capture 133 bats representing 3 species. As part of the same cooperative agreement, the cooperators also met with National Park Service staff in the spring of 2005 to discuss and examine potential bat use at GEWA, THST, and COLO. They inspected the various habitats within the parks to determine potential bat use and approximate survey effort required to inventory bat communities. The cooperators obtained GIS layers that will allow them to develop a more accurate approximation of survey effort within each park.

- Scheduled FY2006 Activities and Products: (1) Draft data products for GEWA, THST and COLO will be submitted to the NCBN data manager for review. Dr. Ron Barry will prepare a final report for THST/GEWA and work with NPS personnel to produce metadata. Tressa Dolbeare's M.S. thesis on habitat-specific species diversity of small mammals and demography of *Peromyscus leucopus* in GEWA will be completed. The preparation of voucher specimens collected at COLO will be completed by Frostburg State University graduate students, and these specimens will be accessioned into the mammal museum at Frostburg State University. Dr. Ron Barry will prepare a final report for COLO, and work with NPS personnel to produce metadata. Heather Warchalowski's and Dana Strang's M.S. theses on small mammal response to Japanese stilt grass (*Microstegium vimineum*) in mixed deciduous-coniferous forests, and effects on small mammals of hurricane-created canopy gaps in forests, respectively, will be completed. Cooperator, Dennis Skidds, from the University of Rhode Island will complete a review and QA/QC of all data products submitted to the Network for all three parks. (2) A final report on mammalian surveys conducted at SAHI by USGS cooperater, Allan O'Connell will be submitted to the network in 2006. (3) Network cooperater, Dr. Edward Gates, will complete the second field season of the bat inventory at ASIS, and submit final reports for the reconnaissance work at COLO, GEWA and THST to the Network.

Task 2.2. Avian inventories (COLO, THST, GEWA, ASIS, SAHI, FIIS, GATE)

- FY2005 Accomplishments: (1) New Jersey Audubon Society (NJAS) has, completed and submitted a review of avian species records in the NPSpecies database for Gateway National Recreation Area (GATE) and Fire Island National Seashore. Gateway data were provided for specific units of the park, i.e., Jamaica Bay/Breezy Point, Staten Island, and Sandy Hook. A final report it to be submitted along with each database. The Network has received and reviewed the Gateway NRA report

from NJ Audubon cooperators. University of Rhode Island cooperator, Linda Fabre, reviewed and QA'd both the GATE and FIIS databases and uploaded them to NPSpecies online. (2) Based on the review described above, the cooperative agreement instituted between the NCBN and the New Jersey Audubon Society was modified to include avian inventories of breeding passerines and secretive marsh birds at GATE. Field work was conducted at all units of Gateway during the 2005 field season. (3) A no-cost time extensions was established with cooperator, Dana Bradshaw, from the College of William and Mary. This modification to the original agreement extends the delivery dates for project products due to the Network as a result of avian inventories at COLO, GEWA, THST and ASIS. (3) Since a cooperative agreement (FY02) was established with the Theodore Roosevelt Sanctuary (TRS) and Audubon Center to inventory avian species at SAHI, TRS has completed all of the field work and submitted a draft final report and data. The final report and data were reviewed and QA'd by University of Rhode Island cooperator, Dennis Skidds.

- Scheduled FY2006 Activities and Products: (1) NJAS will complete and submit a final report for the FIIS avian species data compilation project. As well as complete the final data products and report for the GATE breeding passerines and secretive marsh birds inventory. (2) The College of William and Mary staff will complete draft and final reports for avian survey efforts in the Northeast Coastal and Barrier Network (NCBN) parks. Reports will include habitat and bird inventory data for all units of each park, in addition to historical data where available. Data will span all seasons and include aerial image maps of point locations and nomenclature. Long-term monitoring recommendations and management suggestions where appropriate will be presented for each park. Additional work will be carried out by the University of Rhode Island cooperator, Linda Fabre, on updating the NPSpecies database for each park and certifying all avian species records.

Task 2.3. Herpetological inventories (COLO, THST, GEWA, GATE, SAHI, FIIS, ASIS)

- FY 2005 Accomplishments: (1) Through a cooperative agreement with Dr. Joseph Mitchell, University of Richmond, herpetological inventories at COLO, GEWA, and THST began in October 2001 and continued through July 2004. A total of 26 species of amphibians and 27 reptiles have been documented for COLO, 10 and 11 respectively, for GEWA, and 13 and 8, respectively, for THST. New county records and range extensions for several species, mostly frogs and salamanders, have been documented. Field work has been completed for the three parks in this I&M project. All data have been entered and a copy sent to the Network data manager for evaluation. Final evaluation of the data has been completed and the site maps completed for the final reports. A final report for COLO was completed and reviewed by Network staff, as well as a draft final report for GEWA. (2) Work continues with the Wildlife Conservation Society (WCS) to complete draft final reports for herpetological inventories conducted at ASIS, GATE, FIIS and SAHI. Additional field work continued in FY2005 on a population of spotted turtles (*Clemmys guttata*) on ASIS. Individuals were tracked using radio-telemetry in an effort to determine population size, habitat usage, hibernacula sites, seasonal movements and habits. (3)

Through an agreement with the University of Rhode Island NPS Field Technical Support Center (URI FTSC), Dennis Skidds, a research associate with the lab continued to develop and implement QA/QC procedures for all herpetological data submitted to NCBN by cooperators.

- Scheduled FY 2006 Activities and Products: **(1)** Cooperator Dr. Joseph Mitchell from the University of Richmond is due to submit final reports for GEWA and THST. **(2)** Network staff will continue to work cooperatively with the Wildlife Conservation Society and Dr. Robert Cook at CACO in finalizing herpetological inventory reports for ASIS, GATE, FIIS, WIFL (William Floyd Estate, part of FIIS) and SAHI.

Task 2.4. Estuarine and freshwater fish inventories (CACO, THST, GEWA)

- FY 2005 Accomplishments: **(1)** During 2004, continued inventory efforts at GEWA were completed following a total of five visits to the park. In addition to participation from the fisheries biologist and crew from Shenandoah National Park, a significant component of the inventory during these visits was accomplished through the assistance of equipment and personnel from the U.S. Fish and Wildlife Service per an interagency agreement. Data entry and verification were completed and a final report submitted to the Network in FY2005.
- Scheduled FY 2006 Activities and Products: **(1)** No fish inventory activities are scheduled.

Objective 3: Conduct investigations on species and species assemblages that are of special concern to network parks.

Task 3.1. Conduct Odonate and Lepidoptera Inventories in Network parks.

- FY2005 Accomplishments: **(1)** A cooperative agreement with the Rhode Island Natural History Survey (RINHS) to conduct odonate (dragonflies and damselflies) inventories at GATE, FIIS and SAHI was established in 2003. RINHS completed site reconnaissance during the fall of 2003 and conducted monthly field surveys from May through September 2004 and 2005. Approximately 65 sites were visited within all three parks (FIIS, GATE, SAHI). Summary reports for each park were submitted to the Network in the fall of FY2005. **(2)** In FY04 a modification to the existing RINHS agreement was completed to inventory Odonate and Butterfly species on ASIS. Lead investigator on this project, Richard Orr, completed site reconnaissance in November, 2004 in preparation for the 2005-2006 project. All identified freshwater ponds on the island were visited and evaluated; with five ponds and one section of salt marsh selected for regular monitoring during the study. By the end of the 2005 season, 23 species of odonates, 27 species of butterflies, and 33 species of orthopterans were identified. For these three taxa their ecological significance and function in the Island's ecosystem were examined. In addition, extensive aquatic insect samples were taken and identified from six selected freshwater ponds. Selected terrestrial arthropods outside of the three main taxa which also appear to have a significant presence on the island have also been identified. **(3)** Through a

cooperative agreement established in FY03 with the Virginia Department of Conservation and Recreation, Division of Natural Heritage (DCR-DNH) to inventory Odonata (dragonflies and damselflies) species and diurnal Lepidoptera (butterflies and skippers) species at COLO and GEWA, DCR-DNH have compiled and reviewed existing species data for both parks, conducted field work to survey for species of Odonata and diurnal Lepidoptera, entered location, habitat, and species information into an Access database, and made management recommendations for rare and endangered species encountered. Final reports and data products were submitted to the Network in FY2005. Cooperator Dennis Skidds from the University of Rhode Island worked with the Virginia cooperators to QA/QC all project products.

- Scheduled FY 2006 Activities and Products: (1) The RINHS will complete voucher specimen preparation, enter data for 2005 field season, and write and submit draft and final reports and data products for each park by January 2006. (2) RINHS, Dr. Richard Orr, will begin compiling odonate and butterfly data collected on ASIS in FY2005 and submit an annual report in December 2005. The project will continue into 2006 with an additional field season. Additional species of odonata and butterflies will likely be limited to stray adults from the mainland. The five selected ponds will be monitored throughout the season. Interactions of the Island's resident odonate and butterfly species and their ecological role on the barrier island will be further described. The unexpectedly high orthopteran diversity at ASIS with distinct habitats containing specific assemblages of grasshoppers, crickets, and katydids will be further studied and surveyed. General surveys of the arthropods of the salt marshes will be conducted to the extent time and resources allow.

Objective 4: Conduct other baseline biological inventories identified as important to Network parks and the Network Vital Signs program.

Task 4.1. Integrate newly collected plot data into the National Vegetation Classification and to ensure adherence to the NPS Vegetation Mapping Program standards.(GATE, SAHI, GEWA, COLO)

- FY 2005 Accomplishments: (1) GATE, SAHI: NatureServe ecologist received data analysis from partner NYNHP on both parks. NatureServe (NS) ecologist Ery Largay has reviewed the data analysis for both parks, and has completed approximately 75% of GATE crosswalk. After conferring with NYNHP, NatureServe has a revised schedule for completed crosswalks to be delivered to NYNHP. COLO: Lesley Sneddon received draft park-specific descriptions from VADNH, and using this information, wrote and delivered to VADNH a dichotomous key for use in accuracy assessment. GEWA: No activity.
- FY 2006 Scheduled activities and products: (1) GATE, SAHI: Ecologist Ery Largay, in consultation with Lesley Sneddon and NYNHP will finalize the NVC types to be mapped at both parks. NatureServe will deliver an edited document (in Word) to NYNHP for their use in writing park-specific descriptions. Completed crosswalks and a dichotomous key for GATE and SAHI will be delivered to NYNHP by April 15, 2006. Upon receipt of park-specific descriptions, NS ecologists will update global descriptions as appropriate. COLO, GEWA: VADNH will complete data analysis for

all seven parks simultaneously in the following fiscal year, and at that time, final NVC units, local descriptions, and global descriptions will be completed.

Task 4.2. Assemble all final classification, map products, and metadata. Work with NPS staff to integrate new information and revise NVC units and maps as appropriate; produce a single set of classification, map deliverables and metadata that meet all VMP standards.

Parks Involved: (ASIS), (THST),

- **FY 2005 Accomplishments:** ASIS: As the plots data delivery system has evolved considerably since the plots were collected, NatureServe ecologist Ery Largay entered plot data into PLOTS 2.0 database. NatureServe attempted to track down the location of the acetate overlays holding the point locations of the plots, but have so far been unsuccessful. Lesley Sneddon traveled to FL to work with John Brock and Amar Nayegandhi on describing vegetation types based on newly acquired LIDAR data. They reviewed the environmental features of each of the types and examined the corresponding wave forms and elevation ranges. Lesley Sneddon found the technology to have good potential for monitoring change in aerial extent, as well as vegetation structure, over time. THST: NatureServe received vegetation map shapefiles, as well as accuracy assessment points, observation points, vegetation classification, and accuracy assessment report from NPS ecologist Chris Lea. Photomosaics were downloaded from the NCSU ftp site.
- **Scheduled FY 2006 activities and products:** ASIS, THST: NatureServe ecologist Ery Largay will locate and assemble the remaining products in preparation for draft final delivery in 2007. The cooperators must still acquire the original plot forms and observation point forms, as well as the PLOTS database. The cooperators have been experiencing problems seeing the two images separately, but Lesley Sneddon is working with a TNC colleague to resolve the problem.

Task 4.3. - Mapping and Product Creation-GATE, SAHI

- **FY2005 Accomplishments:** (1) Field data from 2004 was compiled by the NY Natural Heritage Program cooperators, but no field work was completed in 2005 to allow the Upper Delaware field work to completed. (2) NCSU cooperators posted mosaics and associated data files for GATE and SAHI to an ArcSDE server accessible to NPS personnel.
- **Scheduled FY2006 Activities and Products:** (1) Field work for accuracy assessment will be completed for GATE and SAHI by NY Natural Heritage Program cooperators. (2) NCSU will prepare and submit final reports and distribute final data CDs/DVDs for both the GATE and SAHI mosaics.

Task 4.4. – Vegetation mapping-COLO, THST and GEWA

- **FY2005 Accomplishments:** (1) The leaf-on (fall) and leaf-off (spring) THST mosaics and associated data files were posted by NCSU cooperators to an ArcSDE server accessible to NPS personnel. Leaf-on (fall) and leaf-off (spring) mosaics for both COLO and GEWA, the vegetation/fire database for each park, and associated data

files were posted to an ArcSDE server accessible to NPS personnel. A final report on the COLO mosaics and formation-level vegetation database has been drafted and circulated to NPS personnel for comments. (2) Virginia Division of Natural Heritage Ecologists entered data collected during the 2004 field season into plots databases, completed vegetation sampling and qualitative evaluation of mapping line work in COLO where an additional 2 quantitative plots were sampled and an additional 12 observation points were collected, completed edits to the photo interpretation line work for COLO and tagged all polygons to units in the United States National Vegetation Classification. A field key and local vegetation descriptions were completed for COLO and an accuracy assessment of all final mapped polygons began for COLO.

- FY2006 Scheduled activities and products: (1) NCSU will complete and submit a final report for the COLO mosaics and formation-level vegetation database and a final report for the GEWA mosaics and formation-level vegetation database. (2) A progress report will be submitted by the Virginia Division of Natural Heritage cooperators in December 2005. Data collected in 2005 will be entered into the NatureServe PLOTS database. Data from COLO and GEWA will be included in a comprehensive regional data analysis of the coastal plain vegetation in Virginia. Local vegetation descriptions will be completed for GEWA. Accuracy assessment for the draft vegetation map of COLO will be completed.

Task 4.5. Inventory of Contaminant Sources in Network Parks (All parks)

- FY2005 Accomplishments: (1) Cooperators from Rutgers University completed a first draft of the FIIS park specific report that includes a baseline inventory of current xenobiotics in the environment based on the historical data and current information gathered by the cooperators in 2003. A complete contaminants risk assessment was included in this report. Network and park staff reviewed this report. Network and CACO staff met with Rutgers cooperators in 2004 to discuss further plans for the project as well as scheduling the completion of the final park reports. No additional work or products were accomplished by the cooperators in FY2005.
- Scheduled FY2006 Activities and Products: (1) A modification to the cooperative agreement with Rutgers University will be completed to include no-cost time extension for product deliverables. All NCBN park reports will be completed and submitted to the network in FY2006. Cooperators and Network staff will communicate via conference call monthly on product finalization.

B. Vital Signs Monitoring

Objective 5: Hire and retain professional staff and provide a safe, healthy, and productive work environment.

- FY2005 Accomplishments: (1) One NPS biotech was hired to conduct pilot monitoring on nekton and salt marsh vegetation in network parks during the 2005

field season. Existing Park and Network staff assisted the biotech with all field work throughout the season. (2) Susan Huse continued with the network as database developer and programmer until January 2005 when she took a permanent research position with a private organization. (3) A cooperative agreement was developed with the Rocky Mountain Biological Lab, Gary Entsminger, to assist the network with technical writing and editing. Gary has been working with the Network on development and editing of both the Network's Vital Signs monitoring plan and Data Management plan. (4) Theresa Moore, on detail to the Northeast Temperate Network assisted the Network in layout and design of the final monitoring plan. Theresa also created a brochure and 1st newsletter for the Network in collaboration with NCBN staff member, Marc Albert.

- Scheduled FY2006 Activities and Products: (1) A monitoring field crew will be put together, including NPS biotechs to be hired again in 2006 to assist with protocol implementation in network parks. (2) Gary Entsminger will continue to work for the Network in the development of monitoring databases that were drafted by Susan Huse in FY2004-2005. (3) The Network will hire a permanent biologist to work in collaboration with the Network Coordinator and Data Management staff.

Objective 6: Develop and maintain working and decision-making processes that engage the network board of directors, technical staff and managers of network parks.

- FY2005 Accomplishments: (1) A board of director's meeting was held via conference call in January 2005, in which the FY04 administrative report and FY05 work plan was reviewed and accepted by the board. During this meeting the Network's staffing plan was discussed, and the Board agreed that the Network should add a permanent biologist position. (2) A Technical Steering Committee meeting was held to discuss the Network's progress and direction in plans for vital signs monitoring, inventories and data management. (3) Network staff continued to travel to parks to update park staff and superintendents. Both ASIS and COLO were visited. (4) Network staff presented information on the Network's inventories, monitoring and data management activities at the Fire Island Science Day.
- Scheduled FY2006 Activities and Products: (1) A Technical Steering Committee meeting will be held to review and discuss the Network's final monitoring plan in December 2005 in Mashantucket, CT. This meeting will include a complete review of the Network's sampling design and protocols. (2) A board of directors meeting will be held again by the end of January 2006 to review the FY 05 report and FY06 work plan. (3) Other meetings are scheduled including Network staff, CACO monitoring program staff and cooperator meetings to discuss individual protocol design and review. (4) Visits to parks by Network staff to update Park staff on inventories, monitoring and data management will continue.

Objective 7: Develop, implement, and maintain a Network data management program.

Task 7.1 – Web page development for the Network

Parks Involved: ASIS, CACO, GATE, SHEN, NCBN parks in general

- FY2005 Accomplishments: **(1)** University of Rhode Island Cooperator, Dennis Skidds, continued maintenance and updating of the NCBN website. Added new content, including the Phase III Vital Signs Monitoring Report and appendices, Information Management Plan and accompanying support documents, Data Management Guidelines and Specifications, and Monitoring and Sampling Design guidance documents. Dennis also collaborated with Carrie Phillips to update CACO's Prototype Long-term Ecosystem Monitoring website and Atlantic Research Center website. Created several BNB and Polyform webforms for NCBN initiatives. Provided technical support for Mid-Atlantic Network website. <http://www.nature.nps.gov/im/units/midn/>. Continued maintenance of the Jamaica Bay Institute (Gateway National Recreation Area) website, <http://www.nature.nps.gov/jbi/>. Created and maintained a website for URI Dept. of Natural Resources Science Course "NRS 555 - Applied Coastal Ecology." <http://www.edc.uri.edu/nrs/classes/NRS555/>. Dennis also assisted Network parks in developing their Nature and Science sites, including ASIS and CACO.
- Scheduled FY2006 Activities and Products: **(1)** Websites for the Northeast Coastal and Barrier Network (NCBN) and GATE's Jamaica Bay Institute will continue to be maintained and enhanced over the coming fiscal year. Updates to other previously-created sites will be completed as requested. **(2)** The Network will continue to provide assistance to Network parks in developing Natural Resource Profile websites, including SAHI, GATE, GEWA and THST.

Task 7.2. Develop an NCBN Database Template based on the NPS Natural Resource Database Template and develop individual monitoring databases for all network protocols.

- FY2005 Accomplishments: **(1)** NCBN staff member, Susan Huse and CACO data manager, Velma Potash, joined the Natural Resource Database Template – Database Structure Revision Team to update the I&M program's Natural Resource Database Template (NRDT). This committee developed Version 3 of the NRDT, improving the database table and data relationship structure to be more adaptable to all inventory and monitoring databases. **(2)** Following the new NRDTv3 structure, Susan Huse converted the NCBN Database Template that she had developed to the new version of the NRDT. This template builds upon databases developed by other Network data management staff as well as existing CACO databases. By creating a unified database structure, Susan created an easy-to-use, menu driven interface to help researchers and staff that are not familiar or comfortable with Microsoft Access, develop inventory and monitoring databases. This new NCBN Database Template includes SOPs for how to use the database, and an SOP for how to convert the template for any monitoring project in any network. A first draft of the NCBN Database Template based on NRDTv3 was posted to the National NPS I&M Program NRDT website as an example that could be used by all monitoring networks. **(2)** The existing NCBN Salt Marsh Monitoring database was converted to the new NRDTv3 format and tested by cooperators.

- Scheduled FY2006 Activities and Products: (1) CACO data manager and Network staff testing the use of the new NRDTv3 have discovered a number of problems with its structure. Both Network and CACO staff have agreed to reformat the database structure of the existing NCBN Database template and CACO databases. Gary Entsminger, Network Cooperator, will work closely with Velma Decker, CACO Data Manager to reformat the NCBN database template and all monitoring databases so that there is compatibility between the Network and CACO.

Task 7.3. GIS and Database Efforts in Support of Inventory & Monitoring Projects in Northeastern National Parks (ACAD, ASIS, BOHA, CACO, COLO, FIIS, GATE, GEWA, SAHI, THST)

- FY2005 Accomplishments: (1) The National Park Service (NPS) has contracted with the Environmental Data Center (EDC) at the University of Rhode Island to provide GIS and database-management support for Inventory and Monitoring efforts underway by park personnel and cooperators. Projects in FY05 ranged from creation of Access databases for a multi-park herpetological inventory to using GIS to generate spatial sampling schemes for long-term estuarine monitoring. Specific accomplishments for FY 05 include: (a) Creating and NCBN Monitoring Programs database. This database houses data mining results that refer to existing monitoring programs going on in NCBN parks or adjacent to the parks. Monitoring program name, contact information and brief abstract about the program was created. This database links each of these programs to the Vital Signs monitoring database. (b) Assisted in data management and report preparation for avian survey of SAHI. (c) Created NCBN Odonate-Lepidoptera Monitoring database for inventory data collected at several network parks by Anne Chazal, Virginia Department of Conservation and Recreation. (c) Created NCBN Odonate Monitoring database for inventory data collected at several network parks by Jackie Sones, Rhode Island Natural History Survey. (d) Continued to develop species-abundance and sampling-location maps for joint Wildlife Conservation Society / NPS herpetological inventory project as new data became available from WCS. (e) Performed QA/QC on spatial data collected in connection with a herpetological survey of NCBN and MIDN parks. (f) Finalized development of spatial sampling schemes for NCBN Estuarine Eutrophication monitoring in collaboration with Hilary Neckles and Blaine Kopp (USGS). Assembled GIS base data, constructed hexagonal sampling grids, and generated random sampling points for multiple estuarine systems. (g) Assisted in development of NCBN Estuarine Monitoring database. (h) Summarized available inventory data and produced Natural Resources report used in the development of SAHI's General Management Plan. Contributed data and maps summarizing avian, herpetological, odonate, mammal, and plant species distribution and biodiversity within the park.
- Scheduled FY2006 Activities and Products: (1) Continue to provide Data Management support for the Network.

Objective 8: Identify and prioritize Network Vital Signs, develop protocols and

implement programs to monitor these Vital Signs in Network parks.

Task 8.1. Test existing protocol for assessing and monitoring salt marsh ecosystems in Network parks. (CACO, FIIS, GATE, ASIS, COLO, GEWA, and two Northeast Temperate Network (NETN) Parks, ACAD and BOHA)

- **FY2005 Accomplishments: (1)** (a) Study sites were selected at ASIS and GEWA by the cooperator, URI, M.J. James-Pirri and NPS collaborator, Dr. Charles Roman. (b) One NPS biotech and a field technician through the University of Rhode Island's Coastal Fellowship program, were hired to carry out field sampling. Sampling for nekton and vegetation was completed for ASIS and GEWA. At GEWA, nekton and vegetation sampling were conducted at Dancing Marsh and Long Meadow Marsh. At ASIS, nekton and vegetation were sampled at Valentine's Marsh and an unnamed marsh near Life of the Dunes Nature Trail. Vegetation was also sampled the North End Marsh (nekton were not sampled at the North End because there was no nekton habitat at this location). Nekton were sampled twice (once in June and once in August) and vegetation was sampled once (July) at each of these sites. Staff from ASIS, the NCBN Network, and other parks assisted with the sampling so that a total of 4 technicians were present on each sampling occasion. (c) An automated water table level logger was tested at one location at ASIS. (d) The existing protocols (nekton and salt marsh vegetation) developed as part of prototype monitoring program at CACO, were standardized to meet I&M program protocol format, to be submitted as part of the NCBN monitoring plan. (e) M.J. James-Pirri worked closely with Network staff to refine data entry steps and query reports of the salt marsh protocol database.
- **Scheduled FY2006 Activities and Products: (1)** Data collected at ASIS and GEWA in FY2005 will be entered into the NCBN Salt Marsh database, analyzed, and report produced. **(2)** Existing draft NCBN Salt Marsh monitoring protocols (vegetation and nekton) will be carefully reviewed by NCBN and Park Staff and an academic Statistician. The cooperators will participate in the review process and produce revised drafts to be submitted to a peer review process. **(3)** A Coastal Fellow, Sarah Maier, at the University of Rhode Island, hired as a field technician in 2005 will present a poster on the 2005 field sampling effort at the Coastal Fellows annual Fall semester seminar at URI.

Task 8.2. Test variables and develop protocol and for assessing and monitoring geomorphologic change in Network parks. (CACO, FIIS, GATE, ASIS, COLO, GEWA, THST, SAHI)

- **FY2005 Accomplishments: (1)** In cooperation with Rutgers University Institute for Marine and Coastal Studies (Rutgers IMCS), the Network revised and tested the ocean shoreline protocol for geomorphological monitoring program. The geomorphology project team revised the narrative and seven of nine SOP sections of the ocean shoreline protocol and re-submitted them to the Network for internal and peer review. The Rutgers IMCS group performed a series of field tests and data analysis of GPS shorelines at various tide stages to determine the optimal shoreline feature for use in the shoreline protocol. The ocean shoreline protocol was tested

with actual field surveys conducted at ASIS, GATE, and FIIS in the fall of 2005. (2) Airborne LIDAR surveys were conducted at ASIS, CACO, COLO, FIIS, GATE, GEWA, THST, and SAHI. Originally, these surveys were scheduled for FY2004 but extreme tropical activity required NASA partners to reschedule for FY2005. Interagency planning between NPS, NASA, and USGS consisted of scheduling and the defining of aerial extent of surveys. NPS provided ground support as requested by NASA and USGS by operating a geodetic grade global positioning system (GPS base station) at CACO and ASIS. NASA has added a high-resolution multi-spectral digital imaging system to its airborne platform. This system was used on a network-wide basis for the first time in the FY2005 park surveys. Network staff acquired the raw aerial imagery from NASA and USGS and developed a GIS based routine to hyperlink the images with georeferenced points along the survey flight lines, allowing park staff to more fully utilize the experimental image product. (3) Experimental LIDAR data products and LIDAR related Standard Operating Procedures (SOPs) were received from USGS and reviewed by Network and selected park staff. The EAARL (Experimental Advanced Airborne Research Lidar) LIDAR is an experimental technology and development of final products involves an iterative process of review and revision. The Network and parks play an active role in the partnership by testing deliverables and providing feedback to NASA and USGS; and by performing quality and accuracy checks on developmental products. (4) Design of an ESRI based GIS Geodatabase for GPS shorelines and other geomorphologic data was initiated through park and Network cooperative activity at NPS ASIS. Activity involved geodatabase design and the creation of a draft version of a shoreline data dictionary to be used in the creation of relational database tables. (5) The shared NCBN-ASIS Geodetic GPS was used on a variety of park, network, regional, and national geomorphology/geology projects. At ASIS, semi-annual topographic surveys were expanded to include monthly measurements at an area of concern within a major beach restoration project. The equipment was integrated into annual surveys at FIIS and GATE including first time use on a major sensitive salt marsh monitoring project in Jamaica Bay. CACO continued annual surveys of migrating dunes, and tidal restoration areas. In addition, the equipment was used to provide ground support to LIDAR survey projects at ASIS and CACO. In all of the above activities, park or network staff trained through a network sponsored training successfully operated the GPS unit. At the national level, the equipment was used in a topographic survey at LAVA by park, NPS Geologic Resource Division, and other WASO staff. (6) Network staff directly participated in NPS WASO Geologic Resources Division's Geological Resources Evaluation (GRE) at ASIS, COLO, GEWA, and THST. The purpose of the GRE was to identify existing geologic data, park needs, and potential methods for filling existing data needs and addressing geologic related resource and management issues.

- FY2006 Scheduled activities and products: (1) The Network will work with Rutgers IMCS and NPS ASIS to develop training for the field data components of the shoreline protocol. This will include training in the proper identification of the shoreline feature and operation of the Trimble ProXR GPS equipment. In addition, the Network will work with NPS ASIS to integrate the NPS Beach Geomorphology

GIS toolbox (Coastal Geotoolbox) into the ESRI ArcGIS 9 software and to develop a basic training module for use of the toolbox with park data. **(2)** The Network will complete the ocean shoreline protocol, submit it to peer review, revise as needed and continue to implement data collection at the four network ocean parks (ASIS, CACO, FIIS, GATE). A major portion of this activity should involve data management issues such as the design and population of a geomorphological geodatabase, conversion of the geodatabase into an Access database to meet I&M standards, and the integration of LIDAR data into the database. **(3)** Network staff will work with Board of Directors and Technical Steering Committee to determine the next protocol development component for the coastal geomorphological monitoring program. **(4)** Network staff will work with NASA and USGS to integrate LIDAR based data products into NCBN programs, continue to develop data standards for LIDAR based data, and continue the development of SOPs for the creation of value added LIDAR derived data products. **(5)** Network will coordinate with parks, NASA, and USGS to plan flight schedules for fiscal year 2006 if necessary and fiscal year 2007.

Task 8.3. Test variables and develop protocol and for assessing and monitoring visitor impacts in Network parks. (CACO, FIIS, GATE, ASIS, COLO, GEWA, THST, SAHI)

- FY2005 Accomplishments: **(1) (a)** January 10-11, 2005, the Network held a workshop at GATE, Sandy Hook unit, to develop goals and objectives for visitor use and impact monitoring by the Network. The workshop brought together experts in visitor impact monitoring, the sociology of recreational park use, and statistics for ecological applications, along with park and Network staff, to clarify the benefits and challenges of project alternatives. **(b)** A scope of work was drafted following the workshop based on the results. A cooperator was not identified in FY2005.
- Scheduled FY2006 activities and products: **(1) (a)** If there is sufficient funding, the Network will identify a cooperator to develop a visitor use protocol for the Network. A visitor impact monitoring protocol will follow. The selected cooperator will identify, prioritize and justify all vital signs and their measures. They will work closely with Network staff to develop a protocol for monitoring visitor use in all Network parks. **(2)** As the project and protocol development progresses, completed project elements will be made available through the Network website.

Task 8.4. Test variables and develop protocols for the use of high spatial resolution satellite remote sensing data for estuarine and terrestrial vegetation habitat mapping in NCBN parks. (FIIS)

- FY2005 Accomplishments: **(1) Terrestrial vegetation classification and mapping:** The cooperator's finished the terrestrial vegetation mapping by digital classification of Quickbird-2 satellite image. They developed a simple protocol that used a stratified classification to extract vegetation types under the control of GIS map layers developed by the previous NPS Vegetation Mapping project. Their classification scheme kept all of the 30 vegetation categories identified by the previous vegetation mapping project. With this protocol the cooperators identified the terrestrial vegetation categories that are most likely to have mixed spectral signatures so that the classification could be focused on the vegetation types and communities identified by

the previous vegetation mapping project. The mapping result was examined by Park and Network staff at a two-day project workshop held August 16th and 17th 2005. The mapping protocol was well accepted. The mapping result is under review by FIIS resource managers. (2) Aquatic Vegetation Classification and Mapping: Built on the successful field campaign using underwater videography and water surface GPS photography, the cooperators were able to accomplish a solid ground reference database for SAV mapping. The reference database included about 400 water surface SAV field GPS photos and 7 hours of underwater video that covered 206 transects (30-m each) of SAV beds around FIIS. The field reference database also included NOAA Nautical Charts that were digitally scanned, georeferenced, and mosaicked; and NOAA bathymetry data with imported soundings and gridded to 5m. They used the masking technique to mask out deep water areas where SAV habitats are unlikely to exist and the inland areas so that the classification and mapping would focus on the SAV beds only. With reference to the existing SAV data developed by the NY DOS - NOAA in 2002 and by Army Corp of Engineers in 1997, the cooperators classified and mapped the SAV in the Great South Bay by 3 major categories of *Seagrass > 50%*; *Seagrass < 50%*, and *Unvegetated Bottom*. The resulting maps demonstrated the advantage of classification of high spatial resolution digital satellite remote sensing data. This mapping protocol was demonstrated at the workshop mentioned above. The mapping results are currently under review by the FIIS resource management. (3) Project Workshop: The purpose of the two days workshop was to involve NPS resource and program managers to review the mapping protocols and results and to get the feed backs from management perspective. The cooperators demonstrated at the workshop the mapping protocols and results on both interactive multimedia and hard copy maps. They discussed the issues about the data, data processing, classification systems, protocols, and the results. They reviewed the results and made corrections on the hard copy maps. The marked hardcopy maps were then brought to FIIS for further review and evaluation. Any feedback comments will be marked again on the hardcopy maps and return to project team at URI for further process to finalize the map products. At the workshop, the Network staff clarified the reporting procedures and issues, such as requests on reporting format, metadata, deliverables and data storage media. The participants of the workshop included Y.Q. Wang and Michael Traber representing the URI project team, Diane Abell representing the FIIS, Bryan Milstead and Sara Stevens from NPS Inventory and Monitoring Program, Northeast Coastal and Barrier Network, Beth Johnson, the NPS Northeast Region I&M coordinator, Roland Duhaime of URI/NPS, and Charles Roman of NPS/CESU.

- Scheduled FY2006 Activities and Products: Once the URI cooperators (Dr. Y.Q.Wang) receive feedback and comments from FIIS staff they will conduct the corrections and finalize the maps. A final report, including a protocol and SOPs describing the procedures will be developed and submitted to NCBN. All data products including metadata will be provided to NCBN staff for archiving.

Task 8.5. Salt Marsh Elevation Monitoring (GATE, FIIS, ASIS)

- FY2005 Accomplishments: Salt marsh elevation monitoring at GATE and FIIS began in

FY02 with funding from NRPP. Funding for this project ended in the spring of FY04 and the Network agreed to support continued data collection at FIIS as this project was in danger of being abandoned. Salt Marsh sediment elevation has been chosen as a vital sign for the NCBN. Since the implementation of this program was costly, the Network decided it was advantageous to insure continuity in data collection. Total costs to the Network for FY04 work was ~\$; GATE was able to provide funds for continued monitoring of their sites. This Sediment Elevation Table monitoring and management was conducted by Drs. Cahoon and Lynch from USGS and has continued through FY04. In FY04, an Interagency Agreement was established between the NCBN, GATE and USGS to continue the monitoring at these parks through 2006. In addition, the new IA provides funds for salt marsh elevation monitoring at ASIS. A draft protocol for Salt Marsh Elevation Monitoring was completed for Cape Cod N.S monitoring program. This protocol will be finalized and adapted for use in NCBN parks. During FY05, elevation monitoring was conducted 3 times, by USGS cooperators (spring, summer, and fall) at the GATE and FIIS stations. New elevation monitoring stations to be established at ASIS were postponed by Network staff pending review of the sampling designs associated with the Network's salt marsh vegetation and nekton protocols. The Network plans to collocate the SETs in those marshes at ASIS where vegetation and nekton will be monitored.

- Scheduled FY2006 activities and products: The CACO Salt Marsh Elevation monitoring protocol will be adapted to the Network parks. Development of this protocol will begin in FY2006. Once the sampling design is reviewed for the Salt Marsh vegetation and nekton protocols, the Network will establish SET stations at ASIS. Data collection will continue at FIIS and GATE.

Task 8.6. Develop an overall statistical sampling design for the NCBN monitoring program, review and revise sampling design sections of existing protocols and make recommendations for the sampling design sections of planned protocols (All Parks).

- Scheduled FY2006 activities and products: Locate a suitable cooperator and develop and agreement to include the following tasks: (1) Review and revise the sampling design standard operating procedures (SOP) for the five existing monitoring protocols (estuarine eutrophication, salt marsh sediment elevation, salt marsh vegetation, nekton, and ocean shoreline change) in collaboration with NCBN protocol authors. (2) Review the protocol development summaries for the planned monitoring protocols (visitor use, visitor impacts, nitrogen loading, beach/dune topography, and landscape change) and develop draft sampling design SOPs for each. (3) Prepare a report following the Northeast Region Technical Report Series guidelines, detailing the results of the SOP revisions, and the development of an overall sampling design for the Network.

Objective 9: Integrate water quality monitoring in the Network Vital Signs monitoring plan.

Task 9.1. Compile and review existing water quality information in network parks. (ASIS, CACO, COLO, GATE, GEWA, FIIS, SAHI, THST)

- FY2005 Accomplishments: **(1)** The Wetland and Water Quality Issues for Parks of the Northeastern US: A Scoping Report for the Coastal and Barrier Network has been completed and reviewed. This report includes a summary of water bodies and wetlands in Network parks, information on waters listed through the Clean Water Act's mandated Water Quality Reports or Impaired Waterbodies Lists, provides statistics on wetlands potentially impacted by impaired waters, identifies outstanding resource waters, and summarizes existing water quality monitoring programs in or adjacent to park waters.
- FY2006 Scheduled activities and products: **(1)** This report will be reviewed by Network staff to determine the timeline necessary to update the collected information.

Task 9.2. Test variables and develop protocol and for assessing and monitoring nitrogen inputs to estuarine ecosystems in Network parks. (CACO, FIIS, GATE, ASIS, COLO and ACAD (Northeast Temperate Network NETN Park)

- FY2005 Accomplishments: Through a cooperative agreement with the University of Rhode Island, principal investigator Scott Nixon, an extension of the Nitrogen Loading Model (NLM-E) was completed using the most accurate and recent land use data (1992). NLM-E was run for each park, including at 30-year historical analysis for ASIS. For ASIS, Land Use data from 1980-2000 were available. The cooperators submitted a draft final report to NCBN staff for review.
- FY2006 Scheduled Activities and Products: Following comments by NCBN staff, the draft report will be revised by the URI cooperators and prepared for external peer review. The report will be peer reviewed in FY06.

Task 9.3. Test variables and develop protocol for assessing and monitoring estuarine eutrophication in Network parks. (CACO, FIIS, GATE, ASIS, COLO and ACAD (a Northeast Temperate Network NETN Park)

- FY2005 Accomplishments: **(1)** In December of 2004 a detailed estuarine vital signs monitoring protocol was delivered to the NCBN for inclusion in the Network's Phase 3 monitoring plan. The protocol includes a background narrative, technical appendices, and the eleven detailed standard operating procedures. Anonymous peer review of the protocol was managed by NCBN drawing upon reviewers with the expertise to evaluate the overall design or one of the following protocol components: seagrass monitoring, probability-based spatial sampling designs, water quality monitoring, data quality assurance and quality control. Seagrass condition monitoring was continued for two sites at Cape Cod National Seashore for the spring and summer 2005 monitoring periods, and a data summary was prepared of all previous monitoring intervals. Field assistance was provided by seashore resource management scientists. Phased implementation of the NCBN provisional estuarine eutrophication protocol was conducted at the two parks with existing estuarine monitoring programs (ASIS and GATE). USGS drafted work plans for these parks,

assisted in evaluating and negotiating budgets, trained park staff on protocol implementation and use of instrumentation, provided technical support to the parks during the field season, and to the Network throughout the FY.

- Scheduled FY2006 Activities and Products: (1) USGS will work with NCBN to evaluate and respond to updated national guidance on Vital Signs design and implementation as it relates to the estuarine eutrophication protocol. The estuarine protocol will be revised to address reviewer concerns, and specifically to include additional supporting statistical information on sampling design and power, additional SOPs on QA/QC, and measurement quality objectives for precision, measurement bias, and detection limits for all parameters. A synthesis report will be prepared to compare data from the 2005 and 2006 network and park estuarine monitoring protocols at ASIS and GATE. The synthesis will include an examination of the inherent strengths of each monitoring approach and will attempt to identify conditions under which inconsistent assessments of condition might emerge systematically. The USGS will collaborate with NCBN to identify a phased implementation strategy for estuarine water quality monitoring at NCBN parks, and will provide technical assistance for the implementation.

III. Staffing

Inventory and Monitoring Staff (NCBN)

Elizabeth Johnson, I&M Regional Coordinator (NPS)

Bryan Milstead, NCBN Coordinator (NPS)

Sara Stevens, NCBN Science Information Coordinator (NPS)

Mark Duffy, NCBN GIS Specialist (NPS)

Marc Albert, NCBN Term Biologist (NPS)

Susan Huse, NCBN Term Database Manager-Position Vacated (NPS)

Linda Fabre, NPSpecies Coordinator (URI Cooperator)

Dennis Skidds, Web page development/Data Management Assistance (URI cooperator)

Sarah Sand-Seasonal Administrative Assistant (NPS)

NCBN Technical Steering Committee

Bryan Milstead, NPS-University of Rhode Island

Sara Stevens, NPS-University of Rhode Island

Elizabeth Johnson, NPS-University of Rhode Island

Carl Zimmerman, NPS-ASIS

Charles Rafkind, NPS-COLO

Michael Bilecki, NPS-FIIS

Allan O'Connell, USGS-Patuxent

John Sauer, USGS-Patuxent

Charles Roman, NPS-University of Rhode Island

Hilary Neckles, USGS-Augusta, ME

Howard Ginsberg, USGS-University of Rhode Island

John Karish, NPS-Penn State University

Mary Foley, NPS-BOSO
Nancy Finley, NPS-CACO
NCBN Board of Directors

Carl Zimmerman (Acting), ASIS
George Price, CACO
P. Daniel Smith, COLO
Michael Reynolds, FIIS
Barry Sullivan, GATE
Vidal Martinez, GEWA/THST
Greg Marshall, SAHI
Bryan Milstead, NCBN Coordinator
Elizabeth Johnson, I&M Regional Coordinator
Mary Foley, Chief Scientist Northeast Region
John Karish, Chief Scientist Northeast Region

NCBN Contractors and Cooperators

RI Natural History Survey, Jacqueline Sones, Virginia Carpenter Brown, Nina Briggs.
NatureServe, Lesley Sneddon
College of William and Mary, Dana Bradshaw
Frostburg State University, Ron Barry
New Jersey Audubon Society, David Mizrahi
North Carolina State University, Hugh Devine
NY Natural Heritage Program, Greg Edinger and Aissa Feldman
Penn State University, Scott Tiffney
Rutgers University, Mark Robson, Keith Cooper
Rutgers University, Norbert Psuty
St. Lawrence University, Chris Monz
North Carolina State University, Yu-Fai Leung
National Audubon Society Theodore Roosevelt Sanctuary
USGS, Allan O'Connell
USGS, Hilary Neckles, Blaine Kopp
USGS, John Brock
NASA, Wayne Wright
Rocky Mountain Biological Laboratory, Gary Entsminger
University of Maryland, Edward Gates, Josh Johnson
University of Rhode Island, Peter Paton
University of Rhode Island, Mary-Jane James-Pirri
University of Rhode Island, Scott Nixon, Stephen Granger, Luke Cole
University of Rhode Island, Y.Q. Wang
University of Rhode Island, URI Environmental Data Center, Peter August, Charles
LaBash, Roland Duhaime, Dennis Skidks, Linda Fabre
University of Richmond, Joe Mitchell
SHEN, James Atkinson
VA DNR-Natural Heritage Program, Chris Ludwig, Anne Chazal, Karen Patterson

Wildlife Conservation Society, John Behler, David Brotherton

IV. Reports, Publications and Presentations (FY 2005)

Reports

Albert, Marc, Bryan Milstead, & Sara Stevens. 2005. Northeast Coastal and Barrier Network Park Use and Impacts Monitoring Workshop: Meeting Notes & Summary. Workshop held January 10-11, 2005. Sandy Hook Unit, Gateway National Recreation Area.

Barry, R. E. Mammal Surveys at George Washington Birthplace National Monument, Thomas Stone National Historic Site, Colonial National Historical Park, Richmond National Battlefield Park, and Fredericksburg and Spotsylvania County Memorial National Military Park. Progress Report for Cooperative Agreement No. 1443DCA309701200, Task Order No. T-3097-01-300 of the Chesapeake Watershed Cooperative Ecosystem Studies Unit. January 2005.

Devine, Hugh A. and William A. Millinor. February 2005. Geospatial Vegetation Data Development for Selected National Parks, Final Technical Report (29pp.) (Supplemental Agreement 10 to Cooperative Agreement 4000-7-9003) North Carolina State University, Raleigh, NC.

Kopp, B.S. and H.A. Neckles. In review. Monitoring Protocols for the National Park Service North Atlantic Coastal Parks: Estuarine Nutrient Enrichment. Prepared for the NPS Vital Signs Phase III Monitoring Plan of the Northeast Coastal and Barrier Network. 154 pp plus appendices.

Mitchell, J. C. September 2004. Inventory of Amphibians and Reptiles of Colonial National Historical Park. National Park Service, Northeast Region. Philadelphia, PA. Natural Resources Report NPS/NERCHAL/NRTR-03/091.

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Stevens, Sara. & Gary Entsminger. 2004. Northeast Coastal and Barrier Network Information Management Plan. National Park Service, Northeast Coastal and Barrier Network, University of Rhode Island.

Thornberry-Ehrlich, Trista L. 2005. Assateague Island National Seashore geologic resource management issues scoping summary. Colorado State University.

Presentations

Cole, L. W., S. W. Nixon, S. Granger, B. S. Kopp, and H. A. Neckles. 2004. Eutrophication assessment in northeast coastal parks. Oral presentation at the New England Estuarine Research Society, October 21-23, Block Island, RI.

Devine, Hugh A. June 2, 2005. "An Enterprise GIS Design for Northeastern National Parks." Northeast Region GIS Annual Meeting, Pennsylvania State University, University Park, PA.

Devine, Hugh A. August 11, 2005. *Enterprise GIS Model for Park Management in the Northeast Region*. NPS National GIS Coordination Workshop, Denver, CO.

Devine, Hugh A. August 11, 2005. *Logical Design for NPS GIS*. Presentation at NPS National GIS Coordination Workshop, Denver, CO.

Devine, Hugh A. August 12, 2005. *Integrated I&M Data Model for Park Management*. Presentation at I&M National Data Managers Workshop, Fort Collins, CO

Kopp, B.S., H.A. Neckles, L. Cole, B. Milstead. S. Granger. 2005. Monitoring estuarine condition with North Atlantic U.S. national parks. Oral presentation at the 18th Biennial Conference of the Estuarine Research Federation. October 16-21, 2005. Norfolk, VA.

Kopp, B.S., and H.A. Neckles. 2005. Monitoring Estuarine Condition in North Atlantic Coastal Parks. Oral Presentation at the 5th Biennial Fire Island National Seashore

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Millinor, William A. June 2, 2005. *Accessing National Park Service Northeast Region Inventory and Monitoring Data Using ArcGIS 9*. Northeast Region GIS Annual Meeting, Pennsylvania State University, University Park, PA.

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Shedd, Justin M. May 12, 2005. *Updating Fire Fuel Loads and Vegetation Datasets After a Natural Disaster*. EastFIRE Conference, George Mason University, Fairfax, VA.

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Stevens, Sara, & Bryan Milstead. April 5, 2005. *Inventory of vertebrates and vascular plants in northeast coastal National Parks*. Fire Island National Seashore 5th Biennial Science Conference, Patchogue, NY USA.

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V. Status of Park Vital Signs Monitoring

| Coastal and Barrier Network 2005 | Air Quality | Water Quality | Water Quantity | Geologic Resources | Plants | Animals | Landscape Characteristics |
|---|-------------|---------------|----------------|--------------------|--------|---------|---------------------------|
| Planning and Design | | | | | | | |
| # parks monitoring w/ NRC funding | 8 | 8 | 0 | 8 | 8 | 8 | 8 |
| # parks monitoring w/ other funding | 1 | 6 | 0 | 4 | 4 | 5 | 0 |
| Protocols Implemented | | | | | | | |
| # parks monitoring w/ NRC funding | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| # parks monitoring w/ other funding | 1 | 4 | 0 | 2 | 3 | 5 | 0 |
| Analysis/Synthesis Available | | | | | | | |
| # parks monitoring w/ NRC funding | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| # parks monitoring w/ other funding | 1 | 3 | 0 | 0 | 2 | 5 | 0 |

Note: Air (CACO), Water (CACO,GATE, FIIS, ASIS, COLO, GEWA), GEO (CACO,ASIS,GATE, FIIS), Plants (ASIS, CACO, GATE, COLO), Animals (ASIS, CACO, GATE, FIIS, COLO).

VI. USGS Protocol Development and Monitoring-Related Research Needs

- Continue supporting the development of methods to use LIDAR technology to monitor shoreline change in coastal Parks.
- Provide the Network with monitoring protocol sampling and statistical design assistance and review.