

**ANNUAL ADMINISTRATIVE REPORT (FY2006) AND
WORK PLAN (FY 2007) FOR INVENTORIES AND VITAL SIGNS MONITORING**

FY2006-FY2007

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

Date

Elizabeth Johnson, Northeast Region Inventory and Monitoring Coordinator,

Date

Sara Stevens, Northeast Coastal and Barrier Network Coordinator

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 2006 and one for FY 2007), 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_FY0607_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 (FY0607) as in the

	example NCCN_ FY0607_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., NCBN_ FY0607_aarwp.doc and NCBN_ FY0607_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).
Review of FY 2007 Work Plan by WASO	
No	[Enter Yes or No]: Has the FY 2007 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'.

Northeast Coastal and Barrier Network
Summary of Major Network Accomplishments and
Public Interest Highlights for FY 2006

Northeast Coastal and Barrier Network - This network includes eight parks: 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). As part of its Vital Signs Monitoring efforts, the network is drawing from the monitoring design and protocol development work initiated by the Cape Cod NS Prototype Monitoring Program, and includes active participation from scientists with the USGS, EPA, NASA, and a number of universities in the Northeast region.

In FY2006 the Network continued to progress on finalizing monitoring protocols for monitoring ocean shoreline position, estuarine eutrophication, salt marsh vegetation, and nekton. Pilot sampling using the estuarine eutrophication and shoreline position protocols continued this year in selected parks. Vertebrate and vascular plant inventory products underwent review and revision as they were submitted to the Network, and some projects completed their last year of field work.

An exciting new effort was initiated this year to inventory marine resources in the coastal parks. This will be a collaborative effort between the NCBN, the North Atlantic Coast Cooperative Ecosystems Study Unit (CESU), and coastal parks in the Northeast region. This year, planning began by distributing and compiling a marine resource survey to park staff, holding a workshop to explore marine resource inventory needs in the region, and putting together a scope of work to develop a marine inventory study plan.

Finally, coastal park condition assessments were initiated this year in three of the Network parks, SAHI, GATE and FIIS. These park condition assessments are funded by the NPS Water Resources Division. This year a cooperative agreement was established with the State University of NY Stony Brook and USGS scientists who are tasked with

reviewing and synthesizing existing information on these three parks to help determine the status of their resources including things like water quality, habitat condition, invasive and feral species, extractive uses, physical impacts from resource use and coastal development, and other issues affecting resource health. Network staff have been actively involved and participating in the development of these assessments by providing a wealth of information compiled for these parks by the Network over the last 6 years.

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.

This year the *Dragonfly, damselfly and butterfly survey at Assateague Island National Seashore was expanded to include native bees and grasshoppers, katydids, and crickets.*

NCBN cooperator, Dr. Richard Orr, an entomologist with the Dept of Agriculture, submitted a new work plan for the FY06-07 field work to include a broader spectrum of invertebrate groups. The scope of the project still includes the dragonflies, damselflies and butterflies as originally planned, but has been expanded to the orthoptera (grasshoppers, katydids, and crickets) and native bees of ASIS. In addition, a comprehensive survey of the terrestrial arthropods of the salt marshes and aquatic

arthropods of the freshwater ponds has been added. A beetle specialist and wildlife photographer have joined the project to add their expertise. Although the complete collection of 2006 field data has not yet fully been reviewed or specimens identified, at least one moth and three native bees found this year are new records for the state of Maryland. The professional photographer has been focusing on documenting the common insect species found on ASIS in order to provide a visual identification record for the park and interpretative staff.

The Network's vertebrate and vascular plant inventory program is slowly winding down. A number of final inventory reports have been submitted for review. Including mammal inventory reports for COLO, GEWA and THST, completed by Dr. Ron Barry from Frostburg State University, herp inventory reports for GEWA and THST, completed by Dr. Joseph Mitchell from the University of Richmond, and odonate inventory reports for COLO, GEWA, SAHI, GATE, and FIIS from cooperators with the Virginia Natural Heritage Program and the Rhode Island Natural History Survey. These ten reports are currently being formatted by Network staff and will be published in the Northeast Region's technical report series in FY07.

Utilizing a combination of data collection techniques, including mist netting and echolocation monitors, cooperators from the University of Maryland Center for Environmental Science, Dr. Ed Gates and Joshua Johnson, will be analyzing habitat use by bats on ASIS. The field work component of this three year bat inventory continued this year and final products will be submitted in FY07.

In FY06, COLO, GEWA, and THST Amphibian and Reptile NPSpecies data were certified by herpetologist, Dr. Joseph Mitchell from the University of Richmond. Vascular Plants of COLO were also certified via a contract with botanist, Helen Hamilton who developed the botanical collection and guide for ASIS. University of Rhode Island cooperators also entered and prepared all databases for certification including, the vascular plants of FIIS, birds of THST and mammals and birds of GEWA.

NCBN inventory products will be synthesized for park GMP (General Management Plan) planning purposes. The Network established a cooperative agreement with staff at the University of Rhode Island this year to assist the Network in combining all inventory products into park specific vertebrate and vascular plant synthesis reports that can assist parks with natural resource protection and planning. These reports will not only combine all inventory results, but include park specific guidance and suggestions for the management and conservation of species and habitats by taxonomic experts familiar with each park.

A new effort to inventory marine resources was initiated this year in the Northeast Region coastal parks by the NCBN, the North Atlantic Coast Cooperative Ecosystems Study Unit (CESU), and parks. The Network surveyed coastal park resource managers to help identify existing marine resource data and gaps. A workshop was then held at the University of Rhode Island in April 2006 that included I&M staff, CESU staff, park and regional scientist and staff from the NPS Submerged Resource Unit and WASO office. This workshop was held to discuss the results of the park surveys, identify data needs and potential data collection methods. As a result, a workshop summary was developed along with a scope of work that would initiate a data mining and compilation effort and the development of a marine inventory study plan for the NCBN and two Northeast Temperate Network (NETN) parks (Boston Harbor Islands and Acadia NP). This scope of work was submitted to WASO I&M and was funded in FY06.

As part of the marine inventory initiative by the Network and CESU, a PMIS project developed by ASIS staff to conduct bathymetry and sediment mapping of the Virginia coastal bays was submitted to WASO I&M along with the marine inventory scope of work. This project was funded this year through biological inventory funds. The ASIS project will be conducted over a two year period, and will complement a similar study completed with non-NPS funds for the Maryland portion of Assateague Island.

Also part of the Network and CESU's marine inventory and mapping effort, a pilot

marine mapping project was developed and conducted at FIIS in August 2006. This pilot was funded by NPS geologic resources staff in order to test the use of NPS Submerged Resources Center and other cooperator equipment in classifying and mapping of submerged resources in very shallow, turbulent, murky, near shore environments that exist in Northeast coastal parks.. Such equipment has been used extensively in marine settings, but often in clear, warm waters along the south Atlantic coast.

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.

The NCBN, along with the Eastern Rivers and Mountains Network developed a scope of work and cooperative agreement with Virginia Polytechnic Institute and State University that would provide both Networks with a complete statistical review of existing protocols, as well as assistance in developing sampling designs for protocols in development. Statistical critique of protocol sampling designs has been completed for the NCBN salt marsh vegetation, nekton and ocean shoreline change protocols. Currently, the Network is revising and rewriting these to reflect this review.

In FY2006 significant work on the Network's coastal geomorphology monitoring

program continued. The NCBN ocean shoreline change protocol was further revised to include a more extensive data management component including a database and SOPs. Cooperators from the University of Rhode Island developed an Access database to house shoreline data from the four ocean parks in the Network, CACO, ASIS, GATE and FIIS. The completed protocol is scheduled for peer review in FY07.

Also part of the Network's coastal geomorphology monitoring program, Network-wide LIDAR (LIght Detection And Ranging) and imagery survey data collected through an interagency agreement with the USGS and NASA in FY2005, were processed and submitted in draft in FY2006. All eight network parks were surveyed completely. In addition to the high resolution topographic data collected, NASA had 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. These data are being used to help answer many park resource management questions including how beaches and dunes are changing within a specific park area or park-wide, and how a variety of recreational park uses might affect park natural resources. The Network plans to continue the collection of LIDAR data on a regular basis, not only provide this valuable data source to park staff, but to assist the parks by monitoring both shoreline and dune change using these data.

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 in FY2005. External peer review of this protocol is complete and revisions began in FY06. Network staff, Cape Cod National Seashore Prototype Monitoring Program staff and the USGS cooperators held a meeting in FY06 to discuss the necessary revisions and changes needed for completion of a final draft. A final version will be completed in FY07. Field testing of the protocol continued in FY06 at CACO, GATE and ASIS with the assistance of park staff.

Final 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 FY06. 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. The Journal, Marine Geodesy, 5th Special Issue on Marine and Coastal Geographic Information Systems has accepted a manuscript based on the results of this work, submitted by the project cooperators, and Network staff. This will be published in 2007.

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 2006 an interagency agreement with USGS was modified to complete written revisions and field implement the Network's estuarine eutrophication monitoring protocol in Network parks. Network staff, Cape Cod National Seashore Prototype Monitoring Program staff and USGS cooperators held a meeting in FY06 to discuss the necessary revisions and changes needed for completion of a final draft. A final version will be completed in FY07. Pilot implementation of the protocol occurred in FY2005 and in FY2006 at GATE, ASIS, and CACO. The Network hired technicians at GATE, CACO and ASIS to assist park staff with data collection and processing.

In order to strengthen quality control on analysis of chlorophyll-a samples, NCBN opted to build within-network capacity through a cooperative effort with the CACO North Atlantic Coastal Laboratory. Instrumentation and some staff salary were provided by the network so that CACO could expand its analytical capabilities and offer analysis of chlorophyll samples for all NCBN parks. This will greatly simplify integration and comparison of results between parks, reduce costs associated QA/QC, and provide the network with better control over year-to-year consistency in methods.

NCBN and Cape Cod NS data management staff are working jointly with the USGS cooperators to develop an estuarine water quality monitoring database that can be used by all of the Network parks. This database is being developed by CACO data management staff with review and assistance by Network staff and cooperators. Included in this database will be automated conversion and upload procedures to NPSTORET. A standard operating procedure will also be developed and incorporated into the protocol describing the database and procedures. This project is targeted for completion in FY07.

In addition to direct sampling of indicators of estuarine eutrophication, the Network has continued to work with University of Rhode Island cooperators to develop a protocol to track sources of nitrogen to park estuaries. The draft report submitted to the Network in 2005 was reviewed by Network staff and sent back to the cooperators for revision in FY06. Revisions and the final draft have not yet been completed by the cooperators.

Public Interest Highlights

Three new Maryland state species records found on Assateague Island

In a collaboration between Assateague Island National Seashore and the Northeast Coastal and Barrier Network, entomologists conducting a three year invertebrate inventory of the park have discovered a moth and three native bee species, all considered new Maryland state records. The complete data set from the 2006 field season has not yet been fully processed, so there is potential for more new state records. A wildlife photographer was also contracted on this project to accompany the entomologists during their surveys of Assateague. Not only has an outstanding photographic record of the insect species of Assateague been compiled, but these extensive photos will eventually be used in an identification guide that will be located at the park visitor's center for use by the general public.

Rare Habitat and Species found at Gateway National Recreation Area during vegetation mapping efforts.

During vegetation mapping efforts by NY Natural Heritage Program ecologists at Gateway National Recreation Area, four state rare plant species were found and added to the Natural Heritage Program state database. A significant maritime dune community was also mapped in the park and entered into the NY Natural Heritage database

Species synthesis reports developed to assist parks with general management planning, species and habitat protection and management, and determining resource condition.

With the completion and submission of most of the vertebrate and vascular plant inventories, the Northeast Coastal and Barrier Network has developed a cooperative agreement with staff from the University of Rhode Island Natural Resources Science Department to compile and analyze these data into *synthesized species reports for each of the parks*. These reports will include a narrative synthesis of historic inventory data, the most recent data collected as part of the Network's inventory program, and data in both the NPSpecies and NatureBib databases, along with input from the existing inventory cooperators. These reports will be developed to assist the parks with general management planning, species and habitat protection and management, and determining resource condition to meet park specific GPRA goals.

The Northeast Coastal and Barrier Network and the North Atlantic Coast CESU begin to develop a plan to inventory marine resources in Northeast coastal parks.

A new effort to *inventory marine resources was initiated this year* in the Northeast Region coastal parks by the Northeast Coastal and Barrier Network, coastal parks and the North Atlantic Coast Cooperative Ecosystems Study Unit (CESU). Park staff surveys requesting information on marine resources were conducted in the winter of 2006 and a workshop held in the spring to help formulate a scope of work detailing the necessary steps needed to implement inventories in these parks. The scope of work describes data mining and compilation of existing marine resource data, followed with a complete marine inventory study plan to be developed in 2007.

Northeast Coastal and Barrier Network and Cape Cod National Seashore Prototype

park partner to enhance existing lab facilities, equipment and staff.

In order to strengthen quality *control on analysis of chlorophyll-a samples* collected as part of the estuarine water quality protocol, the NCBN and CACO cooperatively enhanced existing lab facilities at CACO. Instrumentation and partial staff salary were provided by the network so that CACO could expand its analytical capabilities and offer analysis of chlorophyll samples for all NCBN parks. This will greatly simplify integration and comparison of results between parks, reduce costs associated QA/QC, and provide the network with better control over year-to-year consistency in methods.

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. The Network continues to work cooperatively with scientists from the Wildlife Conservation Society, the College of William and Mary, Frostburg

State 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 began 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, have been and continue to be inventoried in network parks through cooperative agreements with the Rhode Island Natural History Survey (RINHS) and the Virginia Natural Heritage Program (VANHP). Draft and final reports and data have been submitted to the Network in 2006 for GATE, FIIS and SAHI. 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 two of the Network parks, GEWA and SAHI.

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 sixth 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 complete monitoring protocols to assess estuarine eutrophication, nitrogen inputs to park estuaries, salt marsh ecosystem dynamics, visitor use and impacts, and geomorphologic change.

The 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. Updates

to this plan and data management standard operating procedures will continue and be posted on the Network's website.

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 continue to collaborate 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 (FY2006) and Scheduled Activities (FY2007)

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

- FY2006 Accomplishments: (1) (All parks) A modification to the existing cooperative agreement with the University of Rhode Island was completed for the ongoing maintenance, update and verification of the NPSpecies database. The following tasks were completed. Ms Fabre, the research associate assigned to this project, reviewed the final certified database and report for COLO vascular plants and submitted this database for upload to NPSpecies. She prepared FIIS and SAHI vascular plant databases, THST and GEWA Bird databases and the GEWA mammal database for certification by taxa experts. Major updates were completed to the GEWA insect database as well. Ms Fabre imported data collected by Dr. Joseph Mitchell for sixteen databases (Amphibians and Reptiles) including APCO, BOWA, FRSP, PETE, RICH, GEWA, COLO and THST for certification, she then reviewed all data, taxonomy and submitted these databases for upload. Ms Fabre also assumed responsibilities as the NCBN NPSpecies Point-of-Contact. Representing the Network, she presented a talk at the NPS I&M Data Manager's meeting in 2006 on NPSpecies data entry procedures. Ms Fabre worked via teleconference to train park biologists (FIIS) to use NPSpecies online, and coordinated with experts for the certification of FIIS, SAHI

and GATE vascular plant databases. Ms Fabre has also provided NPSpecies data for the GEWA GMP planning process as well as provided data for a Natural Resource Summary of ASIS, being completed by NPCA. Ms Fabre is also in charge of scanning species related documents for all parks and verifying these data in the NPSpecies database. In addition, Ms. Fabre was appointed to the NPSpecies I&M Program User Board to represent the Northeast Region.

- Scheduled FY2007 activities and products: (1) (all parks) The cooperator will continue to 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 (Figure 1); provide training to NPS personnel and Cooperators regarding the use of NPSpecies as needed. Databases to be certified by taxa experts in 2007 include: ASIS amphibian, reptile, birds and mammals; COLO birds and mammals; FIIS, SAHI and GATE vascular plants; GEWA birds and mammals; THST fish and mammals.

Park	<i>Amphibians</i>	<i>Reptiles</i>	<i>Birds</i>	<i>Fish</i>	<i>Mammals</i>	<i>Vascular Plants</i>
ASIS	2007	2007	2007	2008	2007	Complete
CACO	Complete	Complete	Complete	Complete	Complete	2007
COLO	Complete	Complete	2007	2008	2007	Complete
FIIS	2008	2008	2008	2008	2008	2007
GATE	2008	2008	Complete	2008	2008	2007
GEWA	Complete	Complete	2007	Complete	2007	Complete
SAHI	2008	2008	2008	2008	2007	2007
THST	Complete	Complete	Complete	2007	2007	Complete

Figure 1. Northeast Coastal and Barrier Network Park NPSpecies database certification schedule.

Task 1.2. The NatureBib Database

- FY2006 Accomplishments: (1) Scott Tiffney, a Penn State Research Associate hired by the NE Region I&M program to manage NatureBib completed the following tasks

in FY06: Scott received and fulfilled NatureBib data requests from park personnel in the Network. He assessed the overall status of NCBN NatureBib databases and began detailed editing of each park database. NCBN NatureBib database records were assessed and edited for duplication, spelling, authority control, data integrity and data comprehensiveness. To date, 800 records in all 8 NCBN park databases have been completed and certified (See Appendix I for detailed description). Scott Tiffney completed a draft Northeast Region NatureBib Data Management Plan and a draft Northeast Region NatureBib Data Entry Manual. A NatureBib Data Management and Data Entry Manual for the NCBN was begun. Scott is also in the midst of 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, 260 documents have been scanned and converted to pdf format including individual page tif files for archiving (final pdf documents with tif files: ASIS - 118, CACO - 49, COLO – 11, FIIS- 16, GATE – 32, GEWA – 18, SAHI – 6, and THST - An additional 617 documents for the NCBN parks have been retrieved from various online sources in either final pdf or djvu format. These are then converted into pdf format in order to retain continuity (in the case of djvu files) and then all are used to create archival tif files. All 877 NCBN documents will then be sent to the NPS NatureBib Offices in Fort Collins where they will be uploaded into the database by the NatureBib staff under the direction of Wendy Schumacher for expediency.

- Scheduled FY 2007 Activities and Products: (1) NatureBib database data requests will continue to be fulfilled as they are received. Completed NatureBib database assessment and editing for ASIS, CACO, COLO, FIIS, GATE, GEWA, SAHI, and THST databases will be summarized in a NCBN NatureBib Certification Report. A NatureBib Data Management and Data Entry Manual for the NCBN will be completed. Scanning and digitizing of NCBN NatureBib documents will continue for the duration of this project. Quarterly e-mail progress reports will be sent to detail task progress for the Network. A web page will be created for digital document storage as needed.

NCBN NatureBib park database status

Park Code	Existing Records*	Records to be Edited**
ASIS	1375	82
CACO	(2752)	(50)
COLO	872	49
FIIS	2169	338
GATE	2975	312
GEWA	197	8
SAHI	193	9
THST	161	2
TOTALS	7942¹	800¹

¹Excludes CACO data

*Data collected from online NatureBib database September 11, 2006

** Based on downloaded records compared with park and master database records

***Based on past de-duping experience

Task 1.3 Assist cooperators with developing FGDC compliant metadata for biological inventories (All NCBN Parks)

- FY2006 Accomplishments: Discussions among cooperators, data managers, and I&M staff in the Northeast identified the need to provide support to cooperators in developing FGDC compliant metadata for their inventory projects. An amendment to the existing cooperative agreement with NCSU Field Technical Support Center (FTSC) was funded by all 4 networks in the region to train undergraduates at NCSU to develop FGDC compliant metadata following the biological profile.
- Scheduled FY 2007 Activities and Products: (1) Trained students will continue to directly assist Northeast Region I&M cooperators with the development of FGDC compliant metadata for all projects. (2) As data becomes available from other NCBN cooperators, NCSU will continue to provide technical support to review biological inventory data and create biological metadata for reviewed projects.

Objective 2: Conduct inventories targeted at vertebrate and vascular plants in the

Network parks and conduct quality assurance and review of all inventory products.

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

- FY2006 Accomplishments: (1) (GEWA, THST, COLO) Draft and revised final reports for GEWA, and a draft final report for THST, were produced and submitted to the NCBN by cooperator, Ron Barry from Frostburg State University. The MS Access electronic database for COLO was submitted to the Network as well. A M.S. thesis on responses of small mammals to Japanese stilt grass (*Microstegium vimineum*) in COLO forest was completed by Heather Warchalowski, a Frostburg State University graduate student. Her bound thesis was submitted to the Network to be entered into Naturebib. A 1st draft of a M.S. thesis on effects of hurricane-created canopy gaps on small mammals in COLO forest was submitted by Dana Strang, a Frostburg State University (FSU) graduate student. A M.S. thesis on habitat-specific species diversity of small mammals and demography of *Peromyscus leucopus* (white-footed mouse) in GEWA has been submitted by Tressa Dolbeare, a Frostburg State University (FSU) graduate student, to her graduate committee in preparation for a defense in October 2006. Preparation of 95 specimens (9 species) collected at COLO was completed and records were created for accession of these specimens into the FSU mammal museum. A draft final report for COLO was begun by Dr. Ron Barry, project cooperator. A project report on inventorying activities at GEWA/THST and COLO was submitted in March 2006. A 1-year extension of the cooperative agreement for the mammal inventory was requested and granted. (2) (SAHI) A final report on mammalian surveys conducted at SAHI by USGS cooperator, Allan O'Connell was submitted to the network in 2006. All data was reviewed by NETN Data Manager, Fred Dieffenbach for NCBN. (3) (ASIS Bats) Network cooperator, Dr. Edward Gates, completed the second field season of the bat inventory at ASIS. A progress report was submitted in Sept. 2006. A single final report for the reconnaissance work at COLO, GEWA and THST was submitted to the Network. Network staff returned comments to the cooperator.
- Scheduled FY2007 Activities and Products: (1) (GEWA, THST, COLO) Tressa

Dolbear's M.S. thesis, a Frostburg State University graduate student, on habitat-specific species diversity of small mammals and demography of *Peromyscus leucopus* in GEWA, will be completed and a copy presented to the Network. Dr. Ron Barry will submit the final report for COLO, and work with NPS personnel to produce metadata. Dana Strang's M.S. theses on the effects on small mammals of hurricane-created canopy gaps in forests, will be completed and presented to the Network. (2) (ASIS) Dr. Ed Gates will prepare and submit a draft and final report on the bats of ASIS. Network staff will provide comments to the cooperator on the 1st draft. All data products will be submitted and reviewed by cooperator, Dennis Skidds.

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

- FY2006 Accomplishments: (1) (GATE) The New Jersey Audubon Society (NJAS) reviewed and analyzed the data collected as part of the GATE secretive water bird inventory that had been developed and funded by the Network in FY2005. In reviewing the data, NJAS found a number of inconsistencies in field staff data collection methods. NJAS requested that this project be extended into 2007, and that another field season be conducted to help support the existing data. In FY06, the Network modified the New Jersey Audubon Society (NJAS) cooperative agreement to add additional funding to help NJAS cover the cost of hiring another field technician. (2) (FIIS, GATE) An extension was given to NJAS to complete the FIIS data compilation and review project report that was initiated in FY04. (3) (COLO, GEWA, THST, ASIS) Cooperator, Dana Bradshaw, from the College of William and Mary submitted the first avian inventory data for GEWA, THST and COLO. Kristina Callahan, MIDN Data Manager reviewed the data and submitted it to the NCBN. No reports have been completed.
- Scheduled FY2007 Activities and Products: (1) (GATE) NJAS will conduct one additional field season at GATE to complete the secretive water bird survey. Data, draft and final reports will be submitted to the Network. (2) (FIIS, GATE) The FIIS data compilation and review draft and final reports will be submitted to the Network. The GATE report, will be reformatted and published in the NE Region technical

report series. (3) (COLO, GEWA, THST, ASIS) The College of William and Mary staff will continue to try and complete draft and final reports for avian inventories completed at COLO, THST and GEWA. 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 for these parks. (4) (ASIS) A contract will be initiated with an ornithologist to complete the ASIS bird data compilation and review project that was originally listed as a task in the College of William and Mary cooperative agreement. Avian species records will be located for ASIS, compiled and entered into NPSpecies.

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

- FY 2006 Accomplishments: (1) (COLO, GEWA, THST) Final reports and data products were submitted to the Network by cooperator, Dr. Joseph Mitchell, University of Richmond. (2) (GATE, FIIS, ASIS, SAHI) Work continues with the Wildlife Conservation Society (WCS) and NPS herpetologist Dr. Robert Cook to complete draft final reports for herpetological inventories conducted at ASIS, GATE, FIIS and SAHI.
- Scheduled FY 2007 Activities and Products: (1) Network staff will continue to work with 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.

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.

- FY2006 Accomplishments: (1) (GATE, FIIS, SAHI) 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 has submitted draft final reports for all three parks along with all data

products. (2) (ASIS) In FY04 a modification to the existing RINHS agreement was completed to inventory Odonate and Butterfly species on ASIS. Because the odonate and butterfly fauna were well sampled in 2005, the lead investigator on this project, Richard Orr, requested that the agreement be modified to add an additional year of sampling. The scope of the project still includes the dragonflies, damselflies and butterflies as originally planned but has been expanded to the orthoptera (grasshoppers, katydids, and crickets) and native bees of ASIS. In addition, a comprehensive survey of the terrestrial arthropods of the salt marshes and aquatic arthropods of the freshwater ponds has been added. A beetle specialist and wildlife photographer have joined the project to add their expertise. During the 2006 field season extensive survey of the orthoptera and bees were conducted, including black lighting for katydids and crickets. Two survey study plots were selected for sampling the salt marsh at regular intervals throughout the 2006 season. Bee traps were setup during visits to the island. Complete data from the 2006 field season is not yet fully processed but at least one moth and three native bees found this year are new records for Maryland. The grasshoppers, katydids, crickets, butterflies, dragonflies, and damselfly field surveys are basically complete; as is the survey of the salt marsh arthropods. Extensive photos were taken of the more conspicuous insects found on ASIS for eventual use in an identification guide located at the visitor's center that can be used by the general public.

- **Scheduled FY 2007 Activities and Products:** (1) (ASIS) The RINHS project will continue into 2007 with completion at the end of the year. All aspects of the project will be enhanced during the 2007 field season but the main focus will be to fill in those areas of the contract that still need the most work. These include, but are not limited to, re-sampling the freshwater pond arthropods, continue survey work on the bees, wasps, ants and leaf beetles on the island and continuing to build a general photographic record of the more conspicuous species of the insects on the island for the field guide.

Objective 4: Conduct other baseline biological inventories identified as important

to Network parks and the Network Vital Signs program.

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

- FY 2006 Accomplishments: (1) (GATE, SAHI) NPS cooperator, Ecologists Ery Largay and Lesley Sneddon from Natureserve, along with NCBN cooperator, NY Natural Heritage Program (NYNHP), finalized the National Vegetation Classification types to be mapped at GATE and SAHI. NatureServe completed an edited document and submitted it to NYNHP for their use in writing park-specific descriptions for SAHI and GATE. Completed crosswalks and a dichotomous key for GATE and SAHI were delivered to NYNHP in FY06. A stratified random sampling scheme was developed, in accordance with USGS/NPS Accuracy Assessment standardized protocol during spring 2006 by NYNHP ecologists. The appropriate number of points for each vegetation type at each park property were generated and assigned a unique identifier. Accuracy assessment points were visited during the 2006 field season (June–October) by Greg Edinger (NY Natural Heritage Program Ecologist). At each visited point, a quick survey was conducted aimed at characterizing the dominant vegetation to verify the identification of the natural community and NVC association present. Greg visited 77% (352/458) of the points located on park property at GATE over a period of 25 days which included one day of marsh island survey by boat. The majority of the unsurveyed points are only accessible by boat and may be surveyed in October 2006. NPS research boats were out of service or unavailable for most of July and August 2006. All natural community data collected during accuracy assessment have been entered into the NYNHP Field Form Database. (2) (COLO, GEWA) A progress report was submitted in December 2005 by cooperator, Karen Patterson from the Virginia Department of Conservation and Recreation. Data collected in 2005 was entered into the NatureServe PLOTS database. Local vegetation descriptions were completed for GEWA as well as an accuracy assessment for the draft vegetation map of COLO.
- FY 2007 Scheduled activities and products: (1) (SAHI, GATE, COLO, GEWA)

NatureServe will revise the global descriptions and the final classification report will be submitted to the heritage programs in NY and VA for incorporation into their final reports to the NPS. NatureServe will provide review of all draft and final reports. NYNHP will conduct accuracy assessment for the SAHI vegetation map in October 2006 or spring 2007. VA DNH will submit a proposal for entering accuracy assessment data to PLOTS, a task that was not a part of the original scope of work.

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.

- FY 2006 Accomplishments: (1) (THST, COLO, GEWA) NCSU completed the final report for the THST aerial photo mosaics (leaf-off and leaf-on) and the final reports for the COLO and GEWA mosaics and formation-level vegetation datasets. The mosaics, were previously distributed to the NCBN Data Manager, and associated data were added to the data archive. (2) (THST, CACO) NatureServe ecologists will compile final products for THST vegetation classification and map, conducted by Chris Lea. NatureServe ecologists completed the accuracy assessment report for CACO and submitted it to the park.
- Scheduled FY 2007 activities and products: (1) (ASIS, THST, CACO) NatureServe ecologist, Lesley Sneddon will meet with Chris Lea to identify the components of the ASIS and THST projects that are still needed. They will also discuss how best to incorporate the vegetation map derived from LIDAR data into the final vegetation mapping report for ASIS. NatureServe will work with CACO to compile all final products for the park. (2) (COLO, GEWA) A progress report is due in December 2006 from the Virginia Department of Conservation and Recreation Natural Heritage Program cooperators. A regional analysis of all quantitative plot data in the Virginia Natural Heritage Ecology database (including COLO and GEWA), is due in the fall of 2006. Results of this analysis will inform the vegetation classification used to map the Parks units in three NPS regions: NCR, MIDN, and NCBN. All final deliverables

and reports will be completed for COLO and GEWA by April 2007. (2) (GATE, SAHI) Greg Edinger (NY Natural Heritage Program Ecologist) and Aissa Feldmann (NY Natural Heritage Ecologist) will review the accuracy assessment results and incorporate revisions into the final vegetation maps during the winter 2006–2007. Greg Edinger, Aissa Feldman, and Jennifer Garrett (NY Natural Heritage Assistant Ecologist) will prepare a report for each park and submit the drafts to NPS for review in June 2007.

Task 4.3. Inventory of Contaminant Sources in Network Parks (All parks)

- **FY2006 Accomplishments:** (1) (GEWA, THST, FIIS, ASIS) Cooperators from Rutgers University completed draft reports for GEWA, THST, FIIS and ASIS. These park specific reports include a baseline inventory of current xenobiotics in the environment based on historical data and current information gathered by the cooperators. A complete contaminants risk assessment was included in each report.
- **Scheduled FY2007 Activities and Products:** (1) (GEWA, THST, FIIS, ASIS, GATE, SAHI, COLO) All network park reports will be completed and submitted in final format to the network in FY07.

Task 4.4 Inventory of Marine Resources in Network Coastal Parks

- **FY2006 Accomplishments:** (1) (CACO, FIIS, GATE, ASIS) A new effort to inventory marine resources was initiated this year in the Northeast Region coastal parks by the Northeast Coastal and Barrier Network and the North Atlantic Coast Cooperative Ecosystems Study Unit (CESU). The Network surveyed coastal park resource managers to help identify existing marine resource data and gaps. A workshop was then held at the University of Rhode Island in April 2006 that included I&M staff, CESU staff, park and regional scientist and staff from the NPS Submerged Resource Unit and WASO office. This workshop was held to discuss the results of the park surveys, identify data needs and potential data collection methods. As a result, a workshop summary was developed along with a scope of work that would initiate a data mining and compilation effort and the development of a marine

inventory study plan for the NCBN and two Northeast Temperate Network (NETN) parks (Boston Harbor Islands and Acadia NP). (2) (ASIS) As part of the marine inventory initiative by the Network and CESU, a PMIS project developed by ASIS staff to conduct bathymetry and sediment mapping of the Virginia coastal bays was submitted to WASO I&M along with the Network and CESU marine inventories scope of work. The ASIS project will be conducted over a two year period, and will be a prototype for all other coastal submerged mapping efforts in the Northeast. (3) (FIIS) Also part of the Network and CESU's marine inventory and mapping effort, a pilot marine mapping project was developed and conducted at FIIS in August 2006. This pilot was funded by NPS geologic resources staff to test the use various equipment for mapping and classification of very shallow water, near shore environments. NPS Submerged Resources Center, other cooperators from University of Rhode Island, park and regional staff worked on a joint mission off shore of the FIIS wilderness area. Although this equipment has been used extensively in marine settings, these have often been in clear, warm waters along the south Atlantic coast. A test pilot was considered necessary along the Northeast coast in order to determine if this equipment is suitable for mapping in both shallow and often turbulent marine waters.

- Scheduled FY2007 Activities and Products: (1) (CACO, ASIS, FIIS, GATE) An interagency agreement will be established with the USGS to initiate a data mining and compilation effort and develop a marine inventory study plan for the NCBN and two Northeast Temperate Network (NETN) parks (Boston Harbor Islands and Acadia NP). This project will be scheduled to be completed in the spring of 2007. As part of this project, an agreement will be established with the GIS FTSC at the University of Rhode Island to provide GIS support and data management to the data mining and inventory study plan development project described above.

B. Vital Signs Monitoring

Objective 5: Hire and retain professional staff and provide a safe, healthy, and

productive work environment.

- FY2006 Accomplishments: (1) (ASIS, CACO) Two NPS biotechs were hired to assist with the Network's estuarine water quality monitoring program. One technician assisted ASIS staff in data collection during the summer of 2006. A second technician was hired and stationed at CACO to assist park staff in setting up and running a water quality lab where chlorophyll samples will be sent from all of the Network parks. (2) (GATE) An SCA intern was hired at GATE to assist park staff with conducting estuarine nutrient monitoring for the Network. (3) The Network prepared a position description and crediting plan in order to prepare to fill the Network Data Manager's position. This position will be stationed at the University of Rhode Island. (4) Network Coordinator, Bryan Milstead, left his position and a new coordinator, Sara Stevens was hired into the position.
- Scheduled FY2007 Activities and Products: (1) The Network will refill two vacant permanent positions, the Network Data Manager and Biologist. The Network staffing plan will be reviewed carefully and other permanent positions for the Network may be submitted to the region for approval.

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

Task 6.1. Informational and technical meetings

- FY2006 Accomplishments: (1) A board of director's meeting was held via conference call in January 2006, in which the FY05 administrative report and FY06 work plan was reviewed and accepted by the board. (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.
- Scheduled FY2007 Activities and Products: (1) A board of directors meeting will be held again by the end of January 2007 to review the FY 06 report and FY07 work

plan. (2) Visits to parks by Network staff to update Park staff on inventories, monitoring and data management will continue. (3) Network staff meetings will be held biweekly to provide updates and discuss staff work plans.

Task 6.2 –Information sharing

- **FY2006 Accomplishments:** (1) University of Rhode Island Cooperator, Dennis Skidds maintained and updated the NCBN website to meet Content Management Systems requirements, created web forms as needed, and created a searchable, online version of an NCBN Monthly Highlights database. Dennis Skidds also assisted in the development of the Nature and Science page for SAHI and facilitated the posting of documents to ASIS' Nature and Science page. (2) Theresa Moore from the Northeast Temperate Network completed a brochure and newsletter for the Network in FY06. In the future, these newsletters will be made available via the Network's website.
- **Scheduled FY2007 Activities and Products:** (1) Additional reports and data will be integrated into the website as needed. A review of the website's content and presentation will be requested of park staff. Following comments, the Network website will be updated. The Network will continue to provide assistance to parks in developing Natural Resource Profile websites, including GATE, GEWA and THST. ArcIMS / Arc SDE utilities will be researched to facilitate data-sharing between NCBN personnel, park units, and other NPS cooperators. (2) An NCBN newsletter will be completed for the spring of 2007.

Task 6.3 - Contribute to General Management Planning

- **FY2006 Accomplishments:** (1) The Network established a cooperative agreement with the University of Rhode Island this year to assist the Network in combining inventory products into park specific vertebrate and vascular plant synthesis reports that can assist parks with species and habitat protection and planning. These reports will not only combine inventory results, but include park specific guidance and suggestions for the management and conservation of species and habitats by taxonomic experts familiar with each park.

- Scheduled FY2007 Activities and Products: (1) A schedule for the completion of draft and final species and habitats synthesis reports will be developed by the NCBN along with the URI cooperator. This will be dependent upon park GMP schedules. As part of this project, knowledgeable natural resource professionals will be identified and contacted to assist with synthesis reports and to continue to act as park specialist for each taxonomic group.

Table showing NCBN Network GPRA Reporting

Park	GPRA Goal	
	1b3a: Vital signs Selected	1b3b: vital signs implemented
ASIS	1	1
GATE	1	1
FIIS	1	1
CACO	1	1
SAHI	1	1
GEWA	1	1
THST	1	1
COLO	1	1

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

Task 7.1. Develop an NCBN Database Template based on the NPS Natural Resource Database Template and develop individual monitoring databases for all network protocols.

- FY2006 Accomplishments: (1) NCBN cooperators, Gary Entsminger, continued the development of the NCBN Salt Marsh monitoring database that was originally

developed by Susan Huse. Gary completed a beta version of this database along with a completed user's guide in FY06. (2) NCBN cooperator, Dennis Skidds, developed an Access database and user's guide for the Network's ocean shoreline position protocol.

- Scheduled FY2007 Activities and Products: (1) Velma Decker, CACO data manager, will continue the development of the Network salt marsh monitoring database and documentation. Velma will also work with NCBN cooperators and the network to develop an estuarine nutrient monitoring database.

Task 7.2. GIS and Database Efforts in Support of Inventory & Monitoring Projects in Northeastern National Parks (All Parks)

- FY2006 Accomplishments: (1) The NCBN has a cooperative agreement 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. EDC lab staff, Dennis Skidds' completed a number of projects for the Network including creating an MS Access database for the Shoreline Change Monitoring Protocol, including a comprehensive users' guide; assisting with writing the Shoreline Change Protocol narrative and SOPs; acquiring and cataloging existing NCBN shoreline data from park GIS managers / Rutgers University staff; collecting GPS field data for Spring shoreline surveys at Sandy Hook (GATE) and FIIS; performing mission planning for Fall surveys; acquiring and developing a catalog of existing network LIDAR data products; performing QAQC on newly-acquired LIDAR data for ASIS, GATE, GEWA, THST; delivering a PowerPoint presentation ("LIDAR and Vital Signs Monitoring in the Northeast Coastal & Barrier Network") at the NER-GIS Annual Meeting; reviewing and testing the salt marsh monitoring database and users' guide; in conjunction with Marc Albert, creating an MS Access database for monthly highlights for the NCBN; developing tessellated hexagon sampling schemes for the NCBN / NETN's Water Quality Monitoring protocols; producing digital and hard copy maps in support of sampling design efforts for the network's salt marsh monitoring protocol; performing

QA/QC on spatial data from mammal inventories at COLO, GEWA, THST and a diamondback terrapin inventory at GATE; continuing to develop species-abundance and sampling-location maps for joint Wildlife Conservation Society / NPS herpetological inventory project; reviewing the final report regarding orthophoto mosaics and formation-level vegetation map for COLO; acquiring geology / hydrology GIS layers developed by Wayne Newell for GEWA; coordinating with park Natural Resource staff to determine desired extents of available MRLC/NED data; processing GPS data collected by Ted Elliman for APPA and BOHA; providing raw and analyzed data to support projects including: a herpetological inventory for WEFA, a submerged resources inventory for FIIS, Taxa-Monitoring research for the National Capital Region, and Resource Assessment Reports for NY parks.

- Scheduled FY2007 Activities and Products: (1) The Network will modify the existing agreement with the EDC lab at URI and Dennis Skidds will: Provide assistance in the development of NCBN monitoring protocols (e.g., GIS support for sampling-design development, contributions to protocol narratives and SOPs, etc.). Perform QA/QC on FIIS odonate inventory database. Plan and conduct surveys for the Shoreline Monitoring program, as needed. Continue to assist in protocol development and begin analyses of shoreline data using DSAS software.

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 protocols 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)

- FY2006 Accomplishments: (1) Data collected at ASIS and GEWA in the summer of 2005 were entered into the NCBN Salt Marsh database, analyzed, and a data report produced. (2) Existing draft NCBN Salt Marsh monitoring protocols (vegetation and nekton) were reviewed by Network cooperator, Penelope Pooler, from Virginia Polytechnic Institute and State University. This work entailed a complete sampling

design and statistical review of each of these protocols. Following a number of meetings between the protocol authors, cooperators and NCBN staff, protocol SOPs were revised and rewritten for the salt marsh vegetation monitoring protocol.

- Scheduled FY2007 Activities and Products: (1) Sampling locations will be developed for each of the NCBN parks and incorporated into both the salt marsh vegetation and nekton monitoring protocols. Following review by each park, this protocol will be sent out for peer review. (2) (ASIS) Pilot sampling may be conducted at ASIS this year to better determine the feasibility of implementing the new sampling design.

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

- FY2006 Accomplishments: (1) (ASIS, CACO, GATE, FIIS) In cooperation with Rutgers University Institute for Marine and Coastal Studies (Rutgers IMCS), the Network revised and tested the ocean shoreline protocol. 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 ocean shoreline protocol was tested with actual field surveys conducted at CACO, ASIS, GATE, and FIIS in FY06. Network staff organized a meeting in March 2006 for park staff, Rutgers' and URI cooperators to discuss the data management and archiving of shoreline position data. The development of an Access database to house these data was planned. Following this meeting a shoreline position monitoring database was developed by URI cooperators and a data management SOP drafted. Existing shorelines for the Network's four ocean parks were acquired and archived at the URI as well. (2) (All parks) Airborne LIDAR surveys were conducted at ASIS, CACO, COLO, FIIS, GATE, GEWA, THST, and SAHI in FY05. NASA had 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 during these 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) (All parks) Experimental LIDAR data products for all parks were submitted in FY06 to the Network, as well as LIDAR related Standard Operating Procedures (SOPs) for extracting ocean shoreline positions and edge of beach vegetation. (4) NCBN and other coastal network staff attended a meeting in St. Petersburg Florida held by USGS cooperators to discuss potential collaboration on data collection efforts between networks using Lidar products collected and produced by USGS and NASA partners. (4) USGS/NCBN interagency agreement was modified to conduct additional LIDAR surveys and develop products for the Network in FY07.

- FY2007 Scheduled activities and products: (1) The Network will complete the ocean shoreline position protocol with the assistance of Rutgers University staff, and submit it for peer review. Park staff will continue to collect data at ASIS, GATE and CACO and submit these data to the Network for archiving and presentation. Network staff will collect shoreline position twice a year at FIIS. (2) The Network will organize a meeting with regional and park GIS staff to discuss the potential uses and data development and management needs of LIDAR data. The meeting will focus on using LIDAR as a monitoring tool for a variety of ecological variables. (3) 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 LIDAR derived data products.

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

- FY2006 Accomplishments: (1) 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. No additional work was completed in FY06.

- Scheduled FY2007 activities and products: (1) Based on available funding, the Network may develop a scope of work for the development of a visitor use protocol.

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.

- FY2006 Accomplishments: (1) (FIIS) Terrestrial vegetation mapping by digital classification of Quickbird-2 satellite image was completed by URI cooperators (Dr. Y.Q.Wang). 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 for FIIS. Following park and network review, corrections and finalized maps were completed and submitted to the Network. A final report, including a protocol and SOPs describing the procedures was developed. All data products including metadata were provided to NCBN staff for archiving. A manuscript based on the outcome of this project was submitted and accepted to the journal, *Marine Geodesy*, 5th Special Issue on Marine and Coastal Geographic Information Systems.
- Scheduled FY2007 Activities and Products: This project is complete. All data products will be submitted to NCSU for archiving and review.

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

- FY2006 Accomplishments: (1) (FIIS, GATE, ASIS) 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 had 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. Salt marsh elevation monitoring data were collected at both FIIS and GATE by USGS scientists three times during FY06. In addition, the FY04 IA provided funds for salt marsh elevation equipment purchase and installation at ASIS. Installation of these SETs was postponed by Network staff pending review of the sampling designs associated with the Network's salt marsh vegetation and nekton protocols.

- Scheduled FY2007 activities and products: (1) (GATE, FIIS, ASIS) Salt marsh elevation data collection will be continued at FIIS and GATE. Following the revised salt marsh monitoring sampling design, it will be determined whether or not the Network will fund additional SET installations at FIIS and GATE in order to collocate protocol data collection. SETs purchased by the Network in 2005 will be installed at ASIS at existing pony monitoring sites and the Network will determine whether or not additional installations will be made in relation to the new salt marsh monitoring protocol design for ASIS.

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).

- FY2006 Accomplishments: (1) A cooperative agreement was developed between the NCBN, the Eastern Rivers and Mountains Network and Virginia Polytechnic Institute and State University. The PI at VA Polytechnic is Penelope Pooler, a biostatistician. In FY06, Penelope began to review and revise the sampling design and standard operating procedures (SOP) for the following monitoring protocols: salt marsh sediment elevation, salt marsh vegetation, and nekton. Protocol revisions were completed in collaboration with each protocol author. The sampling design SOP for salt marsh vegetation has been rewritten based on the revised sampling plan. Sampling for sediment elevation and nekton will follow the same design by being collocated at a portion of the vegetation sampling sites. Ms. Pooler also reviewed the sampling and analysis SOPs for the

Network's ocean shoreline position protocol. The sampling SOP needed no revisions. Based on discussions with NCBN protocol authors and researchers it was decided to adopt a new software package for analysis of shoreline change. This package, DSAS (Digital Shoreline Analysis System) is an add-in for ArcGIS which will require changes to the analysis SOP for shoreline change.

- Scheduled FY2007 activities and products: Penelope Pooler will continue to revise the analysis SOP for the Network's ocean shoreline position monitoring protocol, and review and revise as needed, the SOP for estuarine eutrophication in collaboration with NCBN protocol authors. As time permits, Ms. Pooler will review the Network's protocol development summaries for planned monitoring protocols (visitor use, visitor impacts, nitrogen loading, beach/dune topography, and landscape change) and develop draft sampling design SOPs for each. She will also 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.

Task 8.7. Integration of the NCBN parks into bird conservation region 30 tidal marsh bird monitoring. (COLO, ASIS, GATE, FIIS, GEWA, THST, SAHI)

- FY2006 Accomplishments: (1) The Network established a new cooperative agreement with the University of Delaware to explore the possibility of incorporating Network parks in a region-wide marsh bird monitoring program. Partnered with the University of Delaware, the Network hopes to develop key partnerships in developing and taking part in a regionally based long term marsh bird monitoring effort that will be developed through extended partnerships with other agencies, states and Universities. Salt marsh breeding bird populations (rails, bitterns, sparrows, etc.) in eastern North America are high conservation priorities in need of site specific and regional monitoring designed to detect population changes over time. The present status and trends of these species is unknown, but are thought to be declining, and the majority of these species are listed as conservation priorities on comprehensive wildlife plans throughout the eastern US. NCBN parks are known to provide important salt marsh habitat to these species.

- FY2007 activities and products: In the fall of 2006, existing tidal marsh GIS data layers for BCR 30 will be generated as a continuous coverage. GIS data layers with NPS boundaries within BCR 30 will be identified. Sites of interest for estimating trend in salt marsh bird populations within NCBN parks will be identified. Monitoring objectives for each NCBN Park and groups of tidal marsh bird species will be determined. The necessary sample intensity to meet monitoring objectives will be identified and a spatially balanced, hierarchical sampling frame using a Generalized Random Tessellated Sample developed. A draft final report, including power analyses, GIS data layers, and a salt marsh bird sampling frame will be submitted for review to Network.

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

Task 9.1. Test variables and develop a protocol for assessing and monitoring nitrogen inputs to estuarine ecosystems in Network parks. (CACO, FIIS, GATE, ASIS, COLO and ACAD (Northeast Temperate Network NETN Park)

- FY2006 Accomplishments: (1) Through a cooperative agreement with investigator Scott Nixon from the University of Rhode Island, an extension of the Nitrogen Loading Model (NLM-E) was completed using the most accurate and recent land use data (1992) for Network parks. This model was run for each park, including a 30-year historical analysis for ASIS with data ranging from 1980-2000. The cooperators submitted a draft final report to NCBN staff for review in FY05. Comments were provided to the cooperators by Network staff and potential peer reviewers contacted, but URI cooperator, Scott Nixon and staff have yet to complete the final report incorporating comments.
- FY2007 Scheduled Activities and Products: Continue to request final report from cooperators, and when received, send out for peer review.

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)

- FY2006 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. In FY 2006 NCBN modified its interagency agreement with the USGS to make revisions and additions to the Estuarine Nutrient Enrichment Vital Signs Monitoring Protocol, assist NCBN with implementation phase-in, and train NPS staff in the proper execution of the protocol. (a) Protocol Revision –Early in FY2006, the reviews and updated national guidance on Vital Signs design and implementation were communicated to US Geological Survey. With input from the NCBN advisory committee and park resource managers, USGS worked with NCBN to plan an approach for addressing these reviews and the new guidance. The protocol was revised to specifically include additional supporting information on sampling designs, target populations, statistical power, and quality control (with measurement quality objectives for precision, measurement bias, and detection limits for all parameters). Procedures for additional seagrass condition measures were also developed and field tested at Cape Cod National Seashore. (b) Protocol Implementation – Water quality monitoring for the Estuarine Nutrient Enrichment protocol was repeated at Gateway National Recreation Area (GATE) and Assateague Island National Seashore (ASIS), and added for the first time at Cape Cod National Seashore (CACO). USGS trained NPS personnel at GATE and CACO in implementing the estuarine monitoring protocol at their locations; trained NPS staff in protocol-specific use of water quality and underwater-light monitoring equipment, sampling design, data quality assurance/quality control (QA/QC); and assisted network and park personnel in developing specifications for purchase of monitoring and laboratory equipment. (c) Chlorophyll-a analysis – In order to strengthen quality control on analysis of chlorophyll-a samples, NCBN opted to build within-network capacity through a cooperative effort with the CACO. Instrumentation and limited staff salary were provided by the network so that CACO could expand its analytical capabilities and

offer analysis of chlorophyll samples for all NCBN parks. This will greatly simplify comparison of results between parks, reduce costs associated QA/QC, and provide the network with strong control over year-to-year consistency in methods. (d) Seagrass Condition Assessment – In addition to providing technical assistance with water quality components of the monitoring protocol, USGS also partnered with CACO to conduct high-resolution seagrass monitoring in the Little Pleasant Bay and Duck Harbor Beach eelgrass beds. Although the seagrass vital signs and measures were originally selected as efficient indicators of overall estuarine response to nutrient enrichment, protocol reviewers and the NCBN Advisory Committee recommended expansion to also address the question of park-wide seagrass condition. This addition would require an unbiased probability-based sampling approach, which would necessarily be of a lower, mid-tier intensity. USGS developed assessment procedures, and tested them for logistical feasibility and data quality in Little Pleasant Bay at Cape Cod National Seashore.

- **Scheduled FY2007 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)

NCBN Coordinator, Sara Stevens

NCBN Biologist, (vacant since July 2006)

NCBN GIS Specialist (vacant since Nov. 2005)

NCBN Data Manager (vacant since Sept. 2005)

NCBN Technical Steering Committee

Sara Stevens, NPS-University of Rhode Island

Elizabeth Johnson, NPS-University of Rhode Island

Carl Zimmerman, NPS-ASIS

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 (now relocated from CACO)

NCBN Board of Directors

Scott Bentley, ASIS

George Price, CACO

P. Daniel Smith, COLO

Michael Reynolds, FIIS

Barry Sullivan, GATE

Vidal Martinez, GEWA/THST

Greg Marshall, SAHI

Sara Stevens, 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, David Gregg, Virginia Carpenter Brown, Nina Briggs, Kira Stillwell, Richard Orr

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, Keith Cooper

Rutgers University, Norbert Psuty

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, Natural Resources Science Department (NRS), Peter Paton, Research Associate Carol Trocki, Graduate Student Assistant, Christine Caron

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 (NRS faculty), Research Associates Charles LaBash, Roland Duhaime, Dennis Skidds, Linda Fabre

University of Richmond, Joseph Mitchell

VA DNR-Natural Heritage Program, Karen Patterson

Virginia Polytechnic Institute and State University, Penelope Pooler

IV. Reports, Publications and Presentations (FY 2006)

Reports

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. March 2006.

Eastman, Elizabeth and Devine, Hugh A. March 2006. Digital Orthophoto Mosaics and Formation Level Vegetation Database for Colonial National Historical Park (Technical report). North Carolina State University, Raleigh, NC.

Eastman, Elizabeth and Devine, Hugh A. June 2006. Digital Orthophoto Mosaics and Formation Level Vegetation Database for George Washington Birthplace National Monument (Technical report). North Carolina State University, Raleigh, NC.

Eastman, Elizabeth and Devine, Hugh A. July 2006. Digital Orthophoto Mosaics and Formation Level Vegetation Database for Thomas Stone National Historic Site (Technical report). North Carolina State University, Raleigh, NC.

Sneddon, L. and R. Zaremba. 2006. Vegetation mapping of the Cape Cod National Seashore. Phase II: accuracy assessment.. Report to the National Park Service. NatureServe, Boston, MA.

Warchalowski, H. P. 2006. Responses of small mammals to invasion by Japanese stilt grass (*Microstegium vimineum*) in mixed coniferous-deciduous forests of Colonial National Historical Park, Virginia. M.S. thesis, Frostburg State University, Frostburg,

Maryland.

Warchalowski, H. P., and R. E. Barry. 2006. Responses of small forest-floor mammals to invasion by Japanese stilt grass (*Microstegium vimineum*) in Colonial National Historical Park, Virginia. Poster presentation. American Society of Mammalogists 86th annual meeting, University of Massachusetts, Amherst, Massachusetts.

Presentations

Fabre, L.L., J. Stringelin-Keefer. 2006. Northeast Region I&M NPSpecies Data Entry Guidance Procedures. Oral presentation at the NPS 2006 Inventory and Monitoring Data Management Conference. April 03-07, 2006. 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. 18th Biennial Conference of the Estuarine Research Federation. October 16-21, 2005. Norfolk, VA.

Kopp, B.S. 2005. Monitoring Estuarine condition within the National Park Service Northeast Coastal and Barrier Network. Update to the NPS Northeast Coastal and Barrier Network Technical Steering Committee. December 7, 2005. Ledyard, CT.

Skidds, D.E. 2006. LIDAR and Vital Signs Monitoring in the Northeast Coastal & Barrier Network. Presentation at the NPS Northeast Region Annual GIS Park Coordinators Meeting, Sandy Hook, NJ.

Stevens, Sara. December 2005. *Inventory of vertebrates and vascular plants in northeast coastal National Parks*. NCBN Technical Steering Committee.

Stevens, Sara, Dennis Skidds, Kristina Callahan and Nathan Piekielek. May 16, 2006. Inventory and Monitoring Update. Northeast Region GIS Meeting, Sandy Hook, NJ.

Stevens, Sara. Northeast Coastal and Barrier Network. July 27, 2006. George Washington’s Birthplace NM GMP Planning Meeting.

Wang, Y., M. Traber, B. Milstead, 2006. Vegetation Mapping for the Fire Island National Seashore Towards Long-term Resource Management and Monitoring, the 21st Annual Symposium of the United States Regional Chapter of the International Association for Landscape Ecology, March 28-April 1, 2006, San Diego.

Publications

Wang, Y., M. Traber, B. Milstead and S. Stevens. 2006 Terrestrial and Submerged Aquatic Vegetation Mapping in Fire Island National Seashore Using High Spatial Resolution Remote Sensing Data. Marine Geodesy, 5th Special Issue on M&CGIS. Accepted, currently undergoing edits.

V. Status of Park Vital Signs Monitoring

Coastal and Barrier Network 2006	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

- Continued support in the development of methods to use LIDAR technology to monitor ecosystems in coastal Parks.

VII. Budget

FY2006 Annual Report Budget Narrative

In FY2006, the NCBN received \$. in funding, including Inventory funds, Monitoring funds, and WRD Water Quality funds. Approximately 74 percent of this funding was used to develop partnerships (via cooperative agreement) between the Network, USGS and a number of Universities for the development and implementation of monitoring protocols and biological inventory projects. Permanent NPS personnel expenses constituted approximately 22% of the budget in FY06. Travel (1.9%), general operations and equipment purchases and the administrative/office support (2.15%) rounded out NCBN expenditures for FY06.

In FY07, the Network anticipates the authorization of approximately \$. Approximately 61 percent of the NCBN budget will be dedicated to monitoring protocol implementation, park data synthesis projects, and marine inventory planning. The Network Program will continue to contribute funds to the University of Rhode Island (URI) to house and administratively support I&M staff as well as provide the Network with GIS and data management support through the NPS Regional Technical Support Center located on

campus.

NCBN FY2006 expenditures and FY2007 budget plan is provided below.