

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE - BOSTON SUPPORT OFFICE
INTERAGENCY / INTRA-AGENCY AGREEMENT

1. Fiscal Year 2002	2. IA # F4520020015	3. Other agency # USGS Patuxent	4. Type (Check appropriate box) ☒ Original ☐ Modification	5. Modification #
6. This agreement is entered into by the National Park Service: Park/Office <u>National Park Service Boston - Support Office</u> Location <u>15 State Street</u> <u>Boston, MA 02109</u>			7. Amount of this transaction \$14,030.00	
☐ To perform work as described herein for the agency named in item 11 (NPS as Servicing / Billing Agency) ☒ To have work performed for the NPS by the agency named in item 11 (NPS as Requesting / Paying Agency)			8. Previous amount, if applicable	
			9. Total amount	\$14,030.00
11. Name of Participating Agency/Bureau/Office <u>USGS-Biological Resources Division</u> Location <u>Patuxent Wildlife Research Center, 12100 Beech Road, STE4035</u> <u>Laurel, MD 20708-4035</u>			10. Under the authority of: ☒ Economy Act, 31 USC 1535 ☐ Reciprocal Fire Act, 42 USC ☐ Other (Cite Authority)	
			12. Economy Act determination attached? ☒ Yes ☐ No	
			13. BPC approval ☐ Yes ☐ No	

14. Statement of work Candidate Variables for Monitoring Estuarine Nutrient Enrichment Within the NPS Coastal and Barrier Network

	REQUESTING (PAYING) AGENCY	SERVICING (BILLING) AGENCY
15. Agency Location Code	15a. 14-10-0099	15b. 14-08-0001
16. Fund account symbol/appropriation	16a. 14-02-1036	16b.
17. Period of fund availability	17a. FY2002	17b.
18. Account/cost structure	18a. 2110-COAS-NII-G-253G-02-\$14,030.00	18b.
19. Procurement document number	19a.	19b.
20. Name of agency contract	20a. Michele Valenza/Cheryl Corbett	20b. Marian Clark
21. Contact's telephone number	21a. 617-223-5162/617-223-5035	21b. 301-497-5623

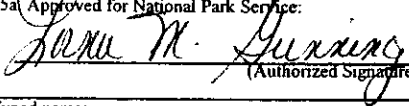
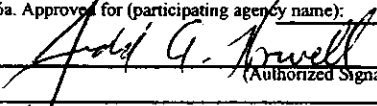
22. Billing method: ☐ SF-1080 ☒ OPAC ☐ Other (Identify)

23. Billing frequency: ☐ Annually ☐ Quarterly ☐ Monthly ☐ Other (Identify)

24. Bill to (Name and address, including zip code):

National Park Service
Accounting Operations Center
Department CDB-3, P.O. Box 4800
Reston, VA 22090

Execution of this agreement constitutes an obligation against the requesting (paying) agency, and authority for the performing (billing) agency to proceed with the work and services to be performed.

25a. Approved for National Park Service:  (Authorized Signature) Typed name: <u>Lorna Gunning</u> Title: <u>Contracting Officer</u> Date: <u>3/20/02</u>		26a. Approved for (participating agency name):  (Authorized Signature) Typed name: <u>Judd A. Howell, Ph.D.</u> Title: <u>Director, Patuxent Wl. Res. Ctr.</u> Date: <u>5/8/02</u>	
25b. Approved for National Park Service: (Authorized Signature) Typed name:		26b. Approved for (participating agency name): (Authorized Signature) Typed name:	
Title:	Date:	Title:	Date:

The following information should be used to complete the corresponding blocks on the face of this form:

1. Enter the current four-digit fiscal year (e.g. 1998).
2. Enter the NPS document number. (The standard 15-digit NPS Procurement Instrument Identification Number [PIIN] number is required for all agreement documents in accordance with NPS-20, Appendix A.. PIIN is assigned by the Contracting Officer.)
3. Enter the other agency's document number.
4. Check "Original" if first submission; "Mod" if modification to existing agreement.
5. Enter the sequential modification number (e.g. 0001).
6. Enter the NPS park or office name; City and State; and check appropriate box indicating whether NPS is the Servicing or Requesting Agency.
7. Enter the amount of this transaction including all direct and indirect costs required to provide the service.
8. If this is a modification, enter the previous aggregate amount.
9. Enter sum of Blocks 7 and 8.
10. Enter the legal authority under which this agreement is made.
11. Enter the name and location of the other agency.
12. Pursuant to FAR 17.503, an Economy Act determination is required by the Requesting Agency and approved by Requesting Agency's Contracting Officer. The determination shall state that the supply or service being provided by the other agency cannot be obtained as economically or conveniently by contracting directly with a private source and is in the best interest of the Government.
13. Approval by the NPS Bureau Procurement Chief (BPC) is required for actions when NPS is the Requesting Agency and the aggregate funds are expected to be \$250,000 or above.
14. Describe the work to be performed and attach to this form.
15. Enter the 8-digit Agency Location Code (ALC) for both agencies. The NPS ALC is 14-10-0099. Obtain other agency's ALC from that agency's Finance Office.
16. Enter the Treasury fund account symbol for the funds which will be used to pay for and/or reimburse the work for each agency.
17. Enter the period of fund availability of the designated funds. (NOTE: The period of availability of funds transferred pursuant to an Economy Act agreement may not exceed the period of availability of the source appropriation.)
18. Enter the account/cost structure for each agency used to pay for and/or reimburse the work.
19. Enter the procurement/document of the billing agency, if applicable.
20. Enter the name of a contact person for each agency.
21. Enter the telephone number of the contact person.
22. Check the appropriate box indicating billing method.
23. Check the appropriate box indicating the requested billing frequency.
24. If the NPS is the paying agency, type in the following billing address:
National Park Service
Accounting Operations Center
Dept. CDB-3, P.O. Box 4800
Reston, VA 22090
(NOTE: If the Requesting Agency is other than NPS, that agency should complete this block.)
25. To be signed by the authorized official(s) for the National Park Service. Enter typed name, title, and date of each signature for the respective approving official.
26. To be signed by the authorized official(s) for the other agency. Enter typed name, title, and date of each signature for the respective approving official.

SUBMITTAL

For Interagency Agreements authorized under the Economy Act, submit this form to the appropriate acquisition office where the IA number will be assigned, the Economy Act Determination will be made, the Solicitor's determination of Legal Sufficiency will be obtained and the BPC approval will be satisfied. The program office should provide supporting information to assist with the Economy Act Determination.

This form may be used to supplement the other agency's document when that agency is the Requesting (Paying) Agency.

After signature by both parties, a fully executed copy with original signatures shall be returned to the acquisition office for record purposes.

STUDY PLAN

Candidate Variables for Monitoring Estuarine Nutrient Enrichment Within the NPS Coastal and Barrier Network

Principal Investigators

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Submitted To:

National Park Service
Coastal and Barrier Network

November 25, 2001

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BACKGROUND AND PURPOSE

Estuaries in the northeastern U.S. are threatened by nutrient enrichment from residential and urban development, agricultural expansion, and air pollution. With much of the watershed area of NPS estuaries lying outside protective park boundaries, the potential for increases in nutrient loading is high. Frequent responses of estuarine ecosystems to excessive nutrient inputs include increased production of organic matter, increased community metabolism, decreased dissolved oxygen concentrations, dense algal growth, decreased light availability, loss of submerged vascular plant beds, and declines in habitat value for fish and wildlife (Valiela et al. 1992, Nixon 1995, Bricker et al. 1999).

A scientifically-based monitoring program is critical to inform and guide management decisions regarding protection of estuarine ecosystems. A monitoring program must address the following questions: 1) Are estuarine nutrient loads and concentrations in network parks increasing? 2) Are estuarine resources in the parks changing in response to nutrient inputs? Ideally, monitoring will detect early changes in estuarine nutrient status and identify causes and consequences of those changes, so that remedial management actions can be developed as needed.

The NPS Vital Signs Monitoring Program was initiated to provide all national park units with scientifically sound information on the status and trends of their natural resources. Monitoring programs will be implemented within biogeographic networks of parks that share similar natural resource characteristics. The Northeast Coastal and Barrier Network consists of 8 parks from Massachusetts to Virginia. The 4 largest parks include extensive estuarine habitat (Cape Cod NS, Massachusetts; Fire Island NS, New York; Gateway NRA, New York/New Jersey; Assateague Island NS, Maryland/Virginia). Colonial NHP, Virginia, is a moderate-sized park with significant estuarine shoreline, and two small parks (Sagamore Hill NHS, New York; George Washington Birthplace NM, Virginia) also include short stretches of estuarine shoreline. The Estuarine Nutrient Enrichment Workgroup of the NPS Vital Signs Monitoring Program, Northeast Coastal and Barrier Network (hereafter referred to as the workgroup), was convened to develop a plan for monitoring estuarine nutrient enrichment throughout the park network. In addition, 2 parks within the adjacent Northeast Temperate Network also include extensive estuarine habitat (Acadia NP, ME; Boston Harbor Islands, MA). It is expected that an estuarine monitoring program developed for the Coastal and Barrier Network could be adapted for application to these Atlantic coastal parks as well.

The level of existing estuarine monitoring is highly variable among parks in the northeastern networks. The most extensive programs exist at Cape Cod NS (evaluating variables for estuarine monitoring at the park) and at Assateague Island NS (monthly measurements of estuarine water quality characteristics). Some parks have undertaken limited estuarine monitoring (e.g. short-term projects monitoring estuarine water quality at Acadia NP), whereas monitoring at others is nonexistent (e.g. Sagamore Hill NHS). The Vital Signs program will build on these unrelated programs to provide a cohesive framework for estuarine monitoring across entire network.

The workgroup outlined a phased approach to developing a protocol for monitoring estuarine nutrient enrichment in the Coastal and Barriers Network (Neckles et al. 2001). Phase 1 involves identifying candidate monitoring variables based on analysis of existing information from diverse sources, including existing NPS monitoring programs within and outside of the network and highly relevant monitoring programs in other agencies. Phase 2 then involves testing the candidate variables to determine their suitability for application at regional scales, their natural spatial and temporal variability, and the appropriate sampling scales. The final product of Phase 2 is an operational monitoring plan.

This project will accomplish Phase 1 selection of candidate variables for monitoring estuarine nutrient enrichment in the context of the Vital Signs Monitoring Program. As outlined below, this work will complement ongoing NPS projects focused on specific aspects of estuarine monitoring (e.g., evaluation of individual park monitoring programs, or analysis of the relevance of other specific monitoring programs to NPS) by summarizing and synthesizing information in a regional framework. The project will result in a list of candidate variables for monitoring estuarine nutrient enrichment throughout the northeastern networks, justification for the variables selected, and a work plan for Phase 2 variable testing necessary to develop an operational monitoring plan.

DESCRIPTION OF RECOMMENDED PROJECT

This project will be accomplished by assembling and synthesizing information from diverse sources relevant to network-wide monitoring of estuarine nutrient enrichment. The following types of information will be collated from existing documents, site visits to all network parks, and meetings with project leads (specific programs are listed as examples, but lists are not assumed to be exhaustive). This information will be analyzed to select candidate monitoring variables based on established guidelines (e.g. Jackson et al. 2000, NPS 2000, Fancy 2001 and references therein, Irwin 2001) and to recommend a plan for regional testing.

Existing programs at individual parks

- An estuarine monitoring protocol is being developed at Cape Cod NS through the NPS prototype monitoring program (Roman and Barrett 1999). The Cape Cod protocol is designed to be applicable at other coastal parks, although modifications or additions to accommodate local conditions are expected. Monitoring variables under investigation include sources of nutrient loading to estuaries, water quality characteristics including dissolved oxygen, seagrass/macroalgal responses, and watershed land use. *Project lead:* Charles Roman, USGS.
- Monitoring variables emerging from the Cape Cod prototype are being evaluated for use at Acadia National Park. Estuaries at Acadia differ markedly from those at Cape Cod in terms of tidal range, freshwater source, and watershed geology. Variables associated with nutrient load, water quality characteristics, and responses by submersed vascular plants, phytoplankton, epiphytic algae, and macroalgae are being tested along a natural eutrophication gradient and within experimentally enriched mesocosms. *Project lead:* Hilary Neckles, USGS.
- The estuarine monitoring program at Assateague Island NS is based on monthly measurements of a comprehensive suite of water quality characteristics at 18 sampling stations. *Project lead:* Brian Sturgis, NPS. The North Atlantic Coast Cooperative Ecosystem Studies Unit (NAC-CESU), Narragansett, RI, is supporting an evaluation of this program. *Project lead:* Scott Nixon, URI.
- Information on relevant programs at other network parks will be gained from site visits.

Existing programs within other agencies

- EPA's Environmental Monitoring and Assessment Program (EMAP) has been collecting data from estuarine and coastal environments since the early 1990's. The geographic extents of several EMAP components coincide to varying degrees with the NPS Coastal and Barrier

Network (Virginian Biogeographic Province; Regional EMAP studies of NY/NJ Harbor and DE/MD coastal bays; and coastal states through the Coastal 2000 program). Monitoring variables include indicators of water quality, sediment chemistry and toxicity, and invertebrate and fish community status. *Contact:* Charles Strobel, EPA NHEERL-AED, Narragansett. The NAC-CESU is supporting an evaluation of EMAP programs to determine the utility of the data and sampling approaches to network estuarine monitoring. *Project lead:* Norm Rubinstein, EPA NHEERL-AED, Narragansett.

- The National Estuarine Research Reserve System (NERRS) operates a System-wide Monitoring Program to measure changes in water quality, estuarine habitat, and surrounding land use throughout the reserve network. Data are collected at each reserve following a uniform, system-wide protocol. Reserves in the northeast are in the same geographic areas as network parks (e.g. Waquoit Bay, MA; Hudson River, NY; Chesapeake Bay, MD and VA). Opportunities exist for sharing monitoring approaches across NERRS and NPS networks. *Project leads:* Research Directors at individual reserves.

- The EPA National Health and Environmental Effects Research Laboratory-Atlantic Ecology Division (NHEERL-AED), Narragansett, RI, is supporting development of nutrient load-response relationships for east coast estuaries. Initial efforts focus on evaluating a suite of variables from ca. 30 sites in southern New England representing a gradient of nutrient inputs. Assessment variables include characteristics of submersed aquatic vegetation, water quality, and sediments. Results of this program will provide some regional tests of potential variables for long-term estuarine monitoring. *Project lead:* Jim Latimer, NHEERL-AED, Narragansett.

- The Chesapeake Bay Program (CBP) is a USEPA/state partnership directing the restoration of Chesapeake Bay ecosystems. Nutrient overenrichment is a primary target of restoration efforts. The Chesapeake Bay Monitoring Program was initiated in 1984 to assess long-term trends in indicators of Bay-wide environmental quality. Nineteen physical, chemical, and biological characteristics are monitored 20 times per year throughout the Bay. Many of these characteristics are focused on assessing trends in nutrient loads and concentrations and estuarine responses to nutrient inputs. Two network parks include Chesapeake Bay shoreline (Colonial NHP, George Washington's Birthplace NM), so opportunities may exist for sharing monitoring approaches. *Contact:* Rich Batiuk, EPA Chesapeake Bay Program, Annapolis.

- The US Fish and Wildlife Service Coastal Program promotes conservation of coastal ecosystems by evaluating coastal ecosystem sustainability, identifying threats to ecosystem functions, and recommending and implementing habitat protection and restoration efforts. FWS Coastal Ecosystem Program Offices carry out on-the-ground conservation projects and catalyze extensive partnerships with other agencies and organizations to achieve coastal conservation goals. Opportunities may exist to share habitat assessment approaches with the northeastern FWS Coastal Ecosystem Program Offices. *Project leads:* Stewart Fefer (Gulf of Maine), Don Henne (S. New England/NY Bight), John Wolflin (Chesapeake Bay).

Other NPS Products

- The NPS Coastal and Barrier Network is supporting a comprehensive review of wetland and water quality issues in northeastern coastal parks. A scoping report will synthesize information available for each park in the Coastal and Barrier Network and the 2 coastal parks in the Temperate Network. For each park, the report will include information on wetland types present, threats to wetland habitats, ongoing inventory or monitoring programs

related to park wetlands and water quality, and recommendations on restoration , monitoring, management, or research needs. *Project lead:* Mary-Jane Pirri, URI

- The NPS Water Resources Division is supporting preparation of a manual for performing NPS Level I water quality inventories. The manual includes background information and a conceptual basis for water quality measurement, methods for sampling water quality constituents, and recommendations on scale and frequency of measurement. *Project lead:* Veronica Berounsky, URI.
- Boston Harbor Islands Water Resources Scoping Report. *Project lead:* Mark Flora, NPS WRD.
- The NPS Coastal and Barrier Network is supporting a review of species and habitats of concern in northeastern parks. The review will summarize existing data and monitoring programs, threats to important species and habitats, and similarities in management issues among network parks. *Project lead:* Linda Fabre, URI.

The synthesis report based on the above analyses will contain the following information:

- Justification for monitoring nutrient effects on estuarine water quality, including a conceptual model of nutrient inputs and ecosystem responses.
- Objectives for the monitoring program.
- Prioritized list of candidate variables for monitoring nutrient loads to estuaries and effects of nutrients on water quality and estuarine ecology in the NPS northeastern networks, and justification for variable selection.
- A work plan and budget for testing candidate variables to determine their suitability for regional implementation and the appropriate temporal and spatial scales of measurement.

SCHEDULE

This work will be accomplished during the fall of 2001-winter 2002. The final report will be completed by September 30, 2002.

PERSONNEL

Principal Investigators:

Dr. Blaine S. Kopp is a USGS scientist affiliated with the Coastal Field Station at URI and duty-stationed in Augusta, ME. Dr. Kopp's expertise focuses on the ecology of estuaries, with particular emphasis on seagrass ecosystems. He is currently collaborating on developing approaches for evaluating, predicting, and monitoring the impacts of coastal eutrophication within estuarine seagrass ecosystems at Acadia NP.

Dr. Hilary A. Neckles is a USGS scientist affiliated with the Coastal Field Station at URI and duty-stationed in Augusta, ME, where her research program focuses on seagrass and wetland ecology. She is the lead investigator on a project developing approaches for monitoring, assessing, and predicting the effects of nutrient enrichment on estuaries at Acadia NP.

Collaborators:

Dr. Charles T. Roman is a USGS scientist at the USGS Coastal Field Station at URI. Dr. Roman has been studying wetlands and estuaries of NPS sites for over two decades. He is the lead investigator on the NPS Cape Cod prototype monitoring program.

Dr. Scott W. Nixon is a Professor of Oceanography at URI. Dr. Nixon's current research interests focus on productivity and biogeochemical cycling of coastal ecosystems, with emphasis on estuaries, lagoons, and wetlands. He is the lead investigator on the CESU project evaluating water quality monitoring at Assateague Island NS.

REFERENCES

- Bricker, S. B., C. G. Clement, D. E. Pirhalla, S. P. Orlando, and D. R. G. Farrow. 1999. National estuarine eutrophication assessment: effects of nutrient enrichment in the nation's estuaries. NOAA, National Ocean Service, Special projects Office and the National Centers for Coastal Ocean Science, Silver Spring, MD. 71pp.
- Fancy, S. G. 2001 (last updated). Development of monitoring programs. NPS web site <http://www.nature.nps.gov/im/monitor/index.htm#Development>.
- Irwin, R. J. 2001. Water quality, contaminants, and aquatic biology vital signs monitoring and other Park Service long-term aquatic monitoring projects: planning process steps. <http://www.nature.nps.gov/im/monitor/rirwinwq.doc>. 59pp.
- Jackson, L.E., J. C. Kurtz, and W. S. Fisher, eds. 2000. Evaluation guidelines for ecological indicators. EPA/620/R-99/005. USEPA, Office of Research and Development, Research Triangle Park, NC. 107pp.
- NPS. 2000. A summary of the Coastal and Barrier Network Monitoring Workshop. National Park Service Inventory and Monitoring Program, Coastal and Barrier Network, *Unpublished report* of workshop held April 13th-14th, Gateway National Recreation Area. 21pp + appendices.
- Neckles, H. A., C. T. Roman, S. W. Nixon, N. Rubinstein, J. Latimer, V. Berounsky, and B. Sturgis. 2001. Selection of monitoring variables. National Park Service Vital Signs Monitoring Program, Coastal and Barrier Network, Estuarine Nutrient Enrichment Workgroup, *Unpublished report* dated February 12, 2001.
- Nixon, S. W. 1995. Coastal marine eutrophication: a definition, social causes, and future concerns. *Ophelia* 41:199-219.
- Roman, C. T. and N. E. Barrett. 1999. Conceptual framework for the development of long-term monitoring protocols at Cape Cod National Seashore. USGS Patuxent Wildlife Research Center, Cooperative National Park Studies Unit, Narragansett, RI. 59pp.

Valiela, I., K. Foreman, M. LaMontagne, D. Hersh, J. Costa, P. Peckol, B. DeMeo-Andreson, C. D'Avanzo, M. Babione, C.-H. Sham, J. Brawley, and K. Lajtha. 1992. Couplings of watersheds and coastal waters: sources and consequences of nutrient enrichment in Waquoit Bay, Massachusetts. *Estuaries* 15:443-457.

BUDGET

Personnel

B.S. Kopp (Res. Oceanographer GS-11; 2 months)	\$ 7,800.00
Fringe on \$7800.00 @ 35%	\$ 2,730.00
Personnel Subtotal	\$10, 530.00

Travel	\$ 3,000.00
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Supplies	\$ 500.00
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Total Direct Costs	\$14,030.00
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(No Indirect Costs assessed by USGS-BRD to DOI Bureaus in FY 2002)

BUDGET JUSTIFICATION

Personnel: Dr. Kopp will commit 2 months of time between December 1, 2001 and April 30, 2002, to this project.

Travel: A trip to each park within the network is required, as are several trips to URI to meet with collaborators.

Supplies: Routine office supplies

CLEARANCES

Submitted by: _____
Principal Investigator Date

Initial Program Chief Review: _____
Program Chief Date

Science Support Clearance: _____
Chief of Science Support Date

Peer Review Clearance: _____
Chief of Science Review Date

Revision Clearance: _____
Program Chief Date

Center Approval: _____
Center Director Date