C R M C
COASTAL RESOURCES MANAGEMENT COUNCIL

UNIVERSITY OF
Rhode Island

May 13, 2008

Commissioner Andrew Dzykewicz
Rhode Island Office of Energy Resources
One Capitol Hill
Providence, RI 02908

Dear Commissioner Dzykewicz:

The Rhode Island Coastal Resources Management Council (CRMC) and the University of Rhode Island (URI) is pleased to provide you and the Board of the Office of Energy Resources with a proposal, *The Ocean/Offshore Renewable Energy Special Area Management Plan (SAMP)*. As stated in the proposal, the goal of the SAMP is to facilitate Rhode Island's entry into the exploration and development of offshore energy resources to help achieve the 15 % goal as designated by Governor Carcieri.

CRMC and URI have a long and vibrant partnership dealing with coastal and ocean management issues, and we look forward to the opportunity to provide Rhode Island with the best ocean-based scientific research and policy expertise possible to inform the state's offshore renewable energy efforts.

Please do not hesitate to contact us with any questions or concerns; full contact information is listed on the cover page of the document. Again, we are pleased to have the opportunity to help the state with its efforts to study offshore renewable energy as a means of improving the quality of life for all Rhode Island citizens.

Sincerely,

Grover Fugate
Executive Director, Rhode Island Coastal Resources Management Council

Jennifer McCann
Principal Investigator, University of Rhode Island (Coastal Resources Center/Rhode Island Sea Grant)

Samuel P. De Bow
Principal Investigator, University of Rhode Island (Graduate School of Oceanography)

The Ocean/Offshore Renewable Energy Special Area Management Plan (SAMP)

June 1, 2008 – May 31, 2010 (Expected Project Dates)
FINAL

Submitted to: Rhode Island Office of Energy Resources

Submitted by: The RI Coastal Resources Management Council (CRMC)
The University of Rhode Island (URI) under The Center of Excellence for Research on Offshore Renewable Energy

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Overview

The Rhode Island State Office of Energy Resources (OER), at the request of Governor Carcieri, has set a goal of obtaining 15% (1.3 million MW-h per year) of state energy needs from wind energy resources. To meet this demand requires approximately 450 MW of new energy generating capacity given the intermittent nature of wind and wave resources. The primary focus is to obtain this energy from offshore wind farms located in state and adjacent federal coastal waters. OER is leading this initiative through its Energy Independence 1 Program. The Rhode Island Coastal Resources Management Council (CRMC), with technical support from the University of Rhode Island (URI), proposes to develop within two years the Ocean/Offshore Renewable Energy Special Area Management Plan (Ocean SAMP). The goal of the SAMP is to facilitate Rhode Island's entry into the exploration and development of offshore energy resources to help achieve the Governor's 15% renewable energy resources goal. By the end of year one, wind farm applications can be submitted to CRMC to begin the required preliminary review process. By the end of year two, the SAMP will be adopted by the state. It is likely that only then will federal agencies, including the U.S. Army Corps of Engineers (ACOE) and the U.S. Minerals Management Service (MMS), initiate the federal permit review processes.

The SAMP objectives are to: 1) Streamline cumbersome federal and state permitting processes and establish a more cost-effective permitting environment for investors; 2) Promote a balanced approach to considering the development and protection of ocean-based resources; 3) Complete the necessary studies to yield the most accurate and current ocean-based scientific data and technologies to build knowledge critical for supporting the permitting process; and 4) Foster a well-informed and committed public constituency. The Ocean SAMP will make Rhode Island a national leader on the issue of offshore energy development.

A SAMP is a unique ecosystem-based management and policy instrument, pioneered by the state of Rhode Island, which streamlines coastal management decision-making. The CRMC is recognized by the National Oceanic Atmospheric Administration (NOAA) as the national leader in SAMP development and implementation. A SAMP is defined under the federal Coastal Zone Management Act (16 U.S.C. § 1452 (Section 303)) as "a comprehensive plan providing for natural resource protection and reasonable coastal-dependent economic growth containing a detailed and comprehensive statement of policies; standards and criteria to guide public and private uses of lands and waters; and mechanisms for timely implementation in specific geographic areas within the coastal zone." The Rhode Island General Assembly has delegated the CRMC as the sole and exclusive manager of the state's submerged lands, simplifying regulatory consultation for developing such plans – an advantage that few other states enjoy.

Implementing and using an Ocean SAMP is the fastest, most efficient and cost-effective way to approve and site offshore renewable energy projects. The alternative is the development of an Environmental Impact Statement (EIS). The ACOE has indicated that an EIS process for this project could optimistically take at least five to seven years. In just two years, the Ocean SAMP, will meet the requirements of the MMS, the ACOE, NOAA, CRMC, and the Rhode Island Department of Environmental Management (DEM) for scientific analysis and planning, including stakeholder involvement. The SAMP will be state and federally consistent in policy

and management for future development and installation of renewable energy infrastructure and will identify prime sites for renewable energy infrastructure. The Ocean SAMP will ensure that the addition of wind farms and other alternative energy infrastructure are integrated with existing uses (e.g., commercial and recreational fishing) and natural assets (e.g., critical species habitats). Industry fully supports this approach because the Ocean SAMP is anticipated to reduce private sector risk via the clarity and certainty of scientifically accurate study and analysis.

CRMC and URI are recognized internationally, nationally and locally for their work in developing and then applying state-of-the-art science to coastal and ocean management decision-making processes. The parties have developed a long and vibrant partnership dealing with coastal and ocean management issues for more than three decades.

Background

The development of offshore wind energy in Rhode Island is on a positive track. In October 2005, Michael McMahon, then-Executive Director of the Rhode Island Economic Development Corporation (EDC), included wind development as part of the Governor's response to increasing energy costs. In January 2006, Governor Carcieri announced the creation of an Office of Energy Resources, led by Commissioner Andrew Dzykewicz, with the mandate to implement 15% of the state's electricity from wind in three years. Subsequently, Commissioner Dzykewicz requested a study to assess Rhode Island's wind energy resources which concluded, in April 2007, that the state has enough wind to deliver 70% of its current electricity needs. This study, The RI Winds Phase I: Wind Energy Siting Study by Applied Technology & Management Inc. (ATM), also demonstrated the great potential of offshore wind energy when compared with onshore potential. A Governor's wind energy stakeholder group complemented the process by providing input and forming a network for the process.

The state is well-positioned to expand its coastal program to the management of offshore renewable energy activities, as it is supported by innovative legislation and proven planning tools which have secured a broad public constituency in coastal communities statewide. Rhode Island has already developed and implemented five SAMPs with another SAMP underway on Aquidneck Island to manage much of the state's coastal area. (See full list at http://www.crmc.ri.gov/samp/index.html.).

Because SAMPs have performed successfully for decades as management tools, Rhode Island created legislation in 2005 permitting CRMC to use SAMPs as the primary planning tool in a major statewide effort – the Marine Resources Development Plan (MRDP) process – to manage and balance use of Narragansett Bay resources. With the MRDP mandating the use of SAMPs as Rhode Island's primary design template for coastal planning, the concept of using the tool to protect and manage Rhode Island's ocean resources is increasingly considered a logical progression, especially in terms of its potential to enable Rhode Island to define and customize its renewable energy goals, needs, and expectations for the future.

The Need for a SAMP

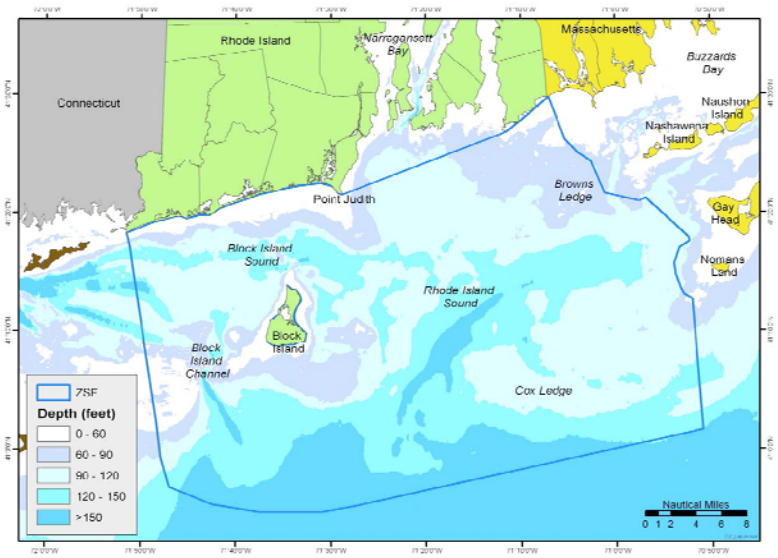
Rhode Island is experiencing a surge of investment interest focused on developing offshore renewable resources in state and federal waters. The state, however, has not established the necessary regulatory or management infrastructure required to make the permitting process cost-effective or efficient for investors. Through the Ocean SAMP, a comprehensive and clearly defined regulatory process will be established to allow Rhode Island to set the standards by which it will entertain permit applications submitted by developers. Doing so increases the likelihood that developers will use the SAMP as application guidance and refrain from submitting sub-standard proposals that ultimately cost the state time and resources in terms of review procedures, and cast a negative public perception of offshore energy projects in general – an outcome beneficial to neither Rhode Island government, its citizens, or potential developers.

In addition, the SAMP presents an opportunity for Rhode Island to ensure that the value and benefit of existing uses of the state's ocean waters – for example, commercial and recreational fisheries – are also considered comprehensively alongside renewable energy options. Similarly, the SAMP represents state recognition of the Public Trust Doctrine, assuring that trust lands, both on land and in water, yield long-term public benefit. Finally, a SAMP process provides a forum for the public and all stakeholders to both learn about resources issues and take part in shaping policy.

The Ocean SAMP Boundary

From the south, the boundary extends west from the town of Westerly, and continues south beyond state waters south of New Shoreham (Block Island). The boundary continues northwest to include the most eastern portion of the Rhode Island shoreline. The northern boundary makes its way up the entire Rhode Island coastline. Specifically, this northern boundary excludes: 1) Narragansett Bay in its entirety; 2) Waters south of the Narrow River stretching east past Beaver Tail Point, the southern tip of Aquidneck Island, and Sakonnet Point; 3) the Rhode Island Salt Ponds; 4) Little Narragansett Bay; and 5) the Narrow River. Federal waters within this boundary are included in the SAMP. To ensure that regional impacts to natural resources are appropriately considered in this process (a federal requirement), this planning boundary includes all waters that are less than 150 feet within this described boundary. This boundary may be altered depending on natural and human use considerations. For example, once the commercial and fisheries usage maps have been completed, it may be appropriate to either expand or reduce this boundary.

The Ocean SAMP Boundary



Project Description

With support from URI, ACOE, and MMS, the CRMC will develop and adopt an Ocean SAMP that focuses on the identification of renewable energy zones, but also addresses policy needs regarding recreational and commercial uses, including fisheries issues; environmental assets, such as critical species' habitats; cultural and historical assets; public infrastructure such as cables and submarine corridors; water quality; and hazardous materials, including waste and dredge material management. Other state agencies, including OER, DEM, EDC, and the Rhode Island Office of Statewide Planning (OSP), will be involved appropriately (See Project Management Strategy and Appendix C for more details).

The Ocean SAMP process will proceed simultaneously on several fronts. First, a current understanding of Rhode Island's ocean waters will be created. This step will: 1) Ensure that the project is using the most accurate and current ocean-based scientific data to make sound management decisions; and 2) Meet federal and state regulations requiring specific studies to be completed in order to invest in renewable resources (See Appendix B for a complete listing of these federal and state required scopes). To fulfill these requirements, the URI team will complete studies on wind, waves, and storm surge; marine transportation; wind farm technology; noise and electromagnetics; physical oceanography; marine mammals and turtles, meteorology and air quality; geology and ocean floor mapping; cultural resources; and avian resources (See Appendix D for more details.).

CRMC/URI will then identify and map existing uses and critical zones, including transportation corridors, military applications, commercial and recreational fishing, and essential habitats. This exercise is necessary to ensure that future activities, including the installation of renewable energy infrastructure, do not significantly impact existing or potential future uses of this region.

It also allows CRMC to identify locations that merit additional protection through the SAMP process.

An initial, or "first order," screening of sites with suitable characteristics for renewable energy will be produced based on these two sets of information (site characterizations and uses). Finally, a conflict analysis will be performed to identify areas needing a more intensive screening exercise, or "second order," screening. Such a screening would be used to confirm that specific sites meet criteria to a reasonable degree of certainty. This work will generate a draft zoning map for public review and comment.

CRMC/URI will also generate regulatory standards for guiding development and protecting ocean resources as part of the Rhode Island coastal management regulatory program. Components of these standards include structural design standards and siting standards. The structural design standards will evaluate and identify the technology appropriate for offshore renewable energy within Rhode Island and adjacent waters. The technologies include actual structural components, foundation designs, power cable selections and configurations, and overall configurations (e.g. number of specific structure types per area). Results from this work will provide minimum construction requirements for any potential development. The siting standards are broad characterizations of the sub-seafloor, seafloor, water column, and above water physical and biological characteristics of the offshore areas. These characteristics will assist CRMC to identify areas appropriate for their potential energy resource development. It is anticipated that by providing prescreened site selection, Rhode Island offers value and efficiency to a development community often frustrated by the unwieldy federal EIS process.

Regarding community involvement, an extensive public process will take place throughout the two-year SAMP process to ensure that all stakeholders – for example, commercial and recreational fishermen – are represented and have ample opportunities to learn about the SAMP and to provide input as well. The Governor's wind energy stakeholder group will also play a significant role to ensure appropriate community involvement. Public engagement mechanisms include advisory committees, public workshops, information events, community meetings, and web-based forums, and will be directed at the public and private sectors alike (see Appendix C for more detailed description of this effort).

Project Management Strategy

The success of this endeavor depends on close coordination among the OER, CRMC, URI, MMS, ACOE, and other interest groups. In terms of project funding, OER will transfer funds directly to URI through a specific URI entity, the URI Partnership for Energy, via a Memorandum of Understanding (MOU). CRMC will serve as project manager, with sole responsibility for directing all aspects of SAMP development. CRMC Executive Director Grover Fugate, principal investigators (J. McCann, S. De Bow) and senior advisors (K. Moran, M. Spaulding) will serve as the project management committee and will meet (in person or conference call) on a weekly or as-needed basis to ensure progress and integration of SAMP research and outreach activities. A separate steering committee, representative of state and other government agencies and offices, non-governmental organizations, and the private sector, will also convene on a frequent basis to ensure a spectrum of technical expertise informs the SAMP

process and helps Rhode Island to meet its offshore renewable energy goals as well as the varied needs of ocean water stakeholders. State agencies anticipated to serve on the steering committee include: Office of the Governor, OER, DEM, EDC, and OSP. Members from the Governor's wind energy stakeholder group will also be a part of this committee.

The Ocean SAMP project management team recognizes the need to ensure all components of this effort are coordinated and accountable. Therefore, once funding is officially awarded to URI, the project management team will meet with each sub-award team (each draft sub-award is described in Appendices C and D) to review the objectives, deliverables and timelines to ensure that results are developed and coordinated to meet both the state and federal technical information requirements and benefit SAMP development. A master schedule will be established to ensure that all sub-awards are coordinated in terms of personnel, field work, equipment and information sharing. To ensure that the SAMP meets all objectives stated above, required monthly financial and quarterly progress reports for each sub-award will be submitted to the project management team for review and approval.

Expected Results

It is anticipated that within one year the SAMP process will have secured for the state an action plan for the management, development, and siting of offshore energy resources that complies with federal and state regulations, and most importantly, has public and government support. With these management tools in place, it is expected that by the end of year one, wind farm applications can be submitted to the CRMC to begin the preliminary review process. By the end of year two, the CRMC will furnish the state with a SAMP that both complies with regulations and appeals to the public, and will likely increase permitting predictability and thus enhance the value of potential sites during competitive bid processes. It likely that federal permitting processes will begin only after state adoption of the SAMP. The SAMP process, carried out over two years, will ensure the creation of several critical outcomes, including: 1) A body of sound scientific data to meet both the federal and state information requirements for offshore renewable energy activities (See Appendix D for more details on each study and Appendix B for a list of federal and state scopes of study); 2) A realistic and effective set of performance standards, including structural design standards and siting standards, to evaluate and identify the technology appropriate for offshore renewable energy within Rhode Island and adjacent waters; and 3) A well-informed and supportive constituency with the momentum to help Rhode Island work toward a state goal of ensuring that 15 % of the state's energy is wind-based.

Project Timeline: June 1, 2008 – May 31, 2010 (Expected)

Date	Major Products
Month 1	CRMC signs contract with URI to begin work (official URI start date).
Month 2	Develop and implement a communication and outreach strategy, including the organization of technical and citizen advisory committees to engage the public throughout the process (See Appendix C).
Month 9	Complete the mapping of existing uses and critical zones, including transportation corridors, military use, and essential habitats, etc. Provide draft profiles of all these aspects to complement the maps.
Month 12	Complete a draft zoning map and regulatory standards for guiding renewable energy infrastructure for public review and comment. Wind energy infrastructure applications can now be submitted to CRMC to being the state preliminary review process.
Month 15	Submit comprehensive draft background papers on issues including marine renewable energy, and recreational and commercial uses for public review and comment.
Month 20	Submit comprehensive draft background papers on issues including environmental assets, cultural and historical assets, public infrastructure and hazardous materials and waste management for public review and comment.
Month 22	Develop regulatory standards for guiding development and protecting ocean resources as part of the Rhode Island coastal management regulatory program for public review.
Month 24	Ocean SAMP completed and submitted.
Month 28	Final reports submitted to OER and appropriate agencies.

Note: This timeline may be altered due to circumstances beyond the control of CRMC and/or URI.

Deliverables

1. Communication and outreach strategy, including the organization of technical and citizen advisory committees to engage the public throughout the process (see Appendix C for more details) (Month 2).
2. Maps of existing uses and critical zones, including transportation corridors, military use, and essential habitats (Month 9).
3. Descriptions for all zones and uses created to complement Deliverable #2 maps (Month 9).
4. Zoning map for guiding renewable energy infrastructure for public review and comment (Month 12).
5. Regulatory standards for guiding development and protecting ocean resources as part of the Rhode Island coastal management regulatory program for public review (Month 12).
6. Background papers on issues including marine renewable energy (includes siting and aesthetics); recreational and commercial uses (includes recreational and commercial fisheries, and other commercial and recreational uses) submitted for public review and comment (Months 15).
7. Background papers on issues including environmental assets (includes habitats for critical species – air, water, and land), cultural and historical assets, public infrastructure (cables, submarine corridors), and hazardous materials and waste management (includes dredge material) for public review and comment (Month 20).
8. Research on site characterization and wind farm potential impacts (See Appendix D for completion dates.).
9. Final Ocean SAMP document submitted to CRMC (Council) for approval (Month 24).
10. Progress reports for Governor and appropriate agencies (Month 28).

Statement of Capability

CRMC is recognized by the NOAA as the national leader in SAMP development, having managed Rhode Island waters since 1983 through regulatory and permitting processes that are highly regarded for their effectiveness – both in terms of enhancing environmental and economic coastal assets and for encouraging collaboration among government, coastal communities, and the private sector. In addition, the Rhode Island General Assembly has delegated the CRMC as the sole and exclusive manager of the state's submerged lands – an advantage that few, if any other states, enjoy.

The URI is internationally renowned for significant contributions in the fields of oceanography and ocean engineering, and is already an established participant in national and international dialogue regarding the future of offshore energy resources. URI has more than 35 years of SAMP experience and continues to produce cutting-edge scientific research to help communities solve pressing issues on local, regional, national, and global scales. URI is recognized worldwide for working with government, communities, and the private sector to create innovative coastal management policies and plans that serve to improve the lives of coastal peoples around the globe.

Appendix A: Ocean SAMP Project Budget (June 1, 2008 – May 31, 2010, Expected Project Dates)

The Ocean SAMP budget reflects the costs for the expected plan of work to complete the Ocean SAMP in two years and meet the project goals and objectives. The Ocean SAMP project management team will require monthly financial and quarterly progress reports for each sub-award. Estimated budget allocations are based on scope of work and will be finalized upon award receipt.

Budget Justification (See budget on next page)

Total Budget Request:	**$3,200,000**
Direct Costs-	$2,637,782
Indirect Cost 25%[i]	$ 562,218

Salaries (PERS2): $ 1,307,148
Is requested in support of project management, policy outreach and supporting study sub awards. Details of personnel are included in each budget worksheet and accompanying notes.

Personnel policy and rates are set by the State of Rhode Island Merit System law, various bargaining units and Rhode Island Board of Governors agreement. Increases have been included for year two at two to three percent based on employment contracts.

Fringe Benefits-(FRINGE): $437,220
Fringe benefits include retirement, health insurance, group life insurance and social security taxes. Fringe benefits are an aspect of employment with the university and not discretionary. Additional detail on fringe benefit rates can be found on the URI website: http://www.uri.edu/research/tro/fringbentbl.pdf

Graduate student assistant health costs are included at the negotiated rate applicable per the agreement with URI referenced at: http://www.uri.edu/research/tro/proposalprep/tuit.pdf

Student and internal payroll costs include 7.65% FICA as mandated by federal tax code.

Personal Service Contracts-(CONS): $40,590
Technical experts and publication design consultants are estimated at $40,590 over the two year period based on estimated time to deliver products included in the scope of work. These are illustrative based on suggested products and may be adjusted based on the final approved work plan.

Travel (DTRVL): $39,623
All travel is domestic, directly related to the project and calculated using the prevailing URI travel policies for mileage, per diem and airfare. Details are included in each sub budget.

Operating, Supplies and Other Direct Costs: $188,493
Operating: All telephone, postage, courier and supplies are in direct support of the individual scope of work outlined in the proposal and are in keeping with the policies of the university and OMB circular A-21.

Other direct costs and supplies: include vessel rental for transportation and sampling; procurement of supporting data on wind, weather, AIS and GIS; underwater camera, grab sampler and analysis tools and equipment are also included under supplies; outreach materials such as displays, CD ROMs and brochures are included as other direct costs-publications. See individual budgets for a complete list of supplies and other direct costs.

Subcontracts: $448,766

The budget includes provision for three subcontracts to assist with implementation:

1. Social networking/web company $39,000
2. The Conservation Agency $20,892
3. New Jersey Audubon Society $388,784

Selection of the group for social networking/web company is to be determined. The other two sub recipients have been identified as key to the successful implementation of the work as outlined in the proposal.

Indirect Costs (F&A): $562,218

In accordance with URI inter-agency agreements an indirect cost rate of 25% has been applied to all direct costs except tuition which is exempt and subcontracts which have a modified rate of full indirect on the first $25,000 of each agreement. Equipment is also exempt but there is no equipment in this proposed budget.

[1] Indirect costs on all direct except tuition which is exempt and subcontracts which are exempt after $25,000 from indirect

UNIVERSITY OF RHODE ISLAND - GRADUATE SCHOOL OF OCEANOGRAPHY THE OCEAN/OFFSHORE RENEWABLE ENERGY SPECIAL AREA MANAGEMENT PLAN (SAMP) COMPREHENSIVE PROPOSAL BUDGET *THE OCEAN OFFSHORE RENEWABLE ENERGY SPECIAL AREA MANAGEMENT PLAN (OCEAN SAMP)*				
Co. PI - Sam DeBow, URI Graduate School of Oceanography		**Request Amt:**		**$ 3,200,000**
Co PI-Jennifer McCann-URI Coastal Resources Center-RI Sea Grant				***APPENDIX A***
	Year 1 Request	**Year 2 Request**		**Total Request**
A. PERSONNEL				
Project Management				
McCann, J.-Coastal Resources Center, URI	33,548	34,554		68,102
DeBow, S. - Director, Center of Excellence, GSO	30,975	30,975		61,950
Olsen, S. - Director, Coastal Resources Center, URI	22,169	22,945		45,114
Squillante, L. - Asst. Director of Operations, CRC, URI	7,871	10,183		18,055
Policy and Outreach- (Appendix C)	196,074	207,795		403,870
URI Supporting Sub-Awards- (Appendix D)	330,984	177,216		508,200
STUDENT SUPPORT				-
Policy and Outreach-Student Support (Appendix C)	44,749	45,868		90,617
URI Supporting Sub-Awards-Student Support (Appendix D)	77,579	33,661		111,241
TOTAL PERSONNEL COSTS	**743,950**	**563,198**		**1,307,148**
B. FRINGE BENEFITS				
Project Management	36,554	38,396		74,950
Policy and Outreach	88,233	93,508		181,741
URI Supporting Sub-Awards	111,611	48,709		160,320
Student Support-Policy & Outreach-CRC	3,423	3,509		6,932
Student Support-URI SupportinG Sub-Awards	8,791	4,486		
TOTAL FRINGE BENEFITS	**248,612**	**188,608**		**437,220**
C. SUBCONTRACTS AND PERSONAL SERVICE CONTRACTS				
Project Management				
Policy and Outreach				
1) Social Networking/Web Consultant Co.	26,000	13,000		39,000
2) The Conservation Agency	15,600	5,382		20,982
3) Technical Experts for Information Series (personal servic	4,500	4,500		9,000
4) Design Company (personal services contract)	15,600	15,990		31,590
URI Supporting Sub-Awards				
1) NJAS Radar Study	152,686	236,098		388,784
TOTAL SUBCONTRACTS	**214,386**	**274,970**		**489,356**
D. EQUIPMENT				
Project Management				
Policy and Outreach	-	-		-
URI Supporting Sub-Awards				
TOTAL EQUIPMENT	**-**	**-**		**-**
E. TRAVEL				
In-State Travel				
Project Management	657	669		1,326
Policy and Outreach	911	945		1,857
URI Supporting Sub-Awards	10,593	7,228		17,821
Out-of-State Travel	-	-		-
Project Management	1,625	1,625		3,250
Policy and Outreach	7,555	7,455		15,010
URI Supporting Sub-Awards				-
TOTAL TRAVEL	**21,341**	**17,922**		**39,263**
F. SUPPLIES/OPERATING				
Project Management	-	-		-
Policy and Outreach	49,260	33,535		82,795
URI Supporting Sub-Awards	95,618	10,080		105,698
TOTAL SUPPLIES/OPERATING	**144,878**	**43,615**		**188,493**
G. OTHER COSTS				
Project Management	-	-		-
Policy and Outreach	53,000	75,500		128,500
URI Supporting Sub-Awards	23,675	13,000		36,675
Tuition & Fees	11,127			
TOTAL OTHER COSTS	**87,802**	**88,500**		**176,302**
				-
TOTAL DIRECT COSTS	**$ 1,460,969**	**$ 1,176,813**		**$ 2,637,782**
				$ -
TOTAL MODIFIED DIRECT COSTS	**$ 1,321,156**	**$ 927,715**		**$ 2,248,871**
				$ -
INDIRECT COST 25% (MTDC)	***$ 330,289***	***$ 231,929***		***$ 562,218***
				$ -
TOTAL REQUESTED FROM AGENCY	**$ 1,791,258**	**$ 1,408,742**		**$ 3,200,000**

Appendix B: A Combined Synthesis of Federal and State Required Scopes of Studies for Offshore Renewable Energy Activities

Required Scopes of Studies for Offshore Renewable Energy Activities from:

- Minerals Management Service (*Programmatic Environmental Impact Statement for Alternative Energy Development and Production and Alternate Use of Facilities on the Outer Continental Shelf Final Environmental Impact Statement October 2007)*
- Rhode Island Coastal Resources Management Council Regulations

Introduction
Purpose and Need
Public Participation
Scope of the Plan
Public Comments on the Draft Plan

Background
Issuance of Regulations Specific to Energy Source
Proposed Policies
Proposed Best Management Practices
Seafloor Habitats
Marine Mammals
Fish Resources and Essential Fish Habitat
Sea Turtles
Avian Resources
Areas of Special Concern
Acoustic Environment
Fisheries
Coastal Habitats
Transportation and Vessel Traffic
Visual Resources
Cultural Resources
Potential Energy Operations

Overview of Potential Alternative Energy Technologies on the OCS
Screening of Alternative Energy Technologies
Wind
Wave

Point Absorbers
Point Absorber Considered for Development
Point Absorber Considered for Commercialization
Attenuators
Overtopping Devices
Terminators
Ocean Currents
Technology Testing
Site Characterization
Facility Construction
Facility Operation
Facility Decommissioning
Electromagnetic Fields

Potential Impact from Energy
Regulatory Controls
Atlantic Region Acoustic Environment
Hazardous Materials and Waste Management
Hazardous Materials Management
Waste Management
Electromagnetic Fields
Current State of EMF Science and Research
Human Health Impacts Associated with EMF
Ecological Health and Exposure Impacts Associated with EMF
Marine Mammals
Threatened or Endangered Species
Nonendangered Species
Marine and Coastal Birds
Threatened and Endangered Species
Nonendangered Species
Use of Atlantic Coast Habitats by Migratory Birds
Terrestrial Biota
Fish Resources and Essential Fish Habitat
Threatened or Endangered Fish Species
Other Fish Species
Essential Fish Habitat
Sea Turtles
Coastal Habitats
Seafloor Habitats
Topographic Features
Benthic Communities
Areas of Special Concern
Marine Sanctuaries
National Park System
National Wildlife Refuges
National Estuarine Research Reserves
National Estuary Program

Appendix C: Ocean SAMP Policy and Outreach Preparation Scope of Work

Rhode Island Ocean Special Area Management Plan, University of Rhode Island Coastal Resources Center and Rhode Island Sea Grant (CRC/RISG) Scope of Work

Name/Organization	Responsibility
Jennifer McCann, CRC/RISG	Project manager and policy and outreach lead
Stephen Olsen, CRC	Senior coastal manager
Dave Beutel, URI,RISG	Commercial and recreational fisheries expert and liaison
Laura Skrobe, URI, RISG	Commercial and recreational fisheries expert and liaison

Expected Results:

CRC/RISG will:

1. Develop a SAMP for Rhode Island's coastal waters that serves as a tool to encourage regulatory and management coordination and consistency among Rhode Island state (CRMC, OER, DEM) and federal agencies (U.S. Department of Energy, ACOE, MMS, and the U.S. Federal Energy Regulatory Commission), other public entities, developers, and environmentalists within this project area. Emphasis will be placed on issues including **marine renewable energy, recreational and commercial uses, environmental assets, cultural and historical assets, public infrastructure, water quality,** and **hazardous materials and waste management**.
2. Foster and engage a well informed and well represented constituency that understands the Ocean SAMP issues and is involved in the creation of the SAMP.
3. Develop a "floating zone" tool that will serve as a mechanism to promote the identification of appropriate sites for the installation of permanent structures.
4. Evaluate and monitor the project to provide partners and stakeholders with information on program development and implementation success. This includes information on staff performance, potential outreach enhancements, including appropriate use of technology tools and skill-building activities provided through the pilot program.

Tasks and Products

1. Develop a SAMP for Rhode Island's Coastal waters that serves as a tool to encourage regulatory and management coordination and consistency among Rhode Island state (CRMC, OER, DEM) and federal agencies (U.S. Department of Energy, ACOE, MMS, and the U.S. Federal Energy Regulatory Commission), other public entities, developers, and environmentalists within this project area. Emphasis will be placed on issues including marine renewable energy; recreational and commercial uses; environmental assets; cultural and historic assets; public infrastructure; water quality; and hazardous materials and waste management.

a) Analyze and develop chapters on issues such as: marine renewable energy (includes siting and aesthetics), recreational and commercial uses (includes recreational and commercial fisheries, and other commercial and recreational uses), environmental assets (includes habitats for critical species – air, water, and land), cultural and historical assets, public infrastructure (cables, submarine corridors), water quality (includes pollutants and productivity), and hazardous materials and waste management (includes dredge material). Each chapter will include a summary of relevant information that exists on the subject, including scientific and regulatory issues around that specific topic as well as proposed policy and regulation revisions for CRMC and other entities. Integration of these issues will also be included in the SAMP.

b) Create a Technical Advisory Committee (TAC) comprised of technical experts, researchers, and practitioners from government (both federal and state), academia, and the private sector to ensure accuracy of issue information and data, provide technical input, and engage in SAMP dialogues with a Citizens Advisory Committee. Experts in the field of commercial and recreational fisheries, habitat protection, and marine alternative energy will serve as major players on this TAC.

c) Develop additional legal and scientific research and analysis to provide a better understanding of the legal, natural, and man-made environment within the project area. Explore, evaluate, and recommend new technologies that expand the range of solutions to resolve the identified issues.

Legal

- Analyze the state and federal permitting process for marine renewable energy projects. Contact members of the legal community, highlighting legal and policy challenges and solutions for implementing renewable energy in Rhode Island. Distribute legal findings to the Sea Grant Legal Program/Roger Williams University School of Law Marine Affairs Institute constituents, including various sectors of the marine renewable energy community.
- Provide legal research and analysis of ocean zoning and other relevant issues including commercial and recreational fisheries to support the development of policies and regulations for the SAMP.

Commercial and Recreational Fisheries

- Update the commercial and recreational usage maps to have a better understanding of how people use the ocean watersheet and where the challenges lie in terms of sharing the resource. Individual meetings to be held with the following groups to maximize the fisheries involvement include: Rhode Island Commercial Fishermen's Association, Rhode Island Lobstermen's Association, Ocean State Fisherman's Association, Rhode Island Fishermen's Alliance, Rhode Island Saltwater Anglers Association, Rhode Island Charter and Party Boat Association, Narragansett Striper Club, and unaffiliated fishermen. Groups will delineate the areas that they use and the final chart will be completed from the compiled information.

- In coordination with the above organizations, organize a series of focused workshops to identify challenges as well as possible solutions for resolving these challenges within the SAMP context. International, national and local experts will be invited to attend these events to ensure the latest information on management and new technologies are considered in the development of realistic solutions. Resource managers, users and others will be invited to help to determine the content and attend these events.

- Highlight the commercial and recreational usage maps and challenges at both the 2008 Seventh Marine Law Symposium at the Roger Williams University School of Law as well as the 2008 Seventh Annual Ronald C. Baird Sea Grant Science Symposium. The outcomes of both Symposia will be communicated to the general public via a magazine piece (41 Degrees North), a technical paper, and a website.

New technologies

- Research opportunities to address diverse issues with shared solutions: We will emphasize the need for interdisciplinary solutions to address SAMP issues to: 1) Realize economic value-add; and 2) Emphasize the connections among and interrelatedness of SAMP issues. For example, we may work with the technical and citizens advisory committees to explore whether a wind farm can produce energy while enhancing commercial and recreational fisheries. Additional research and activities may be conducted as necessary on SAMP topics.

2. Foster and engage a well informed and well represented constituency that understands the Ocean SAMP issues and is involved in the creation of the Ocean SAMP.

a) **Create a Citizens Advisory Committee (CAC) to help guide the process.** We will convene a body that represents key community and civic organizations in the state to: 1) Ensure a wide range of stakeholders reflecting Rhode Island's diverse ethnic and economic backgrounds participate in SAMP dialogue; and 2) Provide a community forum for effective and efficient collaboration with the TAC. The CAC will include members from the Governor's wind energy stakeholder group.

b) **Create and then implement an assessment directed at Rhode Island residents that:** 1) Gauges their understanding of Ocean SAMP issues and communicates the beginning of the SAMP process; 2) Identifies key SAMP issues of public interest; and 3) Reflects public preference for various forms of SAMP participation (i.e., evening discussions, quarterly weekend workshops, blogs, morning coffee presentations, etc.)

c) **Develop and implement the Ocean SAMP outreach and communication strategy.** The strategy will be based on assessment results and will provide the public with an opportunity to understand the Ocean SAMP issues and then play a role in creating Ocean SAMP policy. Communication/outreach products will be selected to foster and engage a well informed and well represented constituency that understands the Ocean SAMP issues and is involved in the creation of the Ocean SAMP. Tools that will likely be developed and shaped by this assessment include the following:

- **Printed outreach project materials** that comprise a suite of compelling pieces that each, in their own way, succinctly describe and illustrate various aspects of the project, its expected project outcomes, and the varied opportunities for public involvement. The related pieces include: 1) A tri-fold brochure also available via the web; 2) A three-month newspaper series that introduces key SAMP issues to the public and links to the online assessment targeted at issue identification and stakeholder needs; and 3) A Rhode Island Sea Grant general audience periodical (possibly 41 Degrees North) dedicated to the Ocean SAMP.

- **Ocean SAMP website** that informs the public of existing information, public events, and other relevant information. The site will help communicate to the public existing and ongoing policy and research for this study area. The site will be enhanced by podcasts featuring interviews of technical experts and citizen participants as a means of introducing SAMP ecological, social, and economic concepts and the perspectives of varied Rhode Island stakeholders. Specifically, we aim to provide interviews by experts and community members about their experiences with alternative energy infrastructure. A section of the web site will be dedicated to project team use only to enable efficient and effective communication and feedback among staff and researchers.

- **Museum display at select Rhode Island public places.** We will enlist technical assistance from the URI library science department and work with the CAC on a process to obtain a museum-caliber, interactive traveling display that will: 1) Encourage citizens to skill-build at no cost and participate in the SAMP process with an array of innovative, computer-based technologies for mapping and

visually engaging in the SAMP; and 2) Anchor an itinerary of community programming, or an informational series, that features SAMP issue presentations, technical expert appearances, and SAMP activities developed for children and adults alike. The display will assist with outreach to thousands of residents, raise awareness of Rhode Island Coastal waters, and highlight actions people can take to become involved in the SAMP.

- **Professional and community enrichment**. We will plan both the 2008 Seventh Marine Law Symposium at the Roger Williams University School of Law as well as the 2008 Seventh Annual Ronald C. Baird Sea Grant Science Symposium to: 1) Communicate Ocean SAMP science to professional and community audiences; 2) Provide Rhode Island with technical expertise for SAMP issues by engaging regional and national experts as program presenters; 3) Provide the TAC with small group opportunities to engage with outside technical experts on exploring potential policy and regulatory solutions to specific Ocean SAMP issues; and 4) Publicize the SAMP to the region and nation as an innovative model for effective, community-based ocean planning and management.

3. Develop a "floating zone" tool *that will serve as a mechanism to promote the immediate identification of appropriate sites for the installation of permanent structures.*

a) Work with the TAC and the CAC to develop characteristics or performance measures for the Ocean SAMP floating zone. This will build on work developed for the ATM study. Physical and biological characteristics include those necessary for the installation of structures, including structures that support alternative energy activities. Characteristics would also include locations where these structures would not be appropriate (e.g. inside a navigational channel).

b) Work with the research community, including the TAC, to identify possible sites that would meet the described criteria.

c) Work with the research community, including the TAC, to "fast-track" research for these identified sites to determine their feasibility as potential sites for the installation of permanent structures.

4. Evaluate project *to provide information to the partners and stakeholders on the degree of program development and implementation success including staff performance, potential outreach enhancements, including appropriate use of the technology tools and skill-building activities, provided through the pilot program.*

A monitoring and evaluation program will be an integral part of the initiative from beginning to end of the grant period. The purpose of monitoring and evaluation will be to provide information to the partners and stakeholders on the degree of program development and implementation success including projected outputs, effective integration of science and management, effectiveness of participatory processes and dialogue between partners directed toward achieving the proposed outcomes, and effectiveness of outreach activities. A systems approach will be

applied that is based on a strategic planning model of the desired outcomes in order to: 1)Focus and adapt program activities; and 2) Characterize changes in behavior, relationships, challenges, and actions of key partners.

Budget Justification (See next page for budget)

Total Budget Request:	$1,502,256
Direct Costs-	$1,204,605
Indirect Cost 25%1	$ 297,651

Salaries (PERS2): $ 535,141
The amount of $535,141 is requested in support: of McCann, for 12 months over two years at $68,102; Olsen, Executive Director, CRC, for four months over two years at $45,114; and Squillante for 2.25 months over two years at $18,055 for project management.

Funds are requested in support of policy and outreach for a Marine Research Associate, Becker for 24 months over two years at $111,736; Communication Specialists: Kennedy for 8 months over two years at $30,838, Allard-Cox for six months at $27,719 and Young for two months at $11,541; Marine Research Associate-Evaluator, Tobey for 4 months over two years at $28,446; SAMP Financial & Administrative Coordinator, for 12 months over two years for $39,577; Marine Research Assistants, Neville for six and Kane for two months each year respectively over two years at $21,071 and 6,820; Marine Research Assistant, Bowen for two months over two years at $10,913; Coastal Marine Manager, Lee for 1 month over two years at $7,182;

Aquaculture and Fisheries Managers, Costa-Pierce, for one month over two years at $10,555 and Desbonnett for two months at $11,294, and Beutel for eight months over two years at $33,639; Marine Affairs Specialist, TBA for two months over two years at $16,216; Legal Advisor, Higgins for two months at $8,140 and Water Quality/Productivity Specialist, TBA for five months over two years at $28,148.

Students-(STUD): $90,617
The amount of $90,617 is requested to support Graduate student (Masters level 1 at $16.73/hour) for 24 months over two years at $25,747; two Graduate students (PhD level at $17.99/hour) for 8 months and 24 months over two years at $11,658 and $34,973; Graduate Law Fellow ($15.30/hour) for 12 months over two years at $12,083; and Undergraduate ($9.50/hour) for eights months at $6,156.

Fringe Benefits (FRING): $247,745
The amount of $240,813 is requested in support of personnel fringe and $6,932 is for student fringe. Fringe benefits include retirement, health insurance, group life insurance and social security taxes. Fringe benefits are an aspect of employment with the university and not discretionary. Additional detail on fringe benefit rates can be found on the URI website: http://www.uri.edu/research/tro/fringbentbl.pdf

Subcontracts (SUBCONTRACTS): $59,982
The budget includes provision for two subcontracts to assist with implementation:

Social networking/web company	$39,000
The Conservation Agency	$20,892

Selection of the group for social networking/web company is to be determined. The other sub recipients have been identified as key to the successful implementation of the work as outlined in the proposal.

Personal Service Contracts-(CONS): $40,590
Technical experts and publication design consultants are estimated at $40,590 over the two year period based on estimated time to deliver products included in the scope of work. These are illustrative based on past personal service contracts with similar scopes of work and may be adjusted based on the final approved work plan.

Operating, Supplies and Other Direct Costs: $82,795
Operating funds requested include $9900 in boat rental fees for transportation and sampling. Supplies include an underwater camera, grab sampler, analysis tools and equipment, a digital camcorder to produce video cast project presentations. Other outreach materials such as displays, CD ROMs and brochures are included as other direct costs-publications.
See individual budgets for a complete list of supplies and other direct costs.

Publications: (PUBS) $128,500
The amount of $128,500 is requested for project publications including $8,750 for widely distributed informational brochure, $10,500 for a museum quality traveling display, $19,250 for outreach materials including fact sheets and other educational materials as specified in the scope of work.. In addition, $25,000 is requested for a perspective document and $65,000 for a printed Ocean SAMP policy document with interactive CD.

Travel (DTRVL): $19,235
$2,475 is requested for in-state mileage for staff to attend meetings, site visits and general project related events; $11,010 is for travel expenses for technical experts to visit and evaluate sites; $1,750 is requested for one staff member to attend project related meeting in Washington each year; $1,950 for attending the ’10 Smart Growth Conference and $2,050 for two staff members to attend the ’09 Coastal Zone Conference in Boston, MA.

Indirect Costs (F&A): $297,651
In accordance with URI inter-agency agreements an indirect cost rate of 25% has been applied to all direct costs except tuition which is exempt and subcontracts which have a modified rate of full indirect on the first $25,000 of each agreement. Equipment is also exempt but there is no equipment in this proposed budget.

Budget:

THE OCEAN/OFFSHORE RENEWABLE ENERGY SPECIAL AREA MANAGEMENT PLAN (SAMP)
SUPPORTING BUDGET

Coastal Resources Center-Rhode Island Sea Grant

College- GSO-2800 6/1/2008 Request Amt: $ 1,502,256
Department: Coastal Resources Center-2806 5/31/2010
Start Date: 6/1/08 End Date: 5/31/10
Co PI: Jennifer McCann

			Year 1			Year 2	TOTAL
Personnel	Salary	Month	Total	Salary	Month	Total	**Project Total**
Project Manager	$5,591	*6.00*	$33,548	5,759	*6.00*	$34,554	**$68,102**
Marine Resource Specialist	$4,587	*12.00*	$55,042	4,724	*12.00*	$56,694	**$111,736**
Associate Coastal Manager	$7,076	*0.00*	$0	7,288	*0.00*	$0	**$0**
Comm./Outreach Specialist	$3,802	*4.00*	$15,208	3,916	*4.00*	$15,665	**$30,873**
Evaluator	$7,007	*2.00*	$14,013	7,217	*2.00*	$14,433	**$28,446**
SAMP Financial & Administrator Coordinator	$3,241	*6.00*	$19,448	3,355	*6.00*	$20,129	**$39,577**
Administrative Staff	$3,460	*3.00*	$10,380	3,564	*3.00*	$10,691	**$21,071**
Administrative Staff	$3,360	*1.00*	$3,360	3,461	*1.00*	$3,461	**$6,820**
Communications Specialist	$5,685	*1.00*	$5,685	5,856	*1.00*	$5,856	**$11,541**
Assistant Director of Operations	$7,871	*1.00*	$7,871	8,147	*1.25*	$10,183	**$18,055**
Technical Expert (Web, IMS, & interactive site)	$5,376	*1.00*	$5,376	5,537	*1.00*	$5,537	**$10,913**
Aquaculture	$10,373	*0.50*	$5,187	10,737	*0.50*	$5,368	**$10,555**
Aquaculture	$5,564	*1.00*	$5,564	5,731	*1.00*	$5,731	**$11,294**
Fisheries Operations Manager	$4,143	*4.00*	$16,571	4,267	*4.00*	$17,068	**$33,639**
Communication / Interviewer/ Video Editor	$4,551	*3.00*	$13,654	4,688	*3.00*	$14,064	**$27,719**
Legal advisor	$4,000	1.00	$4,000	4,140	1.00	$4,140	**$8,140**
Water Quality / Productivity Specialist	$5,530	2.00	$11,060	5,696	3.00	$17,088	**$28,148**
Marine Affairs Specialist	$7,988	*1.00*	$7,988	8,228	*1.00*	$8,228	**$16,216**
Coastal Marine Manager	$7,076	*0.50*	$3,538	7,288	*0.50*	$3,644	**$7,182**
Executive Director	$11,085	*2.00*	$22,169	11,473	*2.00*	$22,945	**$45,114**
Subtotal Staff Salary		*119553.78*	$259,662		*123140.39*	$275,478	**$535,141**
Subtotal Staff Fringe @ 45%			*$116,848*			*$123,965*	**$240,813**
TOTAL PERSONNEL COSTS			**$376,510**			**$399,443**	**$775,954**
Student Salary & Fringe	Rate	Months	Total	Rate	Month	Total	
Graduate Student (Masters level 1 @ $16.73)	$1,060	12.00	$12,715	1,086	12.00	$13,033	**$25,747**
Graduate Student (Ph.D level 3 @ $17.99)	$1,439	*4.00*	$5,757	1,475	*4.00*	$5,901	**$11,658**
Graduate-Law fellow (15hrs. @ $15.30)	$995	*6.00*	$5,967	1,019	*6.00*	$6,116	**$12,083**
Graduate Student (Ph.D level 3-20 hrs. @ $17.99	$1,439	*12.00*	$17,270	1,475	*12.00*	$17,702	**$34,973**
Undergradate Student (Step 8-20 hrs. @ $9.50)	$760	*4.00*	$3,040	779	*4.00*	$3,116	**$6,156**
Subtotal Student Salary			*$44,749*			*$45,868*	***$90,617***
Subtotal Student Fringe (FICA .0765 %)			*$3,423*			*$3,509*	***$6,932***
Total Student Salary & Fringe			***$48,172***			***$49,377***	***$97,549***
TOTAL PERSONNEL & FRINGE			***$424,683***			***$448,820***	***$873,503***
Subcontracts/Consultants	Cost	Unit	Total	Cost	Unit	Total	
Social networking/web consultant	$13,000	2.00	$26,000	$13,000	1.00	$13,000	**$39,000**
The Conservation Agency	$10,400	1.50	$15,600	$10,764	0.50	$5,382	**$20,982**
Technical Eperts for public informational series	$1,500	3.00	$4,500	$1,500	3.00	$4,500	**$9,000**
Design- ($35 an hour)	$5,200	3.00	$15,600	$5,330	3.00	$15,990	**$31,590**
TOTAL SUBCONTRACTS			**$61,700**			**$38,872**	**$100,572**
Operating	Cost	Unit	Total	Cost	Unit	Total	**Total**
Public Meetings	$ 255	8.00	$2,040	$ 255	8.00	$2,040	**$4,080**
Lauch Event	$ 5,000	1.00	$5,000	$ -	0.00	$0	**$5,000**
Closing Ceremony	$ -	0.00	$0	$ 5,000	1.00	$5,000	**$5,000**
Assessment Survey	$ 1,750	1.00	$1,750	$ -	0.00	$0	**$1,750**
Video Editing Software (Adobe Premiere Pro CS3)	$ 800	1.00	$800	$ -	0.00	$0	**$800**
Canon Digital Camcorder	$ 450	1.00	$450	$ -	0.00	$0	**$450**
Canon Camcorder Tripod and power adaptor	$ 100	1.00	$100	$ -	0.00	$0	**$100**
Computer Equipment	$ 1,975	3.00	$5,925	$ -	0.00	$0	**$5,925**
Materials and Supplies, Telephone (field & office)	$ 1,530	1.00	$1,530	$ 1,530	1.00	$1,530	**$3,060**
Symposia (Baird, Law)	$ 9,000	1.00	$9,000	$ 9,000	1.00	$9,000	**$18,000**
Lab & Field Supplies	$ 15,000	1.00	$15,000	$ 8,000	1.00	$8,000	**$23,000**
Boat Rental R/V Zostera 12 days (275 per day)	$ 275	12.00	$3,300	$ 275	12.00	$3,300	**$6,600**
Boat Rental R/V Chaffee 12 days ($250 per day)	$ 250	12.00	$3,000	$ 275	12.00	$3,300	**$6,300**
Postage	$ 1	1365.00	$1,365	$ 1	1365.00	$1,365	**$2,730**
TOTAL OPERATING			**$49,260**			**$33,535**	**$82,795**
Publications	Cost	Unit	Total	Cost	Unit	Total	
Brochure	$3	3500	$8,750	0	0.00	$0	**$8,750**
Museum Displays	$3,500	3.00	$10,500	0	0.00	$0	**$10,500**
Outreach materials (fact sheets, etc)	$3	3500	$8,750	3	3500	$10,500	**$19,250**
Ocean SAMP Interactive Perspective Document/P	$5	5000	$25,000	0	5000	$0	**$25,000**
Ocean SAMP Policy Document/CD	$0	0.00	$0	$7	10000	$65,000	**$65,000**
TOTAL PUBLICATIONS			**$53,000**			**$75,500**	**$128,500**
Travel	Cost	Unit	Total	Cost	Unit	Total	
In-State Mileage	$40	30	$1,215	$42	30.00	$1,260	**$2,475**
Honorarium Travel	$1,835	3	$5,505	$1,835	3.00	$5,505	**$11,010**
Out-of State-Washington, DC	$875	1.00	$875	$875	1.00	$875	**$1,750**
Out-of State- Smart Growth Conference '10	$0	0.00	$0	$1,950	1.00	$1,950	**$1,950**
Out-of State-Boston, MA Coastal Zone 09 Confere	$1,025	2.00	$2,050	$0	0.00	$0	**$2,050**
TOTAL TRAVEL			**$9,645**			**$9,590**	**$19,235**
DIRECT COSTS			**$598,288**			**$606,317**	**$1,204,605**
TOTAL MODIFIED DIRECT COSTS			**$597,288**			**$593,317**	**$1,190,605**
OVERHEAD - 25%			**$149,322**			**$148,329**	**$297,651**
TOTAL BUDGET			**$747,610**			**$754,647**	**$1,502,256**

Appendix D: URI Supporting Sub-awards for the Ocean SAMP

1. Project Management

Principal Investigators:
Sam De Bow, URI Graduate School of Oceanography
Jennifer McCann, URI Coastal Resources Center/Rhode Island Sea Grant

Study Objectives:
- Provide overall management and coordination for Ocean SAMP and all URI projects contributing to wind farm siting issues
- Coordinate project with activities of URI Partnership in Energy and Center of Excellence in Offshore Renewable Energy

Deliverables:
1. Monthly oral and quarterly written progress reports
2. Ocean SAMP for Coastal Waters of Rhode Island
3. Copies of all project reports generated by URI project team

Proposed Schedule:

Start:	TBD
URI reports	As specified in start-up plan
Final report	As specified in start-up plan

Budget Justification (see budget on next page):

Total Budget Request	$100,043
Direct Costs-	$80,035
Indirect Costs 25%-	$20,009

Salaries (PERS2): $61, 950
Salary is requested to fund 8.2 months of S. De Bow, URI Graduate School of Oceanography, Research Operations and Special Operations, for project management of the Ocean SAMP.

Fringe Benefits-(FRINGE): $15,878
Fringe benefits include retirement, health insurance, group life insurance and social security taxes. Rates vary by person and are listed individually as a percentage. The application of fringe benefits is set forth by contract and is not discretionary. Additional detail on fringe benefit rates can be found on the URI website: http://www.uri.edu/research/tro/fringbentbl.pdf

Travel (DTRVL): $ 2,207
Funding in the amount of $707 is requested for in-state mileage to attend meetings, participate in workshops, and attend to general grant related business. Funding in the amount of $1500 is requested to support out-of-state travel to attend grant related conferences.

Budget:

The URI Graduate School of Oceanography The Ocean / Offshore Renewable Energy Special Area Management Plan **Project Management Sub Award Budget**							
College:GSO-2800						Request Amt:	$ 100,043
Department: GSO-2800							
Start Date: 6/1/08 End Date: 5/31/10							
Contact: Sam De Bow	**Salary**	**Effort**	**Year 1 Request**	**Salary**	**Effort**	**Year 2 Request**	**Total Request**
A. Personnel							
DeBow, S- Director	7,500	4.1	30,975	7,500	4.1	30,975	61,950
TOTAL PERSONNEL COSTS			**30,975**			**30,975**	**61,950**
B. Fringe Benefits							
Staff		25.63%	7,939			7,939	15,878
TOTAL FRINGE BENEFITS			**7,939**			**7,939**	**15,878**
C. Equipment							
TOTAL EQUIPMENT			**-**			**-**	**-**
D. In State-Travel		0.505	354			354	707
Out of State Travel		750	750			750	1,500
TOTAL TRAVEL			**1,104**			**1,104**	**2,207**
E. SUPPLIES							
TOTAL SUPPLIES			**-**			**-**	**-**
F. SUBCONTRACTS			**-**			**-**	**-**
TOTAL SUBBONTRACTS			**-**			**-**	**-**
G. OTHER COSTS							
TOTAL OTHER COSTS			**-**			**-**	**-**
							-
TOTAL DIRECT COSTS			**$ 40,017**			**$ 40,017**	**80,035**
							-
TOTAL MODIFIED DIRECT COSTS			**$ 40,017**			**$ 40,017**	**80,035**
							-
INDIRECT COST 25% (MTDC)			**$ 10,004**			**$ 10,004**	**20,009**
							-
TOTAL REQUESTED FROM AGENCY			**$ 50,022**			**$ 50,022**	**100,043**

2. Engineering Studies in support of the Ocean SAMP

A. Wave, and storm surge characterization for RI coastal waters

Principal Investigator(s) & Staff:
Malcolm L. Spaulding, URI Graduate School of Oceanography, Ocean Engineering
Stephan Grilli, URI Graduate School of Oceanography, Ocean Engineering
Annette Grilli, URI Graduate School of Oceanography, Ocean Engineering

Overview:
This study is divided into three separate components: (1) wave, and storm surge characterization for RI coastal waters; (2) marine transportation paths based on AIS data, and (3) revised wind farm site screening analysis. Proposals providing study objectives, tasks, deliverables and schedule are provided in separate sections below. Budgets for each of the components, as well as a summary budget, are provided as an attachment.

Study Objectives:
- Perform a detailed comparison of the mean annual wind speeds as provided by AWS TrueWinds and used in the ATM screening study to wind data from US Army Corp Wave Information Study (WIS) sites in coastal waters of RI, from WeatherFlows coastal RI network, from the site at Charlestown, RI located at the former naval air facility, and to the data from the Martha's Vineyard Observatory. Adjust the AWS wind resource maps if appropriate to accurately represent wind resource.
- Using the data sets noted above determine the once in 25, 50, and 100 yr return period winds.
- Using the US Army Corp flood profile information estimate the 25, 50, and 100 yr return period surge height.
- Using a wave model estimate the mean and once in 25, 50, and 100 yr wave periods and amplitudes for southern RI coastal waters. Perform the analysis with and without the corresponding storm surge.

Study Tasks:
1. Collect wind data from AWS TrueWinds (in hand), WeatherFlow (available for purchase), Charlestown (summary available), WIS (available via web site) and Martha's Vineyard (available via web site). Collect wave data from WIS site.
2. Comparison of mean values from above wind data sources to AWS TrueWind data for offshore areas to validate AWS winds, make adjustments as appropriate (using a standard representation of the wind boundary layer) to provide best estimates of wind fields for various heights, including the approximate windmill hub height of 80 m.
3. Perform statistical analyses on the wind and wave data to estimate once in 25, 50, and 100 yr event.
4. Perform simulations using STWAVE (or a similar non phase-resolving program) to estimate the mean and once in 25, 50, and 100 yr wave conditions, based on hindcast wave data obtained at the regional WIS nodes. Perform simulations for a number of representative wave directions (3-4) and without and with changes in mean water level due to the associated storm surges.

Deliverables:

1. Final report summarizing the study
2. GIS maps of the following parameters
   - Mean annual wind speeds at 50 and 80 m, mean annual power output at 50 and 80 m.
   - Extreme wind speeds for once in 25, 50, and 100 yr events
   - Storm surge for once in 25, 50, and 100 yr events
   - Extreme wave heights for once in 25, 50, and 100 yr events, with and without storm surge
   - Contours of wave breaking zones for once in 25, 50, and 100 yr events

Proposed Schedule:

Start:	TBD
Wind Resource analysis complete	4 Months
Wave Analysis complete	10 Months
GIS maps	11 Months
Final report	13 Months

B. Marine transportation paths based on AIS data

Principal Investigator(s) & Staff:

Malcolm L. Spaulding, URI Graduate School of Oceanography, Ocean Engineering
Stephan Grilli, URI Graduate School of Oceanography, Ocean Engineering
Annette Grilli, URI Graduate School of Oceanography, Ocean Engineering

Study Objectives:

- Analyze Automated Identification System (AIS) data to determine the transportation corridors in southern RI coastal waters.
- Compare the AIS data to USCG shipping lanes, fairways and precautionary areas, determine impacts of recent changes in transportation rules for study area

Study Tasks:

1. Collect AIS data for Narragansett Bay, and offshore RI waters (from eastern end of Long Island Sound, western end of Buzzards Bay, RI shoreline to line from just south of Montauk Point-south or Block Island and south of Gay Head). Data is available from Maritime Information Systems, Inc, Bristol, RI (continuously from August 2007 to present, in tabular form from early 2007 to Aug 2007).
2. Prepare a GIS layer of data and compare to USCG regulated marine transport areas and routine ferry transportation corridors

Deliverables:

1. Final report summarizing the study
2. GIS maps of the AIS tracks with USCG regulated areas overlaid

Proposed Schedule:

Start:	TBD
GIS maps complete	7 – 8 Months
Final report	8 – 9 Months

C. Revised wind farm site screening analysis (Phase II)

Principal Investigator(s) & Staff:
Malcolm L. Spaulding, URI Graduate School of Oceanography, Ocean Engineering
Stephan Grilli, URI Graduate School of Oceanography, Ocean Engineering
Annette Grilli, URI Graduate School of Oceanography, Ocean Engineering

Study Objectives:

- Perform a detailed review of Phase I site screening for RI coastal waters performed by ATM (RI Winds study) and replicate ATM's maps.
- Refine screening study to include: list of parameters given in Battelle's screening report for dredged material disposal, protected marine species, recreational and commercial fisheries, essential fish habitat, seabed characterization, extreme environmental loading (winds, storm surge, and waves), surficial and sub-bottom (depth to bedrock) characteristics, and maps related to suitable structures and costs based on foundation and structure technology assessment.
- Develop a ranked list of sites for potential development

Study Tasks:

1. Collect and assemble available GIS data from RI-GIS and ATM RI Winds and Battelle study for southern RI coastal waters related to siting criteria. Verify data source and maps. (performed by August et al team)
2. Obtain GIS data generated by URI project team members as outlined in Objective 2.
3. Assemble all data sets for screening analysis (performed by August et al team)
4. Perform screening analysis to select final candidate sites. Provide explanation for each step in the process.
5. Prepare a final report summarizing the methodology, results and conclusions. Provide rank ordered list of recommended sites.

Deliverables:

1 Final report summarizing the study
2 GIS maps of all parameters used in the screening analysis (August et al)

Proposed Schedule:

Start:	TBD
GIS layers	9 Months
Final report	12 Months

Budget Justification (see budget on next page):

Total Budget Request:	$231,397
Direct Costs:	$185,117
Indirect Cost 25%:	$ 46,279

Salaries (PERS2): $136,916
A total of $89,920 in year 1 and $46,996 in year 2 is requested for salary to support the senior personnel, technical staff, and graduate students needed to accomplish the project.

Fringe Benefits-(FRINGE): $36,102
Fringe benefits include retirement, health insurance, group life insurance and social security taxes. As the rates vary by person and are listed individually, the average rate is 48.24% and 42.4% has been applied to overall salaries requested. The application of fringe benefits is set forth by contract and is not discretionary. Additional detail on fringe benefit rates can be found on the URI website: http://www.uri.edu/research/tro/fringbentbl.pdf

Supplies: $12,100
The amount of $12,000 is requested in year 1 to purchase data necessary to perform the proposed scope of work. A summary of the data purchases is listed below:

AWS True Winds Data: $600 is requested to cover the cost of purchasing the AWS True Winds data set which consists of wind speed data (50 m elevation) for coastal RI waters. The data set is the same as used by ATM (2006, 2007) in their RI WINDS study. While the contour map of winds is available from the ATM study, the actual data on which they are based is not.

Weather Flow Data: $5,000 is requested to cover the cost of purchasing wind data sets collected by Weather Flow and distributed by Isurf for stations adjacent to southern RI waters. Data is available from Beavertail, Block Island Jetty, Bristol, Fogland, Halfway Rock, Ninigret Pond, Pt Judith, Rose Island, Sabin Point and West Falmouth. Data is provided at hourly intervals with record lengths that vary from 3 to 10 years depending on the location.

AIS (Automated Identification System) Data: $6,500 is requested to cover the cost of Automated Identification System data for the southern RI waters and adjacent Massachusetts, New York, and Connecticut waters. The data provides the location vs. time (and a variety of other parameters) of all vessels, over 65 ft in length, that transit the area. AIS went into operation in early January 2007. Selected portions of the January 2007 to August 2007 data is estimated to cost $1,000, since it needs to be retrieved from storage and reformatted. The August 2007 to present data is estimated to cost an additional $5,500. The data will be provided both in its original form and as GIS ArcView shape files.

Budget:

URI Graduate School of Oceanography
The Ocean / Offshore Renewable Energy Special Area Management Plan
Engineering studies in support of the Ocean SAMP Sub Award Budget

College: Engineering -2300 40%
Department: Ocean Engineering -2306 60%
Start Date: 6/1/08 End Date: 5/31/10

Malcolm Spaulding,Ocean Engineering	Salary	Effort	Year 1 Request	Salary	Effort	Year 2 Request	Total Request
A. Personnel							-
Spaulding, M., Professor (summer)	12,791	1	12,791	12,791	1.3	17,012	29,803
Grilli, S., Professor (summer)	12,300	1.0	12,300	12,300	-	-	12,300
Research Faculty	5,850	7.5	43,875	5,850	-	-	43,875
Research Faculty	7,500	-	-	7,500	3	22,500	22,500
Graduate Student (summer)	3,492	3	10,477	3,492		-	10,477
Graduate Student (summer)	3,492	3	10,477	3,492		-	10,477
Graduate Student -400 hrs. @$18.71	2,619	-	-	2,619	2.86	7,484	7,484
TOTAL PERSONNEL COSTS			**89,920**			**46,996**	**136,916**
B. Fringe Benefits							
Research Faculty		48.24%	21,165				21,165
Research Faculty		42.40%				9,540	9,540
Faculty FICA		7.65%	1,919			1,301	3,221
Graduate Student - Summer Hourly		7.65%	1,603			572	2,175
TOTAL FRINGE BENEFITS			**24,688**			**11,414**	**36,102**
C. Equipment							
TOTAL EQUIPMENT			**-**			**-**	**-**
D. In State-Travel			-			-	-
Out of State Travel			-			-	-
TOTAL TRAVEL			**-**			**-**	**-**
E. SUPPLIES							
TOTAL SUPPLIES			**-**			**-**	**-**
F. OTHER COSTS							
AWS True Winds Data			600			-	600
Weather Flow Data			5,000			-	5,000
AIS Data			6,500			-	6,500
TOTAL OTHER COSTS			**12,100**			**-**	**12,100**
							-
TOTAL DIRECT COSTS			**$ 126,708**			**$ 58,410**	**185,117**
							-
TOTAL MODIFIED DIRECT COSTS			**$ 126,708**			**$ 58,410**	**185,117**
							-
INDIRECT COST 25% (MTDC)			**$ 31,677**			**$ 14,602**	**46,279**
							-
TOTAL REQUESTED FROM AGENCY			**$ 158,385**			**$ 73,012**	**231,397**

3: RI Wind Farm Structures/Foundations Study – Support Structures and Foundations for Offshore Wind Turbines

Principal Investigator(s) & Staff:
Sau-Lon James Hu, URI Graduate School of Oceanography Ocean Engineering
Christopher D. P. Baxter, URI Graduate School of Oceanography Ocean/Civil Engineering

Background

Offshore wind turbine structure

Offshore wind turbine structure is a structural system consisting of a *support structure* for an offshore wind turbine and a *foundation* for the support structure. The support structure for an offshore wind turbine is considered as the structure between the seabed and the nacelle of the wind turbine that the structure supports. The foundation, which is from the seabed downwards, of the support structure is treated as a separate component.

In order to ensure that the operation of wind farms installed at hostile offshore sites will be reliable and cost effective, it is essential that the wind turbines, support structures and foundations are designed and optimized taking proper account of external conditions at the site. Since offshore wind turbines are likely to be installed in relatively shallow water, there is considerable uncertainty in the calculation of hydrodynamic loading, both for fatigue and extreme loads which may be driven by breaking waves.

Structures and foundations shall be designed to ensure acceptable safety of structure during the design life of the structure against limit states. A limit state is a condition beyond which a structure or structural component will no longer satisfy the design requirements. Two particular limit states are considered in this study: (1) *ultimate limit states* (ULS) correspond to the maximum load carrying resistance; and (2) *fatigue limit states* (FLS) correspond to failure due to the effect of cyclic loading.

Support structures

Bottom-mounted support structures for large offshore wind farm developments fall into a number of generic types which can be categorized by their method of installation, their structural configuration and the selection of their construction materials. The water depth limits for the different types of support structures have been suggested in a few offshore wind turbine standards. Roughly, the structural configuration of support structures can be categorized into five basic types:

- monopile structures – The monopile support structure is a simple design by which the tower is supported by the monopile, either directly or through a transition piece, which is a transitional section between the tower and the monopile. The monopile continues down into the soil. The structure is made of cylindrical steel tubes. The pile penetration depth can be adjusted to suit the actual environmental and soil conditions. A possible disadvantage is a too high flexibility in deep waters. The limiting condition of this type of support structure is the overall deflection and vibration. This type of structure is well suited for sites with water depth ranging from 0 to 25 meters.

- tripod structures – The tripod is a three-leg structure made of cylindrical steel tubes. The central steel shaft of the tripod makes the transition to the wind turbine tower. The tripod can have either vertical or inclined pile sleeves. The base width and pile penetration depth can be adjusted to suit the actual environmental and soil conditions. These types of structures are well suited for sites with water depth ranging from 20 to 50 meters.
- lattice structures – The lattice tower usually consists of three corner piles interconnected with bracings. At the seabed, pile sleeves are mounted to the corner piles. The soil piles are driven inside the pile sleeves to the desired depth to gain adequate stability of the structure. This type of structure is well suited for sites with water depth ranging from 20 to 40 meters.
- gravity structures – The gravity type support structure is a concrete-based structure with small steel skirts. The ballast required to obtained sufficient gravity consists of sand, iron ore or rock that is filled into the base of the support structure. The base width can be adjusted to suit the actual soil conditions. The structure requires a flat base and some form for scour protection. These types of structures are well suited for sites with firm soils and water depth ranging from 0 to 25 meters.
- floating structures – The low-roll floating structure is basically a floater kept in position by mooring chains and anchors. In addition to keeping the floater in place, the chains have the advantage that they contribute to dampen the motions of the floater. At the bottom of the hull of the floater, a stabilizer is placed to further reduce roll. Floating structures are especially competitive at large water depths where the depth makes the conventional bottom-supported structures non-competitive.

Hybrid support structure designs may be utilized combining the features of the categorized structures.

Foundations for support structures

Monopile, tripod and lattice structures are usually piled. *Piled foundations* by far forms the most common form of offshore foundation. Piled offshore structures have been installed since the late 1940'es and have been installed in water depth in excess of 150 meters. The standard method of offshore and near-shore marine installation of piled structures is to lift or float the structure into position and then drive the piles into the seabed using either steam or hydraulic powered hammers. The handling of piles and hammers generally requires the use of a crane with sufficient capacity, ideally a floating crane vessel.

The tripod structures can be built with *suction bucket anchors*, instead of piles. The wind turbine support structure can be transported afloat to the site. During installation, each bucket can be emptied in a controlled manner, thus avoiding the use of heavy lift equipment. Further, the use of the suction buckets eliminates the need for pile driving of piles as required for the conventional tripod support structure. The support structure shall be installed at locations, which allow for the suction anchor to penetrate the prevalent soils (sand or clay) and which are not prone to significant scour. This type of structure is well suited for sites with water depth ranging from 20 to 50 meters.

Gravity foundations, unlike piled foundations, are designed with the objective of avoiding tensile loads (lifting) between the bottom of the support structure and the seabed. This is achieved by providing sufficient dead loads such that the structure maintains its stability in all environmental conditions solely by means of its own gravity. Gravity structures are usually competitive when the environmental loads are relatively modest and the "natural" dead load is significant or when

additional ballast can relatively easily be provided at a modest cost. The ballast can be pumped-in sand, concrete, rock or iron ore. The additional ballast can partly be installed in the fabrication yard and partly at the final position; all depending on the capacity of the construction yard, the available draft during sea transport and the availability of ballast materials. The gravity based structure is especially suited where the installation of the support structure cannot be performed by a heavy lift vessel or other special offshore installation vessels, either because of non-availability or prohibitive costs of mobilizing the vessels to the site.

Floating structures can by their very nature be floating directly in a fully commissioned condition from the fabrication yard to the site. The installation is simple since the structure can be towed to the site and then be connected by the chains to the anchors. The anchors can be fluke anchors, drag-in plate anchors and other plate anchors, suction anchors or pile anchors, depending on the actual seabed conditions. When the anchors have been installed, the chains can be installed and tightened and hook-up cables can be installed.

Study Objectives:

- Perform a detailed assessment of the technology used for support structures and foundations for offshore wind turbines.
- Evaluate the relevant parameters (water depth, depth to bedrock, scour depth, wind and wave loads, etc.) that govern the choice of the different technologies.
- Estimate the relative costs of the different technologies based on known site conditions in RI coastal waters.

Study Tasks:

1. Perform a detailed literature review of different structure/foundation systems (monopiles, gravity-based structures, floating structures, etc) used in offshore wind turbines. Collect experience learned from implementing those technologies in areas such as UK, Germany, Denmark, etc.
2. Identify/justify important environmental parameters (water depth, wave height and period, depth to bedrock, etc.) that govern the selection of which structure/foundation system to be used in a given location. After relevant data regarding wind, wave and soil conditions being provided, perform static, dynamic and fatigue analyses to quantify the limits of environmental parameters for various structure/foundation systems.
3. Perform cost analysis for various structure/foundation systems suitable for locations in RI coastal waters. Based on the safety and cost consideration of the structure/foundation system, identify the systems to be recommended for the proposed wind farm sites in RI coastal waters.

Deliverables:

1. Final report summarizing the study
2. GIS maps of the following parameters:
    a. Necessary support structure dimensions, including pile diameter and height, under design conditions with return periods 25, 50, and 100 years.
    b. Necessary penetration depths of monopile foundations under design conditions with return periods 25, 50, and 100 years.
    c. Relative cost estimates of the different designs for each location within the GIS incorporating relevant site and loading conditions.

Proposed Schedule:

Start	TBD
Support structure analysis complete	11 – 12 Months
Foundation analysis complete	11 – 12 Months
Final report	23 Months

Budget Justification (see budget on next page):

Total Budget Request:	$67,307
Direct Costs:	$44,944
Indirect Cost 25%:	$11,236

Salaries (PERS2): $42,753
A total of $42,753 in year 1 is requested for salary to support the senior personnel, technical staff, graduate students, and a visiting scholar.

Fringe Benefits-(FRINGE): $2,191
Fringe benefits for the visiting scholar include 7.65% FICA and health benefits.

Tuition & Fees: $11,127
A total of $11,127 in tuition and fees is requested in year 1 to support a visiting scholar.

Budget:

The URI Graduate School of Oceanography
The Ocean / Offshore Renewable Energy Special Area Management Plan
RI Wind Farm Structures/Foundations Study: Support Structures and Foundations for Offshore Wind Turbines

College:Engineering -2300 — Request Amt: $ 67,307
Department: Ocean Engineering -2306
Start Date: 6/1/08 End Date: 5/31/10
Contact: Hu, J.

	Salary	Effort	Year 1 Request	Salary	Effort	Year 2 Request	Total Request
A. Personnel							
Hu, J. (summer)	12,137	1.0	12,137	12,137	-	-	12,137
Baxter, C.(summer)	9,064	1.0	9,064	9,064	-	-	9,064
Visiting Scholar	1,000	6	5,600				
Graduate Research Assistant, Level I (Fall)	2,191	3	6,572	2,191		-	6,572
Graduate Research Assistant, Level I (Summer)	3,411	3	9,380	3,411		-	9,380
TOTAL PERSONNEL COSTS			**42,753**			**-**	**42,753**
B. Fringe Benefits							
Health Benefits-Scholar	1045	0.00%	1,045			-	1,045
Visiting Scholar-FICA		7.65%	428			-	428
Graduate Student - Summer Hourly		7.65%	718			-	718
TOTAL FRINGE BENEFITS			**2,191**			**-**	**2,191**
C. Equipment							
TOTAL EQUIPMENT			**-**			**-**	**-**
D. In State-Travel			-			-	-
Out of State Travel			-			-	-
TOTAL TRAVEL			**-**			**-**	**-**
E. SUPPLIES							
TOTAL SUPPLIES			**-**			**-**	**-**
F. SUBCONTRACTS			-			-	-
TOTAL SUBBONTRACTS			**-**			**-**	**-**
G. OTHER COSTS							
Tuition			10,944			-	10,944
Fees			183			-	183
TOTAL OTHER COSTS			**11,127**			**-**	**11,127**
							-
TOTAL DIRECT COSTS			**$ 56,071**			**$ -**	**56,071**
							-
TOTAL MODIFIED DIRECT COSTS			**$ 44,944**			**$ -**	**44,944**
							-
INDIRECT COST 25% (MTDC)			**$ 11,236**			**$ -**	**11,236**
							-
TOTAL REQUESTED FROM AGENCY			**$ 67,307**			**$ -**	**67,307**

4: RI Wind Farm Siting Study- Acoustic Noise and Electromagnetic Effects

Principal Investigator(s) & Staff:
James H. Miller, URI Graduate School of Oceanography , Ocean Engineering
Gopu Potty, URI Graduate School of Oceanography , Ocean Engineering
Kathleen Vigness-Raposa, URI Graduate School of Oceanography , Office of Marine Programs

Introduction:

The equipment and facilities associated with generating offshore wind power have the potential to affect the surrounding environment. In particular, the equipment can cause increased levels of noise both in the atmosphere and in the ocean. Also, increased electric and magnetic fields can be generated in the process of creating the electrical power and in transmitting the power to shore. The fields have the potential to affect animals such as turtles, marine mammals, birds and fish.

One of the fundamental activities in any environmental assessment is the measurement of the existing conditions at the proposed candidate site. The National Research Council's 2003 report, "Ocean Noise and Marine Mammals" (Frisk et al., 2003), stated that ambient noise is "the noise associated with the background din emanating from a myriad of unidentified sources. Its distinguishing features are that it is due to multiple sources, individual sources are not identified (although the type of noise source—e.g., shipping, wind—may be known), and no one source dominates the received field."

The candidate site off Block Island has an ambient noise field that varies with season, wind speed, boat traffic, rainfall rate, etc. To understand the impact of the offshore wind farm, a measurement of the ambient noise field is required which is addressed in this proposal. In addition to underwater noise, airborne noise will be measured at the site and at Block Island for the same reason. In addition to the acoustic measurements, electric and magnetic ambient fields will be measured at the candidate site.

European researchers have quantified the noise and other effects from offshore wind farms in Denmark. (Danish, 2006) That report will be a source for our study. Recently, new injury and behavior criteria for marine mammals including cetaceans and pinnipeds have been published (Southall et al., 2007). Our analysis of the effects of the additional noise caused by the offshore wind farm will utilize the new criteria.

Study Objectives:

- Perform a detailed analysis of the atmospheric noise conditions and underwater noise conditions presently existing in the candidate locations.
- Predict the atmospheric noise and underwater noise levels during and after construction of the wind facility in the candidate locations.
- Estimate the effects of the added noise on marine mammals, turtles, and other animals native to the region.
- Perform a detailed analysis of the electromagnetic field conditions in the candidate locations.
- Predict the electric and magnetic (EM) fields due to the wind farm and associated cabling.
- Estimate the effects of the added EM fields on marine mammals, turtles and other animals native to the region.

Study Tasks:

Task 1. Collect acoustic data using calibrated systems in air and underwater at the candidate locations.

The ambient noise levels will be measured both underwater and above water at the candidate locations. Underwater noise measurements will be made with Passive Aquatic Listeners (PALs) (developed at Applied Physics Laboratory, University of Washington by Dr. Jeff Nystuen; http://staff.washington.edu/ jan4/JANystuenWebsite/) or a similar system. This system will be rented for this study and will be deployed and retrieved after a period of approximately a week using a research vessel. Boat time for this purpose has been allocated in the budget. Atmospheric noise measurements will be made with a sound level meter from the drifting research vessel. In addition long-term atmospheric noise measurements will be made at land stations closer to the candidate sites. These measurements will be made in consultation with the study groups dealing with marine mammals, turtles and birds.

Task 2.Collect EM field data using calibrated systems in air.

This task involves measuring the existing electromagnetic field (EMF) at the candidate locations and predicting the increase in those levels due to the wind farm. The measurement of EMF will be made along the proposed onshore power transmission route. These data will then be used to estimate the field strength corresponding to peak electrical loads. The field measurements will be made with a standard Electro Magnetic Field meter.

Task 3. Build a noise prediction model for the wind farm so average intensity of the radiated noise for various candidate designs, operating conditions and locations can be estimated.

This task involves the prediction of the increase in the radiated noise levels during the construction and operating phases of the wind farm. This will involve identifying the various sources of noise (during construction and operation) and predicting the noise levels associated with each of these sources. A detailed literature review will be done to collect available data from existing noise data from windmills around the world. These data, along with the design details of the proposed wind farm, environmental conditions at the candidate site, construction methodology, etc., will be used to develop a model to predict the noise levels.

Task 4: Quantify the effects of the added noise, including predicting the number of takes of marine mammals, turtles, and other protected species that may occur in the region.

With the outputs from the noise modeling that will occur as part of Task 3, estimates of the acoustic exposure of protected species, such as marine mammals, sea turtles, sea birds, and fish, will be calculated and interpreted as Level A (injury) and Level B (behavioral) zones of influence. Acoustic exposure should be considered as both the highest received level of sound an animal might receive (sound pressure level) as well as the total sound energy an animal might receive while in the region (sound exposure level). Southall et al. (2007) recently published the most comprehensive review of the data available to determine the appropriate levels from which to estimate zones of influence of underwater sound on marine mammals. The criteria from Southall et al. (2007) coupled with the noise modeling from Task 3 will provide the data needed to predict Level A (injury) and Level B (behavioral) zones of influence under different operational scenarios. GIS maps of the zones of influence under nominally defined operational scenarios will be provided as a deliverable.

Task 5: Quantify the effects of the added electromagnetic fields (EMF) on marine mammals, turtles, and other protected species that may occur in the region.

With the outputs from the EM measurements that will occur as part of Task 2, estimates of the electromagnetic exposure of animals that might occur in the region will be calculated. The primary consideration is for animals that may have magnetic sensory organs. Both terrestrial (e.g., birds) and marine animals (e.g., fish, sharks, sea turtles) likely use the Earth's magnetic field for orientation, navigation, or migration. While it is not anticipated that the EMF associated with the proposed wind project would affect animals, an estimate of their peak exposure level and their total electromagnetic exposure will be calculated.

Deliverables:

1. Final report summarizing the study
2. GIS maps of the following parameters:
   a. Radiated noise from the wind facility
   b. Prediction of level A (injury) and level B (behavioral) zones of influence for various species.

Proposed Schedule:

Start:	TBD
Underwater Noise analysis complete	7 Months
Airborne Analysis complete	12 Months
Electromagnetic Effects analysis complete	18 Months
GIS maps produced	20 Months
Final report	23 Months

References:

Frisk, G., D. Bradley, J. Caldwell, G. D'Spain, J. Gordon, M. Hastings, D. Ketten, J. Miller, D. L. Nelson, A. N. Popper, and D. Wartzok, *Ocean Noise and Marine Mammals*, National Academy Press, (2003).

"Danish Offshore Wind – Key Environmental Issues," DONG Energy, Vattenfall, The Danish Energy Authority and The Danish Forest and Nature Agency, November 2006. http://www.ens.dk/graphics/Publikationer/Havvindmoeller/havvindmoellebog_nov_2006_skrm.pdf

Southall, Brandon L., Ann E. Bowles, William T. Ellison, James J. Finneran, Roger L. Gentry, Charles R. Greene Jr., David Kastak, Darlene R. Ketten, James H. Miller, Paul E. Nachtigall, W. John Richardson, Jeanette A. Thomas, Peter L. Tyack, "Marine mammal noise exposure criteria: initial scientific recommendations," *Aquatic Mammals*., 33(4), 411-522, (2007).

Budget Justification (see budget on next page):

Total Budget Request:	$121,250
Direct Costs:	$97,000
Indirect Cost 25%:	$24,250

This budget reflects the resources needed to do the subsurface and surface geology studies, the benthic biology and habitat distribution studies, and the archaeological and cultural resources studies. A two-year budget for a total of $305,550 is presented. The first year total of $200,990 is substantially higher than the second year total of $104,560 due to the field survey activities, which will be completed in the first year; only laboratory, data analysis, and report preparation activities will be performed in year 2.

Salaries (PERS2): $59,378
Funds are requested for personnel costs for the principals as follows: 1 month for Miller in year 1 and 0.5 month in year 2. For Potty, 1.5 months in year 1 and 1 month in year 2. For Vigness-Raposa, 3 months in both years are requested

Fringe Benefits-(FRINGE): $16,661
Fringe benefits include retirement, health insurance, group life insurance and social security taxes. As the rates vary by person and are listed individually. The application of fringe benefits is set forth by contract and is not discretionary. Additional detail on fringe benefit rates can be found on the URI website: http://www.uri.edu/research/tro/fringbentbl.pdf

Travel (DTRVL): $361
Travel is requested in the amount of $361 over the two years are requested for trips to Block Island for the airborne noise measurements.

Supplies: $14,600
Funds are requested for supplies for the execution of the task outlined in the proposal. Where advisable, rental of equipment is proposed when the cost of the equipment purchase is not justifiable. In particular, rental fees for a Passive Aquatic Listener (PAL) system are requested for 1 month in year 1 and 1 month in year 2 at a cost of $2,000 per year. The PAL system costs $20,000 if purchased. Mooring floats and anchors are requested for both deployments at a cost of $1,500 per year. While the anchors are not retrievable, the floats can also be damaged during the deployment and hence two floats of requested. Mooring gear costs are requested in the amount of $500 in each year. An acoustic release rental and deck box rental is requested in the amount of $1,000 per year. A sound level meter and data acquisition system is requested for the airborne sound measurements in the amount of $2,000 and $600, respectively. An EMF (Electro-Magnetic Field) handheld meter is also requested with a cost of $1,000.

Other Costs: $6,000
Boat rental fees for the deployments and recovery of the PAL are requested (2 days at $1,500 per day) in each year.

Budget:

The URI Graduate School of Oceanography
The Ocean / Offshore Renewable Energy Special Area Management Plan
RI Wind Farm Siting Study- Acoustic Noise and Electromagnetic Effects Sub Award Budget

College: Engineering/2300 — Request Amt: $ 121,250
Department: Ocean Engineering/2306
Start Date: 6/1/08 End Date: 5/31/10
Contact: J. Miller

	Salary	Effort	Year 1 Request	Salary	Effort	Year 2 Request	Total Request
A. Personnel							-
James H. Miller, Professor	11256	1	11,256	11,537	0.5	5,769	17,025
Gopu R. Potty, Asst. Research Professor	7259	1.5	10,888	7,440	1	7,440	18,329
Kathleen Vigness-Raposa, Sr. Research Scientist	2917	4.57	13,333	2,989	3.58	10,692	24,025
TOTAL PERSONNEL COSTS			**35,477**			**23,901**	**59,378**
							-
B. Fringe Benefits							-
James H. Miller		26%	2,870			1,471	4,341
Gopu R. Potty		41%	4,464			3,051	7,515
Kathleen Vigness-Raposa		20%	2,667			2,138	4,805
TOTAL FRINGE BENEFITS			**10,001**			**6,660**	**16,661**
C. Equipment							
TOTAL EQUIPMENT			**-**			**-**	**-**
D. In State-Travel			200			161	361
Out of State Travel							
TOTAL TRAVEL			**200**			**161**	**361**
E. SUPPLIES							
Passive Aquatic Listener (PAL) Rental			2,000			2,000	4,000
VLF Handheld EMFMeter			750				750
Data acquisition system			1,600				1,600
PAL Release Rental			1,000			1,000	2,000
Anchor and float			1,500			250	1,750
Mooring gear			500			500	1,000
Acoustic Release and Deckbox rental			750			750	1,500
Handheld Sound Level Meter			2,000				2,000
TOTAL SUPPLIES			**10,100**			**4,500**	**14,600**
F. OTHER COSTS							
Boat rental			3,000			3,000	6,000
TOTAL OTHER COSTS			**3,000**			**3,000**	**6,000**
							-
TOTAL DIRECT COSTS			**$ 58,778**			**$ 38,222**	**97,000**
							-
TOTAL MODIFIED DIRECT COSTS			**$ 58,778**			**$ 38,222**	**97,000**
							-
INDIRECT COST 25% (MTDC)			**$ 14,695**			**$ 9,555**	**24,250**
							-
TOTAL REQUESTED FROM AGENCY			**$ 73,473**			**$ 47,777**	**$ 121,250**

5: Characterizing Physical Oceanography of the Rhode Island Coastal Ocean

Principal Investigator(s) & Staff:
Dan Codiga, URI Graduate School of Oceanography
Dave Ullman, URI Graduate School of Oceanography

Objectives:

- Examine previously completed studies of circulation and hydrography (temperature and salinity) in RI coastal waters to (a) summarize general characteristics of physical oceanography of the region, and (b) catalogue available observations and available modern published model outputs from numerical simulations constrained by observations.
- Obtain available observations and observation-constrained model outputs and use them to
    - characterize tidal currents in the area,
    - characterize sub-tidal flow including time-mean circulation, seasonal variations, and responses to wind and riverine forcing on timescales shorter than seasonal, and
    - characterize temperature and salinity fields and their seasonal variations, including vertical structure and associated density stratification where possible.
- Estimate strengths of extreme currents (25, 50, and 100-year events).

Tasks:

1. Perform a literature search on observations and numerical modeling of tidal and subtidal currents, and hydrographic properties (temperature and salinity) in RI coastal waters. Distill the information in to a general summary of physical oceanography of the region, with emphasis on typical and extreme near-surface conditions.
2. Determine and catalogue the sources of observations and published numerical simulations that are available. Observations of expected relevance include HF radar (e.g.(Ullman and Codiga, 2004; Mau et al., 2007), ship-based surveys (e.g. (Kincaid, 2005), hydrographic databases (e.g. from National Oceanographic Data Center (Conkwright, 1998), and time series from moorings in neighboring waters (e.g. (Shonting and Cook, 1970). There are several model outputs of expected relevance (Edwards, 2004a; Edwards, 2004b; Chen et al., 2006; Mau et al., 2006; Rogers, 2008).
3. Obtain the available observations and model outputs.
4. For each parameter of interest, merge the various observation and model sources, as possible, and perform relevant analyses (e.g. current ellipse determination; breakdowns and averaging by season; statistical characterizations) to generate the information necessary to create GIS layers.
5. Extreme current analysis and estimation, incorporating extreme wind event statistics as provided by co-investigators characterizing wind fields.

Deliverables:

1. Final report characterizing physical oceanography of Rhode Island coastal waters.
2. Information to generate GIS layers, where justified by available observations and model outputs, of the following parameters:
    a. Tidal current ellipse characteristics (major axis, minor axis, orientation angle of major axis, Greenwich phase) at the surface; at additional subsurface depths as possible.
    b. Subtidal current magnitude and direction by season at the surface; at additional subsurface depths as possible.
    c. Temperature and salinity by season at the surface; at additional subsurface depths as possible.
    d. Extreme surface currents for once in 25, 50, and 100 year events.

Proposed Schedule:

Start date:	TBD
Literature review complete:	6 Months
Observations & model outputs identified /obtained:	8 Months
Analysis & GIS layers complete:	10 Months
Final report:	12 Months

Budget Justification (see budget on next page):

Total Budget Request:	$53,562
Direct Costs:	$42,849
Indirect Cost 25%:	$10,712

Salaries (PERS2): $28,871
Funds are requested for $28,871 in year 1 for 3 months of Codiga and 1.5 months of Ullman.

Fringe Benefits-(FRINGE): $13,303
Fringe benefits include retirement, health insurance, group life insurance and social security taxes. As the rates vary by person and are listed individually as percentages. The application of fringe benefits is set forth by contract and is not discretionary. Additional detail on fringe benefit rates can be found on the URI website: http://www.uri.edu/research/tro/fringbentbl.pdf

Supplies: $675
The amount of $675 is requested for supplies to cover partial software license fees, photocopying, and telephone charges; the investigators have access to the needed computing and data storage resources.

Budget:

URI Graduate School of Oceanography
The Ocean / Offshore Renewable Energy Special Area Management Plan
Characterizing Physical Oceanography of the Coastal Ocean off Rhode Island

College:GSO-2800 — Request Amt: $ 53,562
Department: Oceanography-2802
Start Date: 6/1/08 End Date: 5/31/10
Contact: D. Codiga

	Salary	Effort	Year 1 Request	Salary	Effort	Year 2 Request	Total Request
A. Personnel							-
Codiga, D. Marine Research Associate	6,224	3	18,671	6,379	-	-	18,671
Ullman, D. Assistant Marine Research Scientist	6,800	1.5	10,200	6,970	-	-	10,200
TOTAL PERSONNEL COSTS			**28,871**			**-**	**28,871**
B. Fringe Benefits							
Research Faculty		46.83%	8,744				8,744
Research Faculty		44.70%	4,559				4,559
TOTAL FRINGE BENEFITS			**13,303**			**-**	**13,303**
C. Equipment							
TOTAL EQUIPMENT			**-**			**-**	**-**
D. In State-Travel			-			-	-
Out of State Travel			-			-	-
TOTAL TRAVEL			**-**			**-**	**-**
E. SUPPLIES							
TOTAL SUPPLIES			**-**			**-**	**-**
F. SUBCONTRACTS			**-**			**-**	**-**
TOTAL SUBCONTRACTS			**-**			**-**	**-**
G. OTHER COSTS							
Software Licenses			350			-	350
Printing/Copying			225			-	225
Telephone-Long Distance			100			-	100
TOTAL OTHER COSTS			**675**			**-**	**675**
							-
TOTAL DIRECT COSTS			**$ 42,849**			**$ -**	**42,849**
							-
TOTAL MODIFIED DIRECT COSTS			**$ 42,849**			**$ -**	**42,849**
							-
INDIRECT COST 25% (MTDC)			**$ 10,712**			**$ -**	**10,712**
							-
TOTAL REQUESTED FROM AGENCY			**$ 53,562**			**$ -**	**53,562**

6: Geospatial data support for a revised wind farm site screening analysis (Phase II)

Principal Investigator(s) & Staff:
Peter August, URI Natural Resource Science
Charles LaBash, URI Natural Resource Science
Christopher Damon, URI Natural Resource Science

Study Objectives:

- Consolidate geospatial data and metadata to support the analytical, visualization, outreach, and communication needs of the wind farm assessment process. All data and metadata will be made available via the WWW.NARRBAY.ORG web portal.
- Assist in the development and implementation of a Phase II site screening process for RI coastal waters.
- Develop a common graphic template for mapping products emerging from the site screening process and assist in the production of cartographic products to support project analysis and communication requirements.

Study Tasks:

1. Collect and assemble relevant and available geospatial data (raster, vector, image, photographic, tabular) to support the site screening process for wind farm assessment. Data sources include (but are not limited to) the Rhode Island Geographic Information System (RIGIS), NARRBAY.ORG, ATM RI Winds, the Nature Conservancy coastal ecoregional assessment initiative, URI research scientists, and the Battelle dredge disposal siting study for southern RI coastal waters. Data will be converted to a common geography (RI State Plane, NAD83, metadata reviewed and enhanced if required to meet FGDC (Federal Geographic Data Committee) compliance. Data will be deposited in a special thread of the WWW.NARRBAY.ORG web portal.
2. Work with scientists developing screening criteria to establish parameters, parameter weights (if required), and perform geospatial analysis and interpolation to select candidate sites. Document the technical steps involved in the screening process.
3. Develop, in conjunction with the project team, a cartographic template for all mapping products resulting from this analysis. Provide an ArcGIS.mxd file of the template to all project scientists and educators.
4. Prepare cartographic products in hard-copy and digital form to support the screening process, outreach activities, development of educational materials, arid project reporting.

Deliverables:

- A web site within WWW.NARRBAY.ORG that will serve as a repository for geospatial data, metadata, analytical and cartographic products resulting from the study.
- Cartographic and analytic products used in the screening analysis.

Proposed Schedule”

Start:	TBD
Mapping/Analysis Complete:	12 Months
Final report and Maps:	16 Months

Budget Justification (see budget below):

Total Budget Request:	$135,800
Direct Costs-	$108,640
Indirect Cost 25%-	$27,160

Salaries (PERS2): $64,700
Salaries are requested for 6.1 months of Damon in year 1 and 1.6 in year 2. Salary for 5.73 months of a GIS technical assistant is requested in year 1 and .59 in year 2.

Fringe Benefits-(FRINGE): $26,745
Fringe benefits include retirement, health insurance, group life insurance and social security taxes. As the rates vary by person and are listed individually, the average rate is 45% and 35% has been applied to overall salaries requested. The application of fringe benefits is set forth by contract and is not discretionary. Additional detail on fringe benefit rates can be found on the URI website: http://www.uri.edu/research/tro/fringbentbl.pdf

Travel (DTRVL): $600
Funding in the amount of $600 is requested for in-state mileage in support of field surveys and meetings for project-related travel.

Supplies: $596
A total of $596 is requested for basic supplies in support the project.

Other Costs: $16,000
$16,000 is requested for URI Environmental Data Center computing charges

Budget:

The URI Graduate School of Oceanography
The Ocean / Offshore Renewable Energy Special Area Management Plan
Geospacial Data Support for a Revised Wind Farm Site Screening Analysis (Phase II)

College: CELS/2000 — Request Amt: $ 135,800
Department: NRS/2004
Start Date: 6/1/08 End Date: 8/30/09
Contact: C. Damon

	Salary	Effort	Year 1 Request	Salary	Effort	Year 2 Request	Total Request
A. Personnel							-
Chris Damon, Sr. GIS Analyst, Research Assoc. IV	5296	6.1	32,500	5,296	1.6	8,500	41,000
Technical Assistant, GIS	3750	5.73	21,500	3,750	0.59	2,200	23,699
TOTAL PERSONNEL COSTS			**54,000**			**10,700**	**64,700**
							-
B. Fringe Benefits							-
Chris Damon		45%	14,625			3,825	18,450
Technical Assistant		35%	7,525			770	8,295
TOTAL FRINGE BENEFITS			**22,150**			**4,595**	**26,745**
							-
C. Equipment			-			-	-
TOTAL EQUIPMENT			**-**			**-**	**-**
							-
D. In State-Travel	1188 miles	0.505	600				600
Out of State Travel							-
TOTAL TRAVEL			**600**			**-**	**600**
E. SUPPLIES							
Supplies			446			150	596
TOTAL SUPPLIES			**446**			**150**	**596**
F. OTHER COSTS							
EDC Computing Charges			13,000		3,000	3,000	16,000
			-			-	-
TOTAL OTHER COSTS			**13,000**			**3,000**	**16,000**
							-
TOTAL DIRECT COSTS			**$ 90,196**			**$ 18,445**	**108,640**
TOTAL MODIFIED DIRECT COSTS			**$ 90,196**			**$ 18,445**	**108,640**
INDIRECT COST 25% (MTDC)			**$ 22,549**			**$ 4,611**	**27,160**
TOTAL REQUESTED FROM AGENCY			**$ 112,745**			**$ 23,056**	**$ 135,800**

7: Marine Mammal and Sea Turtle Analysis for the Rhode Island Ocean Special Area Management Plan

Principal Investigator(s) & Staff:
Robert Kenney, URI Graduate School of Oceanography

Objective:
The objective of this project is to perform detailed analyses and mapping of the spatial and temporal distributions and relative abundances of all marine mammals and sea turtles in the marine waters of the State of Rhode Island and adjacent areas.

Methodology:
All available existing data on the occurrence of marine mammals and sea turtles in Rhode Island and nearby waters will be assembled. The majority of the data will come from two sources: the North Atlantic Right Whale Consortium (NARWC) database (Kenney, 2001) and the Northeast Regional stranding databases maintained by the National Marine Fisheries Service, Northeast Regional Office. Formal requests for use of these data will need to be submitted to the respective sources.

There may be additional sighting records available from commercial whale-watching operations that have been conducted from Galilee, Rhode Island. The current whale-watching company is known as the "Francis Fleet," which operates several vessels during the summer months. However, there was a previous whale-watching boat in the 1980s—the Super Squirrel. An attempt will be made to acquire any available data from the Francis Fleet operator or the current and previous naturalists from both companies, however the short time-line may prevent incorporating all of the data that may exist. Any newly acquired data must be quality-controlled and standardized to be fully compatible with the NARWC database.

Seasonal GIS maps of occurrence will be created from all of the available data for each species of marine mammal and sea turtle. Maps based on raw data simply show point occurrences of sightings.

A major issue with the interpretation of distribution and habitat-use patterns based on raw sighting and stranding data is that the patterns are usually biased by the distribution of survey coverage ("effort"). One method to overcome this potential bias is to quantify survey effort, and then to correct sighting frequencies for differences in effort, producing an index termed sightings-per-unit-effort (SPUE). The units are numbers of animals sighted per unit length of survey track. To standardize the SPUE data even further, the data are limited to only a subset of the survey tracklines which meet defined criteria for "acceptability," which include having at least one observer formally on watch, visibility of at least 2 nautical miles, sea state of Beaufort class 3 or below, and altitudes below 1200 feet (applicable only to aerial surveys). SPUE values are computed for consistent spatial units and can therefore be mapped or be statistically compared across areas, seasons, years, etc. Development of this method was begun during CETAP (1982), and it has been used in a variety of analyses (Kenney & Winn, 1986; Winn et al., 1986; Kenney, 1990; Hain et al., 1992; Shoop & Kenney, 1992; Kraus et al., 1993; DoN, 2005;

Pittman et al., 2006). Because the method requires regular location and environmental data to reconstruct the survey tracks and quantify effort, only a subset of the sighting data can be included, and stranding data are entirely excluded.

The SPUE method involves partitioning the study area into a regular grid based on latitude and longitude. The grid size selected is a compromise between resolution (smaller cells) and sample sizes (larger cells), and cannot be determined without preliminary examination of the available survey data. Our previous studies have used cells ranging from 3 min X 3 min (5.6 X 4.2 km) to 10 min X 10 min (18.5 X 13.9 km). All acceptable aerial and shipboard survey tracks will be parsed into grid cells and their lengths computed and summed by season. For sea turtles, only aerial survey data will be used, since sea turtles are rarely detected from shipboard surveys (Shoop & Kenney, 1992). Sightings will be similarly assigned to cells and the numbers of animals sighted will be summed by cell and season. Finally, the number of animals will be divided by the effort, then multiplied by 1000 to avoid small decimal values. The SPUE index will be in units of animals sighted per 1000 km of survey track.

It is possible to map the gridded SPUE data directly (e.g., Shoop & Kenney, 1992; Kraus et al., 1993), however the data are usually sparse and difficult to interpret. Interpolation can smooth out the relative density contours and fill in predicted values in some un-sampled areas. Pitman et al. (2006) used inverse-distance weighting to create interpolated relative density maps. For a Navy Marine Resources Assessment (DoN, 2005), we used a kriging function within the GIS environment for that purpose (Watterson et al., in prep). We plan to use the kriging option to produce interpolated GIS maps of seasonal relative densities for all of the species with sufficient sightings.

The final step will be to prepare a background paper that includes a species account for each marine mammal and sea turtle species that is present. Each species account will include all of the GIS maps produced for that species.

Deliverables:

1. Seasonal GIS maps of all occurrences of all species of marine mammals and sea turtles based on all available sighting and stranding data.
2. Seasonal GIS maps of interpolated relative abundances (i.e., sightings per unit effort, SPUE) of those marine mammals and sea turtles with sufficient numbers of sightings, corrected for survey effort, based only on the appropriate aerial (turtles) or aerial and shipboard (mammals) survey data.
3. A background paper summarizing the study, including all of the GIS maps. This could include recommendations for expanded Phase II work if the existing data appear to be insufficient for all the necessary environmental impact assessment tasks.

Proposed Schedule:

Start:	TBD
Existing data collection completed:	3 Months
GIS occurrence maps:	4 Months
SPUE analyses completed:	5 Months
GIS SPUE maps:	6 Months
Draft background paper:	8 Months

Revisions, prepare final version: 8 Months – 23 Months

Personnel and Duties:

Dr. Robert D. Kenney is Principal Investigator on this project. He has been at GSO conducting marine mammal research for almost 30 years. He is the database manager for the North Atlantic Right Whale Consortium and has extensive experience in the performance of the sorts of analyses proposed here. He will be responsible for project oversight, for all data analysis tasks, and for the majority of report preparation.

Ms. Kathleen J. Vigness-Raposa is Associate Investigator on this project. She is a Ph.D. candidate in Natural Resources Science, working on GIS modeling of whale habitat use patterns. She is skilled in Geographic Information Systems, and has taught GIS courses in NRS. She will be responsible for all of the GIS mapping work and will assist in report preparation.

References:

ATM (Applied Technology & Management). 2007. Final Report, RIWINDS, Phase I: Wind Energy Siting Study. Applied Technology & Management, Inc., Newport, RI. 131 pp.

CETAP (Cetacean and Turtle Assessment Program, University of Rhode Island). 1982. A Characterization of Marine Mammals and Turtles in the Mid- and North-Atlantic Areas of the U.S. Outer Continental Shelf, Final Report. Bureau of Land Management, Washington, DC. 576 pp.

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Pittman, S., B. Costa, C. Moy, D. Wiley, and R.D. Kenney. 2006. Cetacean distribution and diversity. Pp. 265-326 in: T. Battista, R. Clark, and S. Pittman (eds). An Ecological

Characterization of the Stellwagen Bank National Marine Sanctuary Region: Oceanographic, Biogeographic, and Contaminants Assessment. NOAA Technical Memorandum NCCOS 45. Center for Coastal Monitoring and Assessment, NOAA National Centers for Coastal Ocean Science, Silver Spring, MD.

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Waring, G.T., E. Josephson, C.P. Fairfield, Quintal, and K. Maze-Foley (eds). 2007. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments—2006. NOAA Technical Memorandum NMFS-NE-201. National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 384 pp.

Watterson, J.C., R.D. Kenney, A. Richardson, A. Kumar, C.L. Schroeder, R. Crossland, J.T. Bell, and D.R. Rees. In preparation. A novel approach for determining and visualizing spatial occurrence patterns for protected species. Journal of Wildlife Management.

Whitaker, J.O., Jr., A. Hicks, H.H. Thomas, J. Bopp, and R.D. Kenney. In preparation. The Mammals of New York. Comstock Publishing Associates, Cornell University Press, Ithaca, NY and New York State Museum, Albany, NY.

Winn H.E., C.A. Price, and P.W. Sorensen. 1986. The distributional biology of the right whale (Eubalaena glacialis) in the western North Atlantic. Reports of International Whaling Commission, Special Issue 10: 129-138.

Budget Justification (see budget below):

Total Budget Request:	$21,317
Direct Costs:	$17,054
Indirect Cost 25%:	$4,263

The bulk of the marine mammal and sea turtle component work will occur in the first year with a projected due date of 1 January 2009 for the draft background paper.

Salaries (PERS2): $12,438
A total of $12,438 in year 1 is requested for salary to support senior personnel, technical staff, and a Ph.D level graduate student needed to accomplish the project. There is no salary requested for year 2.

Fringe Benefits-(FRINGE): $4,253
Fringe benefits include retirement, health insurance, group life insurance and social security taxes. As the rates vary by person and are listed individually at 41%. The application of fringe benefits is set forth by contract and is not discretionary. Additional detail on fringe benefit rates can be found on the URI website: http://www.uri.edu/research/tro/fringbentbl.pdf

Supplies: $363
A total of $363 is request for supplies intended for program use only per OMB A-21, costs will be pro-rated across all grants on which they are utilized, and there will be no use for routine administrative purposes. Computer supplies are budgeted at $20 per month for 7 months and $5 per month for 5 months. Photocopy charges are budgeted at $15 per month for 12 months and $5 per month for 5 months. Telephone charges are budgeted at $5 per month for 12 months, and would include only project-related long-distance and off-campus local calls.

Budget:

The URI Graduate School of Oceanography
The Ocean / Offshore Renewable Energy Special Area Management Plan
Marine Mammel and Sea Turtle Analysis for the RI Ocean SAMP

College: GSO/2800 — Requested Amt: $ 21,317
Department: Oceanography/2802
Start Date: 6/1/08 End Date: 5/31/10
Contact: R. Kenney/GSO

	Salary	Effort	Year 1 Request	Salary	Effort	Year 2 Request	Total Request
A. Personnel							-
Robert Kenney, Assoc. Marine Research Scientist	8483	1.17	9,900	8,483	-	-	9,899.56
PhD, Level III-KVR	2961	0.9	2,538	2,961	-	-	2,538.36
TOTAL PERSONNEL COSTS			**12,438**			**-**	**12,437.93**
							-
B. Fringe Benefits							-
Robert Kenney		41%	4,059			-	4,058.82
PhD. Student, Level III		7.65%	194			-	194.18
TOTAL FRINGE BENEFITS			**4,253**			**-**	**4,253**
							-
C. Equipment			-			-	-
TOTAL EQUIPMENT			**-**			**-**	**-**
D. In State-Travel							-
Out of State Travel							-
TOTAL TRAVEL			**-**			**-**	**-**
E. SUPPLIES							
Computer Supplies			165			-	165
Long Distance Telephone			68			-	68
Photocopy			130			-	130
TOTAL SUPPLIES			**363**			**-**	**363**
F. OTHER COSTS			-			-	-
TOTAL OTHER COSTS			**-**			**-**	**-**
							-
TOTAL DIRECT COSTS			**$ 17,054**			**$ -**	**$ 17,054**
							-
TOTAL MODIFIED DIRECT COSTS			**$ 17,054**			**$ -**	**$ 17,054**
							-
INDIRECT COST 25% (MTDC)			**$ 4,263**			**$ -**	**$ 4,263**
							-
TOTAL REQUESTED FROM AGENCY			**$ 21,317**			**$ -**	**$ 21,317**

8: Air quality and meteorology studies in support of ocean SAMP

Principal Investigator(s) & Staff:
John Merrill, Graduate School of Oceanography
Brian Heikes, Graduate School of Oceanography

Study Objectives:
Perform an analysis of prevailing winds, storm occurrence and precipitation distributions (type, intensity, and frequency) based on climatological data from the US National Climatic Data Center (NCDC), noting the seasonal variations. We do not propose an in-depth analysis of winds, but will augment other studies being carried out in the SAMP initiative by compiling results from airports and volunteer observers included in the NCDC archive. The area covered will be coastal Rhode Island and nearby offshore areas.

Using the data sets noted above determine the intensity, duration and frequency of fog and other obstructions to visibility in the context of safety for marine and aircraft transportation. We will estimate the probability of icing conditions in the offshore area in the context of static loading of structures.

Using routine weather balloon profiles from nearby operational observing sites including Upton, NY and Chatham, MA, we will document the depth of the mixed layer and the strength of capping temperature inversions. These data will be compared with the few available profile data from the Narragansett Bay Campus of URI obtained in ongoing observations of the vertical profile of ozone. These will be used to characterize the meteorological environment in the context of air pollution outbreaks associated with stagnant wind conditions and near-surface trapping of pollutants.

We will review EPA criteria air pollution regulations and non-attainment data for Rhode Island and adjacent states. This information is needed in the context of potential beneficial reductions in emissions of primary pollutants and precursor species. We will compile and summarize applicable regulations on air quality and related impacts of working vessels associated with the contemplated structures and facilities. Related regulations for air toxics will be included in these analyses.

Study Tasks:
1. Collect data, available on the Web from NCDC (climatological information), meteorology department Web sites (rawinsonde profile data), EPA Web sites (yearly summary of criteria air pollutant measurements) and the related AirNOW site (event-specific air quality data) and locally (Narragansett ozonesonde profile data).
2. Compile needed long term and seasonal mean values and characterize variability.
3. Analyze profile data for mixed layer depth and inversion characteristics.
4. Integration of air quality regulatory and noncompliance data.

Deliverables:
1. Final report summarizing the study
2. Figures and tables with quantitative data, air quality parameters and related information.

Proposed Schedule (to be finalized upon award in project *Plan of Work*):

Start:	TBD
Meteorology analysis complete	1 – 2 Months
Air Quality analysis complete	4 Months
Preliminary report available	6 Months
Final report	8 Months

Budget Justification (see budget on next page):

Total Budget Request:	$6,769
Direct Costs:	$5,415
Indirect Cost 25%:	$1,354

Salaries (PERS2): $3,716
A total of $3,716 is requested in support of a student who will be supervised by the P.I. A summer intern with an interest in renewable energy has also been identified to work on this project.

Fringe Benefits-(FRINGE): $284
Fringe benefits to cover FICA costs of 7.65% are requested for the student employee.

Travel (DTRVL): $ 200
Funding in the amount of $200 is requested for in-state mileage in support of travel to nearby offices of the RI DEM or EPA Region I.

Supplies: $1,215
A total of $1,215 is request for supplies including the purchase of a Mac Mini, a small desktop computer for use by the intern.

Budget:

URI Graduate School of Oceanography
The Ocean / Offshore Renewable Energy Special Area Management Plan
Air Quality and Meteorology Studies in Support of Ocean SAMP Sub award Budget

College:GSO-2800 Request Amt: $ 6,769
Department: Oceanography-2802
Start Date: 6/1/08 End Date: 5/31/09
Contact: J. Merrill

	Salary	Effort	Year 1 Request	Salary	Effort	Year 2 Request	Total Request
A. Personnel							-
Graduate Student	1,603	2.32	3,716	1,603		-	3,716
TOTAL PERSONNEL COSTS			**3,716**			**-**	**3,716**
B. Fringe Benefits							
Graduate Student - Summer Hourly		7.65%	284			-	284
TOTAL FRINGE BENEFITS			**284**			**-**	**284**
C. Equipment							
TOTAL EQUIPMENT			**-**			**-**	**-**
D. In State-Travel		0.505	200			-	200
Out of State Travel			-			-	-
TOTAL TRAVEL			**200**			**-**	**200**
E. SUPPLIES							
Computer, Mini Mac			800			-	800
Computer Supplies			415			-	415
TOTAL SUPPLIES			**1,215**			**-**	**1,215**
F. SUBCONTRACTS			**-**			**-**	**-**
TOTAL SUBCONTRACTS			**-**			**-**	**-**
G. OTHER COSTS							
TOTAL OTHER COSTS			**-**			**-**	**-**
							-
TOTAL DIRECT COSTS			**$ 5,415**			**$ -**	**5,415**
							-
TOTAL MODIFIED DIRECT COSTS			**$ 5,415**			**$ -**	**5,415**
							-
INDIRECT COST 25% (MTDC)			**$ 1,354**			**$ -**	**1,354**
							-
TOTAL REQUESTED FROM AGENCY			**$ 6,769**			**$ -**	**6,769**

9: Wind Farm Siting Study -Regional Subsurface Geology, Surficial Sediment, Benthic Habitat Distribution, and Cultural Resources

Principal Investigator(s) & Staff
John W. King, URI Department of Oceanography
Rob Pockalny, Department of Oceanography
Sheldon Pratt, Department of Oceanography
Chris Roman, Department of Oceanography
Jon Boothroyd, Department of Geology
Rod Mather, John Jensen, Department of History

Study Objectives:

- Conduct coarse resolution geophysical, geological, biological surveys and groundtruthing studies of prospective wind farm sites.
- Develop a GIS data layer of regional subsurface geology that includes identification of depth to bedrock and the type of materials overlying bedrock.
- Develop a GIS data layer of geologic habitat (i.e., surficial sediment type and depositional environment).
- Develop a GIS layer of biological habitat (benthic community type and structure) using the NOAA CMECS (coastal marine ecosystem ecological classification standard) classification system. Describe the macrobenthic invertebrates present in the project area. Identify the habitat parameters responsible for their distribution and biomass. Identify the elements of their natural history that will allow valuation of the potential effects of construction and operation of generating systems..
- Using published and unpublished historic and archaeological data, indentify and assess the potential for submerged *historic* archaeological sites and properties within select parts of the Ocean SAMP study area
- Using existing archaeological and environmental data, identify and assess the potential for submerged *prehistoric* archaeological sites within select parts of the Ocean SAMP study area.
- Augment cultural resources assessments #5 & 6 above using existing and newly acquired geophysical survey data.

Study Tasks:

1. Collect existing data including glacial geology data, subbottom sonar (CHIRP and/or 3.5kHZ) sidescan sonar, multibeam bathymetry and benthic biology data to summarize current state of knowledge and identify data gaps. Primary data sources include USGS, GSO and Geology department archives, NSF, NGDC, EPA, ACOE, RIDEM, RIDOT, and New England Power Company data sets.
2. a) Conduct low resolution (wide line spacing) subbottom, sidescan, interferometric sonar surveys of potential sites to identify depth to bedrock, surface sediment bottom type and structures, water depth. Edgetech and Benthos systems are available at URI for these studies. A 3.5 kHz subbottom sonar system will be leased to attain the necessary penetration in areas of hard bottom. b) Conduct low resolution groundtruthing studies using SPI (sediment profile imagery) camera, underwater video surveys, and grab samples analyzed for benthic biology and grain size. Limited vibracoring will be done as required in this study. All necessary equipment and boats are available at URI.

3. *Examination of historical biological data*: Collect data from published and unpublished quantitative studies of macrobenthos in the study area. These include studies carried out by the NMFS, (Woods Hole and Sandy Hook Laboratories), NED Army Corps of Engineers, EPA, RIDEM, RIDOT, and New England Power Company (Charlestown, RI study). Most of these studies do not discuss correlations with habitat variables or regional spatial distribution of benthic species. It is proposed to integrate information from these studies at both the species and community levels.
4. *Biological field sampling program*: Initial biological examination of study sites will be made using historical studies, geological sampling and photography and a small number of benthic grab samples. The presence of large-scale changes in faunal assemblages within the sites will be determined and counts will allow correlation of species distribution and sediment hydraulic parameters. All material present in the grab sample will be processed and organisms retained on a 1mm sieve will be identified and enumerated. Species and community parameters will be correlated with sediment variables obtained at each sample location. Tubes, mounds, and burrows of infauna and epifauna will be identified from bottom images.
5. Develop a geospatial database of known significant cultural resources in select parts of the Ocean SAMP study area ad create a database of potential submerged historic resources in select parts of the Ocean SAMP study area. This task will include compiling data from CRM reports, local archives, the US ACOE, and NOAA sources.
6. Analyze existing and newly acquired geophysical survey data for cultural resources in the study area.
7. Develop coarse resolution environmental, prehistoric, and historic context for select parts of the Ocean SAMP study area.
8. Prepare GIS data layers and associated final reports.

Deliverables:

1. Final report summarizing the study.
2. Low resolution GIS data layers (maps) of depth to bedrock and overlying materials, geological habitat (bottom type and depositional environment), biological habitat (benthic community) in CMECS classification system (i.e., biotope), and cultural resources.
3. Geological, biological, and archaeological interpretation and supporting data for data layers (maps).

Proposed Schedule:

Start	TBD
Complete Field Surveys	6 Months
Provide GIS data layers to develop floating zone tool	12 Months
Complete final reports	12 – 20 Months
Final reports	20 – 22 Months

Budget Justification (see budget on next page):

Total Budget Request:	$305,550
Direct Costs-	$244,440
Indirect Cost 25%-	$61,110

This budget reflects the resources needed to do the subsurface and surface geology studies, the benthic biology and habitat distribution studies, and the archaeological and cultural resources studies. A two-year budget for a total of $305,550 is presented. The first year total of $200,990 is substantially higher than the second year total of $104,560 due to the field survey activities, which will be completed in the first year; only laboratory, data analysis, and report preparation activities will be performed in year 2.

Salaries (PERS2): $140,784
A total of $78,520 in year 1 and $62,264 in year 2 is requested for salary to support the senior personnel, technical staff, and graduate students needed to accomplish the project. There is no salary requested for the P.I., J. King for 12-months salary personnel.

Fringe Benefits-(FRINGE): $32,642
Fringe benefits include retirement, health insurance, group life insurance and social security taxes. As the rates vary by person and are listed individually, the average rate is 40% and 45% has been applied to overall salaries requested. The application of fringe benefits is set forth by contract and is not discretionary. Additional detail on fringe benefit rates can be found on the URI website: http://www.uri.edu/research/tro/fringbentbl.pdf

Travel (DTRVL): $ 4,035
Funding in the amount of $4,035 is requested for in-state mileage in support of field surveys and meetings for project-related travel.

Supplies: $66,979
A total of $9,894 in year 1 and $5,085 in year 2 is requested for field and lab supplies; a total of $52,000 in year 1 is requested for boat rentals and several types of equipment rental to perform field surveys. The field surveys will be conducted by the Paleomag-Geochemistry Lab technical staff, as noted, under the direction of the PI.

Budget:

The URI Graduate School of Oceanography
The Ocean / Offshore Renewable Energy Special Area Management Plan

Wind Farm Siting Study - Regional Subsurface Geology, Surficial Sediment, Benthic Habitat Distribution and Cultural Resources

College: GSO/2800 — Request Amt: $305,550
Department: Oceanography/2802
Start Date: 6/1/08 End Date: 5/31/10
Contact: Prof. John King-GSO

	Salary		Year 1 Request	Salary	Effort	Year 2 Request	Total Request
A. Personnel							
King, J., Professor	0	-	-	-	-	-	-
Boothroyd, J. Professor	7800		5,571	7800		5,571	11,143
Pockalny, R.	9730		6,950	9730		6,950	13,900
Pratt, S.	15825		11,304	7825		5,589	16,893
Mather, I.R.	9199		9,199	3943		3,943	13,142
Jensen, J.	7500		7,500	7500		3,214	10,714
Hegg, Tech. Asst.	7500		6,967	7500		6,967	13,934
Heil, C. Tech.	12000		8,276	12000		8,276	16,552
Gibson, C.Tech.	8000		5,517	8000		5,517	11,034
Arch/Historical Tech. Asst.	1750		1,750	1750		750	2,500
Shumchenia, E. Grad Stud (partial summer)	6000		5,574	6000		5,574	11,148
Oakley (Grad Student, partial summer)	4170		3,874	4170		3,874	7,748
Smith (Grad Student, partial summer)	6500		6,038	6500		6,038	12,076
TOTAL PERSONNEL COSTS			**78,520**			**62,264**	**140,784**
B. Fringe Benefits							
40%		40%	10,301			6,300	16,602
0.0765%		7.65%	1,852			1,775	3,627
45%		45%	6,207			6,207	12,414
TOTAL FRINGE BENEFITS			**18,360**			**14,282**	**32,642**
C. Equipment			-			-	
TOTAL EQUIPMENT			**-**			**-**	**-**
D. In State-Travel			2,018			2,017	4,035
Out of State Travel							-
TOTAL TRAVEL			**2,018**			**2,017**	**4,035**
E. SUPPLIES							
Materials and Supplies			9,894			5,085	14,979
Boat Rentals/Expenses			18,000				18,000
Sub-bottom system rental			15,000				15,000
C3D system rental			10,000				10,000
Underwater camera systems			6,000				6,000
Grab sampler			1,500				1,500
Graom-size analyzer			1,500				1,500
TOTAL SUPPLIES			**61,894**			**5,085**	**66,979**
F. OTHER COSTS							
TOTAL OTHER COSTS			**-**			**-**	**-**
TOTAL DIRECT COSTS			**$ 160,792**			**$ 83,648**	**$ 244,440**
TOTAL MODIFIED DIRECT COSTS			**$ 160,792**			**$ 83,648**	**$ 244,440**
INDIRECT COST 25% (MTDC)			**$ 40,198**			**$ 20,912**	**$ 61,110**
TOTAL REQUESTED FROM AGENCY			**$ 200,990**			**$ 104,560**	**$ 305,550**

10: Spatial distribution and abundance, and flight ecology of Marine and Coastal Birds off coastal Rhode Island

Principal Investigator(s) & Staff
Dr. Peter Paton, URI Department of Natural Resources Science
Dr. Scott McWilliams, URI Department of Natural Resources Science
Dr. David Mizrahi, New Jersey Audubon Society
Dr. Kim Peters, New Jersey Audubon Society

Goal: Assess current spatial and temporal patterns of avian abundance in Rhode Island coastal waters

Primary Objectives:

- Assess spatial distribution and abundance of birds in RI coastal waters, and how this varies seasonally;
- Compare current avian distribution and abundance data with historical survey data;
- Assess diel patterns of avian use of RI coastal waters;
- Quantify flight ecology for birds and bats in RI coastal waters;
- Determine foraging and roosting sites for Roseate Terns (a federally-listed species).

Tasks:

1) Compile historical avian survey datasets for RI coastal waters:

There are a number of systematic avian surveys that have been conducted in coastal RI. These include waterbird surveys at Sachuest NWR, Trustom Pond NWR, and Ninigret NWR by USFWS personnel and volunteers during winter months (S. Paton, unpubl. data), avian surveys at Napatree Spit throughout the year by C. Raithel (RIDEM, unpubl. data), winter waterfowl surveys by RIDEM and R. McKinney (US EPA), and shorebird use of coastal ponds during fall migration (Trocki and Paton, unpubl. data). In addition, Paton (unpubl. data) monitored avian flight behavior (flight elevation, flock size, species composition) near Pt. Judith using visual surveys in 1997 and 1998. Various observers have been studying diurnal raptor migration at Napatree Spit for a number of fall migration periods (J. Zybrowski, unpubl. data) Finally, two bird banding stations at Kingston Wildlife Research Station (Paton and McWilliams, unpubl data) and Block Island Banding Station (E. Lapham, unpubl. data) have been monitoring landbird migration via mist nets for over 25 years.

We propose to compile all these data sets to quantify migratory phenology in the region. These data could be used develop preliminary models of diurnal flight behavior in the region, preliminary estimates of the spatial distribution and abundance of birds in the region, and preliminary models of migratory phenology of birds in the region. We propose to hire a technician to complete this data compilation.

2) Establish land-based survey points and boat-based transects to survey birds from 15 July 2008 through 15 July 2009;

We propose to establish a series of land-based survey points along the southern coast of RI and on Block Island to quantify the seasonal distribution, abundance, and flight behavior (height above water, flight direction) of diurnal Waterbirds within the study area boundaries. This research will be conducted by an ornithologist. A systematic survey route will be

established. Observers will use spotting scopes to quantify diurnal movement ecology of birds (e.g., flock size, flight behavior) within study area boundaries. Surveys will take place from mid-July 2008 through mid-June 2009.

In addition, we propose to establish a boat-based transect sampling scheme. Observers will quantify the spatial distribution and density of diurnal Waterbirds based on these surveys.

3) Use land-based radar to determine diel and seasonal changes in avian and bat spatial distribution and abundance from 15 March 2009 through 15 Dec 2009;

Specific objectives for this task are to (1) estimate nightly and seasonal passage patterns of aerial vertebrates (i.e., birds, bats) traversing Rhode Island's coastal and Block Island regions, (2) estimate altitudinal distributions of bird/bat movements and determine what proportion occurs at altitudes deemed a "risk" for collisions with wind turbines (3) determine flight directions and pathways of bird/bat targets traversing Rhode Island coastal waters and (4) investigate how meteorological conditions affect flight dynamics and behavior.

To accomplish these objectives, we will use two mobile marine radars systems to collect data on bird and bat flight dynamics and behavior. One system will be located on Block Island and operate during migration periods in spring (~15 March - 15 June) and fall (15 August - 15 December) 2009. The other system will be moved systematically among several (two or three) locations along the Rhode Island coast from 15 March - 15 December 2009. Note that this system will operate from mid-June to mid-August to monitor diurnal movement patterns of colonial waterbirds (e.g., terns) traveling between onshore nesting sites and offshore foraging areas.

Each system consists of two 25 kW Furuno X-band marine radars (frequency = 9410 GHz, wavelength = 3 cm, model # FAR2127BB, Furuno Electric Company, Nishinomiya, Japan) operating simultaneously to monitor various flight dynamics and behavior measures . The radars are fitted with standard 6.5' open array antennas, which produce a fan-shaped electromagnetic beam 1.23° x 20°. In each system, one radar unit will operate with the antenna rotating in the horizontal plane, describing a 360° arc every 2.5 seconds. Data collected in this mode will provide information on flight direction, flight paths and passage rates. The second radar's antenna will rotate in the vertical plane. This is accomplished by mounting the antenna turning unit perpendicular to the ground. We will use data collected in this mode to generate passage estimates and to monitor the altitudinal distribution of targets. The antenna will sweep from horizon to horizon, describing a 180° arc above radar level (arl), 20^{o} wide. To avoid spurious target propagation, the radar will not transmit when the antenna is pointing toward the ground. We anticipate that the radar's orientation (e.g., facing north, antenna sweeping east to west) will maximize the number of target detections along the predominant axis of bird migration.

The radar's pulse length (i.e., rate that electromagnetic energy is transmitted) can be set from 0.07 - 1.2 μsec and detection ranges from 0.125 - 96 nautical miles (nm). For all radars, we will use a 0.15 μsec pulse length and a 1.0-2.0 nm detection range. Short pulse lengths provide better target resolution and more accurate location and distance estimates. Similarly, short detection ranges result in improved resolution of small passerine or bat-sized targets. The radars we use feature color-coded target representation that indicates return signal strength. This allows for discrimination and removal of weak reflectors that could be insects. The radar units also are equipped with an integrated global positioning system (GPS) and target tracking feature that allows us to determine each target's coordinates and quantify target flight directions.

Each radar's processor unit is connected directly to a computer equipped with a PCI frame grabber circuit board. Using proprietary scheduling software, we will automatically capture a user-defined number of consecutive radar sweep images as bitmap files for any interval and for any period. Typically we collect images for five consecutive radar sweeps, every 10 minutes, from sunrise to sunset (~360 images/night/radar). We chose 10 minute intervals because we believe this insures total turnover of targets between samples. During most of the study, data collection will start at sunset and continue through sunrise the following morning, except during the summer months (i.e., mid June-mid August) when we will monitor diurnal movement patterns of colonial waterbirds.

Using data processing software developed by New Jersey Audubon Society (NJAS) staff, we will identify all targets in images from each data set (i.e., horizontally and vertically oriented radars) and extract information on target strength and position (e.g., *X*-, *Y*-coordinates, altitude). Prior to processing, all data images will be visually screened to identify incidences of precipitation (e.g., rain, fog) or insect contamination. Precipitation and insects typically have distinct characteristics that allow trained observers to distinguish them from bird and bat targets. Once processing is complete, the software program exports a text file. Additionally, we have developed data analysis software that enumerates targets from each image and can summarize passage and altitude for any user-defined interval (e.g., every 10 min, hourly, nightly). We will use data averaged over the 10 min sample interval to examine nightly temporal patterns in passage rate and altitude.

The radar's tracking feature creates a trail that represents the path a target travels over a given time interval. We will use software developed by NJAS that allows a user to map target trails as line segments, calculate a bearing for each line segment and output these data as a text file. Using bearings from one image/hr of sampling and circular statistics software (Oriana© 2.0), we will calculate mean hourly and nightly target vectors. We will use various circular statistical tests (e.g., Rayleigh's test, Watson-Williams *F*-test) to determine if vectors are nonrandom and how vectors differ among nights. Line segments representing target tracks will be imported into a GIS to map nightly and seasonal flight pathways.

We will use multivariate statistical analyses (e.g., linear multiple regression, logistic regression) and information theoretic approaches to develop probabilistic models that describe relationships between each response variable (i.e., passage, flight direction, flight altitude) and meteorological conditions, time of night, date, season and year. We anticipate using hourly meteorological data available from the National Weather Service's National Climate Data Center's website.

4) From late summer 2008 and 2009, use land-based surveys to quantify distribution and abundance of roosting Roseate Terns in RI coastal ponds, use boat-based transects to assess Roseate Tern foraging sites.

There is considerable interest in Roseate Tern (*Sterna dougallii dougallii*) foraging and movement ecology within the study area boundaries, because this species is federally-listed as endangered in 1987. There are only about 3,500 pairs in the northeast. Existing data has documented large concentrations (500+ birds) of Roseate Terns at Napatree Spit and known nesting sites occur just outside of study area boundaries at Great Gull Island (NY) and Faulkner Island (CT). Recently fledged birds regularly occur in RI waters, thus it is important we determine the distribution of foraging sites, roost sites, and flight pathways within the study area.

We propose to conduct a series of land-based surveys of roost sites, land-based surveys of foraging ecology and migratory pathways, and boat-based transects within study area boundaries to assess the spatial distribution and abundance of birds. Systematic surveys will take place from early July to mid-August in 2008 and 2009.

Deliverables:

1. Final report summarizing the study
2. GIS maps of the following parameters:
    a. current seasonal distribution and abundance of each bird species in RI coastal water
    b. historical patterns of seasonal distribution and abundance for each bird species in RI coastal water
    c. temporal and spatial patterns of flight pathways in RI coastal waters
    d. distribution and abundance of roseate tern roost sites and foraging sites in RI

Proposed Schedule:

Start:	TBD
Final Report	23 Months

Budget Justification (see budget on next page):

Total Budget Request:	$654,747
Direct Costs-	$596,544
Indirect Cost 25%[2]	$ 58.193

Salaries (PERS2): $ 129,885

Paton and McWilliams will be supervising technicians, Research Associates, assisting with study design, data analysis and report writing. Paton will work on this project during summer 2008 and both Paton and McWilliams will work on project during summer 2009

Research Associate: The research associate will be responsible for all land-based and boat based surveys of birds from coastal Rhode Island and Block Island. This research will include quantifying phenology of migration and flight ecology of diurnal Waterbirds (e.g. loons, seaducks, terns, wading birds, shorebirds). Research Associate will supervise field crew and volunteers, be responsible for study design, data analysis, and report writing. Work will start 15 July 2008 and end 15 January 2010.

Technician-bird surveys: They will be responsible for conducted land and sea based avian surveys and for helping NJAS radar crew move radar. This work will take place from 15 March to 15 Dec 2009.

Technician; data compilation: This person will be responsible for compiling and summarizing all historical datasets collected on bird migration in study area boundaries. This work will take place during summer 2008.

Fringe Benefits-(FRINGE): 41,416
Fringe benefits include retirement, health insurance, group life insurance and social security taxes. As the rates vary by person and are listed individually, an average rate of 65.2% has been applied to overall salaries requested. The application of fringe benefits is set forth by contract and is not discretionary. Additional detail on fringe benefit rates can be found on the URI website: http://www.uri.edu/research/tro/fringbentbl.pdf

Travel (DTRVL): $7,575
Assume average of 66 miles per day for 1 vehicle for 5 days per week for 75 weeks

Supplies: $9,845
The amount of $9,845 is requested to acquire high quality 20-60X spotting scope, 10 power binoculars, night-vision binoculars, and miscellaneous field supplies

Subcontracts: $388,784
NJAS Radar Subcontract: Based on mobile 1 radar unit tracking avian/bat migration in coastal RI waters from 15 March to 15 Dec 2009. Includes all data analysis and report writing.

Other costs: $14,000
Assumes 56 transect surveys at $250 per survey in boat expenses

[2] Indirect costs on all direct except subcontracts which are exempt after $25,000 from indirect.

Budget:

The URI Graduate School of Oceanography
The Ocean / Offshore Renewable Energy Special Area Management Plan
Spatial distribution and abundance, and flight ecology of Marine and Coastal Birds off coastal RI Sub Award Budget

College:CELS-2000 50% Request Amt: $ 654,747
Department: NRS-2004 50%
Start Date: 6/1/08 End Date: 11/30/09

Contact:	Salary	Effort	Year 1 Request	Salary	Effort	Year 2 Request	Total Request
A. Personnel							
Paton, P., Professor (summer)	9,927	1.0	9,927	10,175	1.5	15,263	25,190
McWilliams	9,500	-	-	9,737	1.5	14,606	14,606
Research Associate II	3,058	12	36,701	3,165	7.4	23,288	59,989
Technician (year 1-16 wks/ year 2-24 weeks)	2,310	4	9,240	2,310	6	13,860	23,100
Technician (year 1-10 wks)	2,800	2.5	7,000	2,800		-	7,000
TOTAL PERSONNEL COSTS			**62,868**			**67,017**	**129,885**
B. Fringe Benefits							
Research Faculty		65.20%	23,929			15,184	39,113
Technician		7.65%	1,242			1,060	2,303
TOTAL FRINGE BENEFITS			**25,171**			**16,244**	**41,416**
C. Equipment							
TOTAL EQUIPMENT			**-**			**-**	**-**
D. In State-Travel	0.505	15,000	7,575	0.52	9,710	5,050	12,625
Out of State Travel			-			-	-
TOTAL TRAVEL			**7,575**			**5,050**	**12,625**
E. SUPPLIES							
Binoculars/spotting scope/night vision equipment			9,000			345	9,345
Material, supplies and misc. expenses	500	1	500	500	-	-	500
TOTAL SUPPLIES			**9,500**			**345**	**9,845**
F. SUBCONTRACTS							
NJAS Radar Study			152,686			236,098	388,784
TOTAL SUBONTRACTS			**152,686**			**236,098**	**388,784**
G. OTHER COSTS							
Boat Surveys-boat use charges	7000	1	7,000	7,000	1	7,000	14,000
TOTAL OTHER COSTS			**7,000**			**7,000**	**14,000**
							-
TOTAL DIRECT COSTS			**$ 264,800**			**$ 331,754**	**596,554**
							-
TOTAL MODIFIED DIRECT COSTS			**$ 137,114**			**$ 95,656**	**232,770**
							-
INDIRECT COST 25% (MTDC)			**$ 34,279**			**$ 23,914**	**58,193**
							-
TOTAL REQUESTED FROM AGENCY			**$ 299,079**			**$ 355,668**	**$ 654,747**

Appendix E: Curriculum Vitae

Project Management Personnel

Grover Fugate

Coastal Resources Management Council, State of Rhode Island, Stedman Government Center
4808 Tower Hill Road, Wakefield, Rhode Island, 02879
Tel: (401)783-7112 / Fax (401)783-3767
e-mail: gfugate@crmc.ri.gov / Website: http://www.crmc.ri.gov/

Education

1984 Master of Business Administration, Memorial University of Newfoundland
1980 Certificate in Public Administration, Memorial University of Newfoundland
1976: B.S. Natural Resources Management, University of Connecticut

Experience

January 1986 - Present - Executive Director, Coastal Resources Management Council. Plans, organizes, directs and coordinates the daily activities the States Coastal Resource Management Agency consistent with the polices, regulations and statutory authorities granted under state and federal law.
January 2008- Present -Adjunct Faculty, Marine Affairs Program, University of Rhode Island.
January 1990- Present- Guest Lecture at the University of Rhode Island.
January 1994- Present-Guest Lecture at Rodger Williams Law School, Bristol Rhode Island
January 1994- Present- Trainer Integrated Coastal Management Training Institute.
January 1985 - January 1986-Director, Shore Zone Management, Department of Development and Tourism, Government of Newfoundland and Labrador.
January 1985 - January 1986- Lecture, Department of Part-time Studies and Extension, Memorial University, St. John's, Newfoundland.
May 1981 - January 1985 - Regional Resource Planner, Lands Branch, Department of Forest Resources and Lands, Government of Newfoundland and Labrador.
May 1979 - May 1981- Land Use Planner, Agricultural Division, Department of Rural, Agricultural and Northern Development, Government of Newfoundland and Labrador.
January 1978 - May 1979 - Forester, Forest Protection Division, Department of Forestry and Agriculture, Government of Newfoundland and Labrador.

Training

Master Design Certification in Low Impact Development –Certificate # 1106044 , October 2006. University of Rhode Island, Coastal Resources Center.

Professional Societies/Honors:

Governor's Citation for Service during the World Prodigy Oil Spill
Governor's Citation for Service during the North Cape Oil Spill
Speaker's Citation for Community Service
Speaker's Citation for Aquaculture Planning

Member of the Lieutenant Governor's Civil Defense Preparedness Advisory Council
Delegate for the Coastal Resource Management Council to the Coastal States Organization
Member of the Legislative Land Use Commission that developed and revised the State's Comprehensive Land Use Planning Act, the Zoning Enabling Act and the Subdivision Review Act.
Member of the Technical Subcommittee on Environmental Permitting, Environmental Quality Study Commission, to develop the Department of Environment legislation.
Member of the Implementation Team on the Department of Environment
Member of Coastal Sates, Coastal Hazards Task Force
Member of the National Estuaries Study Program, Narragansett Bay Project's, Management Committee, Policy Committee, and Implementation Committee.
Member of the Rhode Island Rivers Council
Member of the Growth Planning Council
Member of the Rhode Island Aqua Fund Council
Member of the Rhode Island Fisheries Council
Member of the Rhode Island Sea Grant Senior Advisory Committee
Peer Reviewer of Putting The Public Trust Doctrine To Work., second edition. Prepared by the Coastal States Organization: A Report of the Second National Study on the Application of the Public Trust Doctrine to the U.S. Department of Commerce. June 1997.
Peer Reviewer and Steering Committee Member of The National Curriculum on the Public Trust. A study guide and curriculum prepared by the Coastal States Organization for the National Oceanic and Atmospheric Agency, U.S. Department of Commerce October 1998
Member of the Rhode Island House Commission to Develop and Coordinate a Collaborative Effort to Formulate a Restoration Plan for the North Cape Barge Oil Spill
Member of the Legislative Commission to Establish a Strategic Plan for Narragansett Bay.
Member of Joint Working Group for the Coastal States Organization and NOAA to develop and monitor a strategic working plan for the Office of Ocean and Coastal Resource Management, part of the National Oceanic and Atmospheric Administration (NOAA).
Member of the Legislative Commission for Lateral Access, to study and draft legislation to protect lateral access along the shore 2006-2007.

Selected Publications

West Coast Crown Land Plan, Policy Document, Government of Newfoundland and Labrador, 1985.
Southern Shore Crown Land Plan, Policy Document, Government of Newfoundland and Labrador, 1983.
Lethbridge-Musgravetown Agriculture Development Area Background Paper, Public Information Report, Government of Newfoundland and Labrador.
Terra Nova Agricultural Development Area Background Paper, Public Information Report, Government of Newfoundland and Labrador.
Integrated Resource Management Planning in Newfoundland" a paper presented to the National Conference of the Canadian Institute of Planners, St. John's, Newfoundland, June 1984.
Fugate, Grover J., "Coordination: Newfoundland's Interdepartmental Land Use Committee". *Integrated Approaches to Resource Planning and Management,* Ed. Reg Lang and Audrey Armour, 1985.
The CRMC: An Organization in Transition." a paper presented to the Narragansett Bay

Symposium; Warwick, Rhode Island. April 1987.
Rhode Island Reviews Long-Term Leases and Permit Terms." a paper presented to the national conference Dockominiums: Opportunities and Problems, National Dockominium Conference. New Haven; August, 1987.
"The Role of Coastal Program in the Control of Non Point Source Pollution Control in Rhode Island." a paper presented to the National Workshop On Coastal Nonpoint Source Water Quality Control; Newport, Rhode Island, 1992.
"Rhode Island's Water and Land Coastal Zoning Program" a paper presented to International Conference on Submerged Lands Management; St. Andrews by the Sea, New Brunswick, Canada. 1993.
"Coastal Management in the State of Rhode Island." a paper presented to the Third Annual Canada/US Marine Technology Business Conference; Newport, Rhode Island, 1994.
"Rhode Island Coastal Resources Management Council's Marina Certification and Dock Registration Program." a paper presented the International Conference on Submerged Lands Management; Annapolis, Maryland, 1995.
"Rhode Island Dock Enforcement Program." a paper presented to the International Conference on Submerged Lands Management; Girdwood, Alaska, 1997.
"Rhode Island's Submerged Lands Litigation History." a paper presented to the International Conference on Submerged Lands Management; Girdwood, Alaska, 1997.
"Public Trust in Rhode Island-Life After the Chamber of Commerce Case". Coastal States Organizations Symposium on the Public Trust, Coastal Zone 97, Boston 1997.
"Policy Coordination in the State of Rhode Island Coastal Resource Management Program", a paper presented to the United Nations, IOC on ICM Conference on Challenges and Strategies for Achieving Integrated Management of Coast and Oceans: Examining Experiences in the Implementation of Chapter 17 of Agenda 21, April 16-18, 1998. Seoul, Korea.
"Rhode Island's Vulnerable Shoreline" Testimony presented to the United States Senate Committee on Environment and Public Works, June 29, 1998. Washington D.C.
"Administering the Trust" a course segment on The Public Trust Doctrine-Striking a Balance Between Public Rights to the Shore. A national curriculum on the Public Trust Doctrine presented in Rhode Island, June 4, 1999, Roger Williams School of Law, Bristol, Rhode Island
"Determining Public Trust Waters and Boundaries" a course segment on The Public Trust Doctrine-Striking a Balance Between Public Rights to the Shore. A national curriculum on the Public Trust Doctrine presented in Rhode Island, June 4, 1999, Roger Williams School of Law, Bristol, Rhode Island
"Coastal Resource Management Councils Special Area Management Plans" Fall 1999, Maritimes, Graduate School of Oceanography, University of Rhode Island Publication.
"Palazzolo- Lessons Learned for Coastal Managers", a paper presented the International Conference on Submerged Lands Management; St John, Virgin Islands, October 2005.
"Metrobay Special Area Management Plan a Rhode Island Coastal Policy Network". Donald D Robadue, Jr. Coastal Resources Center University of Rhode Island, Jennifer McCann, Coastal Resources Center University of Rhode Island, Grover Fugate, Rhode Island Coastal Resource Management Council, a paper submitted for CZ07 The International Coastal Zone Conference, Portland, Oregon; September 2007.

Samuel P. De Bow, Jr.

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Education:

M.S., Hydrographic Sciences from the Naval Postgraduate School
B.S., Commerce & Engineering, Drexel University

Experience:

2007 to Present: Research Operations and Special Operations, University of Rhode Island Graduate School of Oceanography.

RADM Samuel P. De Bow, Jr. was the Director of the National Oceanic and Atmospheric Administration (NOAA) Commissioned Corps and NOAA's Office of Marine and Aviation Operations. He was nominated for this position by President George W. Bush, confirmed by the Senate, and subsequently promoted from captain to rear admiral, upper half.

The NOAA Commissioned Corps is a small, elite corps of officers--all with college degrees in science, engineering, or mathematics—who command NOAA ships and aircraft as well as serve within the many environ-mental research programs of NOAA. The NOAA Corps is one of the nation's seven uniformed services. NOAA's Office of Marine and Aviation Operations (OMAO) is composed both of NOAA Corps officers and civilians who operate, manage, and maintain the agency's fleet of research and survey ships and aircraft.

RADM De Bow was appointed into the NOAA Corps in 1976. His career has focused on NOAA's mission to ensure safe navigation. He has served aboard three NOAA hydrographic survey ships that acquire data to update the nation's nautical charts, and two mobile hydrographic field units. Hydrographic surveys accurately determine least water depths and locate obstructions and other dangers to navigation on the sea floor. His last sea tour was as commanding officer of the NOAA Ship RUDE; under his direction, RUDE located the wreckage of TWA Flight 800 after the jet's disastrous crash in 1996. During his career, RADM De Bow has conducted hydrographic surveys throughout the coastal waters of the United States, including Alaska. While in graduate school, he was a NOAA exchange hydrographer, working with the Norwegian Hydrographic Service in Stavanger, Norway.

RADM De Bow's shore tours have included a variety of staff, management and technical positions, the majority of which were in support of NOAA's mapping and charting mission. While awaiting Flag confirmation he served as Executive Assistant to the Deputy Under Secretary of Commerce for Oceans and Atmosphere, who manages NOAA's workforce of approximately 13,000. Prior to that, RADM De Bow was chief of the Hydrographic Services Division (3/99-7/03), where his primary responsibility was to provide overall guidance and leadership for NOAA's national hydrographic survey program. Here he was instrumental in revitalizing NOAA's aging hydrographic fleet while managing close to $100 million in private

sector contracts for data. He also served as NOAA's on-scene operations officer during the search for John F. Kennedy Jr.'s downed aircraft in 1999 (found by NOAA Ship RUDE), and coordinated NOAA's search efforts for Egypt Air 990 in 1999 (found by NOAA Ship WHITING).

Professional Societies/Honors:
In September 2006, RADM De Bow was confirmed as a member of the Mississippi River Commission. During his career, he has been a member of a group awarded the Department of Commerce Gold Medal (the Department's highest award), and has received two individual Department of Commerce Silver Medals and a NOAA Bronze Medal (NOAA's highest award) for his achievements. He has also received a U.S. Coast Guard and three NOAA Corps commendation medals in addition to numerous other medals and ribbons. He was a senior executive fellow at Harvard University's John F. Kennedy School of Government, and attended the Leadership for a Democratic Society course at the Federal Executive Institute.

Kathryn Moran

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Education:

1977	B.Sc. Civil Engineering, University of Pittsburgh
1981	M.Sc. Ocean Engineering, University of Rhode Island
1995	Ph.D. Civil Engineering, Dalhousie University (TUNS)

Experience:

2006 -	Associate Dean, Research and Administration, Graduate School of Oceanography, Univ. of Rhode Island
2006 -	Full Professor, Univ. of Rhode Island
2001 - 2006	Assoc. Professor, Univ. of Rhode Island, Joint appointment in the Graduate School of Oceanography and Department of Ocean Engineering, College of Engineering
2000 - 2001	Program Manager, Atlantic Canada Petroleum Institute
1998 - 2000	Director, Ocean Drilling Programs and Associate Director, U.S. Science Support Program for the ODP, Joint Oceanographic Institutions, Inc.
1981 - 1998	Marine Geotechnical (Research) Engineer, Geological Survey of Canada, Bedford Institute of Oceanography

Professional Societies/Honors:

1982-1984	Chair, Ocean Engineering Committee, Association of Professional Engineers of NS
1985-1987	Member, Marine Geotechnical Subcommittee, Associate Committee on Geotechnical Research, National Research Council of Canada.
1986- 2000	Member, Canadian Standards Association Committee on the Code for the Design and Construction of Offshore Production Structures.
1987-1989	Member, Associate Committee on Geotechnical Research, National Research Council
1989-1993	Chair, JOIDES Shipboard Measurements Panel
1993-1996	Member, Canadian Geotechnical Research Board
1995 - 1998	Chair, Steering Comm. JANUS Database Development Proj., Ocean Drilling Pgm.
1997-1998	Chair, Bedford Institute of Oceanography Library User's Committee
2000 - 2001	Co-Chair, Industrial Liaison Committee, Integrated Ocean Drilling Program
2000 - 2001	Member, JOIDES Arctic Detailed Planning Group
2002 - 2004	Co-Chair, Technical Advisory Panel, Integrated Ocean Drilling Program
2005 - 2007	Member, ORION (NSF Ocean Observing Initiative) Engineering Committee
2006 -	Member, UNOLS, Arctic Icebreaker Coordinating Committee
2007 -	Member, Council of The Oceanography Society
2007 -	Member, Discovery Channel's Planet Green Advisory Council

Selected Recent Publications

Moran, K. Deep sea drilling: methodology (second edition), in J. Steele, S. Thorpe, and K. Turekian and (eds.), Encyclopedia of Ocean Sciences, Academic Press Ltd., London, 2007.

Moran, K., Altmann, V., O'Regan, M. and Ashmanka, C., Acoustic Compressional Wave Velocity as a Predictor of Glaciomarine Sediment Grain Size, ASTM Geotechnical Testing Journal, 2007.

Moran, K., Backman, J. et al., The Cenozoic History of the Arctic Ocean, Nature, June, 2006.

Moran, K., Paulson, M., Lengkeek, M. Jeffery, P., Frazer, A., Deep Water Scientific Drilling in Lake Malawi, Africa, Journal of the Marine Technology Society, 40:1, 29-35, 2006.

Sluijs, A. Schouten,S., Pagani M., Woltering, M., Pedentchouk, N., Brinkhuis, H., Sinninghe Damste, J., Dickens, G., Huber, M., Reichart, G-J., Stein, R., Matthiessen, J., Lourens, l., Backman, J., Moran, K. et al., The Cenoxzoic Arctic Ocean, Nature, June. 2006.

Jennifer McCann
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Tel: (401).874-6224 / Fax: (401) 874-6920
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Education:

University of Rhode Island, M.A. Marine Affairs & Policy, 1994
University of New Hampshire, B.A. Spanish & International Relations, 1986

Professional Experience:

2007-Present: Leader for United States Coastal Program, Coastal Resources Center at the University of Rhode Island, Narragansett, RI.
2000-2007: Leader for the U.S. Sustainable Coastal Communities Project, Coastal Resources Center at the University of Rhode Island, Narragansett, RI.
1995 – 2000: Project Manager for the Aquidneck Island Ecosystem Management Initiative, Coastal Resources Center at the University of Rhode Island, Narragansett, RI.
1995 – 1998: Project Manager for the Mexico Integrated Coastal Management Initiative Coastal Resources Center at the University of Rhode Island, Narragansett, RI.
1993 – 1995: Project Manager for the Dominican Republic Sustainable Coastal Management Program, The Center for Marine Conservation, Washington, DC/Dominican Republic.
1989-1993: Marine Protected Areas Specialist for New England, The Center for Marine Conservation, Washington, DC/New England.

Professional Societies/Honors:

2004 Northeast Sea Grant Network's Outstanding Outreach Program Individual Award.
2004 University of Rhode Island's Outstanding Outreach Award.
Stellwagen Bank National Marine Sanctuary Education and Outreach Advisory Committee, 2003 – present
Aquidneck Island Planning Commission Master Plan Task Force, 1996 - present
State Tourism Award, 2000 – Aquidneck Island Partnership
Certificate of Environmental Achievement by Renew America and the National Awards Council for Environmental Sustainability, 1999 – Aquidneck Island Partnership
Richmond Conservation Commission, Chair, 1999 - present
Partnership for Narragansett Bay, 2002 - present

Selected Publications:

McCann J, S. Menezes, and M. Allard Cox (eds.). Urban Coastal Greenway Design Manual for the Metro Bay Region. Pages: 51. Written for the Rhode Island Coastal Resources Management Council and Rhode Island Sea Grant.
McCann J., N. Mitchell, G. Ricci. Rhode Island Coastal and Estuarine Land Conservation Plan, 2004. Written for Rhode Island Coastal Resources Management Council. 27pp.
McCann, J, V. Lee. Developing a Collective Vision, Core Principles and Goals for Narragansett Bay, Coastal Rhode Island and Their Watersheds in Rhode Island, Massachusetts and Connecticut: Technical Report, 2003. Written for the Partnership for Narragansett Bay. 28pp.
McCann J. and D. Storti. Aquidneck Island: Our Shared Vision, 1999. Written for The Aquidneck Island Partnership and Rhode Island Sea Grant 74pp.

Stephen Olsen

University of Rhode Island, Coastal Resources Center, Narraganstt, Rhode Island 02882
Tel: (401).874-6224 / Fax: (401) 874-6920
Email:sbo@crc.uri.edu / Webpage: http://www.crc.uri.edu

Education:

M.S. biological oceanography. University of Rhode Island, Narragansett, RI; 1970
B.A. Oberlin College, Oberlin, OH; 1967; biology major; minor in Spanish literature

Professional Experience:

1975 to Present: Director of the URI Coastal Resources Center, a university-based organization dedicated to developing strategies for the effective governance of coastal ecosystems

2000-2007: Leader for the U.S. Sustainable Coastal Communities Project, Coastal Resources Center at the University of Rhode Island, Narragansett, RI.

1997 to Present: Affiliated Professor of Oceanography, University of Rhode Island (URI).

2003 to Present: Leader, the EcoCostas Latin American Network for Collaborative Learning.

1997 to Present: Chief of Party, final evaluations of coastal management programs sponsored by the global Environmental Facility (GEF) and by the Swedish Foreign Assistance Program (Sida) in Latin America, the Caribbean and East Africa.

Professional Societies/Honors:

1996 to Present: Leader of The Common Methodology for Learning Initiative sponsored by the U.S. AID, the Swedish Foreign Assistance Program, and the UNDP.

1995 to 1998: Senior advisor to Inter-American Development Bank's Strategy for Marine and Coastal Management. The bank's loans on coastal and marine resources development and management will approach seven billion dollars this decade.

1996: Advisor to the Carter Center's Global Development Initiative, a program designed to improve the effectiveness of international partnerships to manage technological change and advance economic and social goals in developing nations.

1993 to Present: Senior policy advisor (1993 to present) for the second generation of USAID-funded coastal management programs in Indonesia, Mexico, Central America and Tanzania. These programs are also administered by the Coastal Resources Center (CRC).

Selected Publications:

Olsen, S.B., P.V. Padma and B. Richter. In Press. A Guide to Managing Freshwater Inflows to Estuaries. The Nature Conservancy and Coastal Resources Center.

Olsen, S.B., J.G. Sutinen, L. Juda, T.M. Hennessey and L. Juda. 2006. A Handbook on the Governance and Socioeconomics of Large Marine Ecosystems. The Coastal Resources Center, Narragansett, Rhode Island.

Olsen, SB, N. Ipsen and M. Adrianse. 2006. Ecosystem-based Management: Markers for Assessing Progress. The Global Program of Action on Land-based Sources of Pollution, Amsterdam, The Netherlands.

Olsen, S.B. and A. Robles. 2003. A Global Network for the Sustained Governance of Coastal Ecosystems. In: Defying Ocean's End. Glover and Earle editors. Island Press.

Olsen, S.B. Editor. 2003. Crafting Coastal Governance in a Changing World. University of Rhode Island, Coastal Resources Center, Narragansett, RI. USA.

Olsen, S.B. and D. Nickerson. 2003. The Governance of Coastal Ecosystems at the Regional Scale: An Analysis of the Strategies and Outcomes of Long-Term Programs. Coastal Management Report #2243. University of Rhode Island Coastal Resources Center. Narragansett, RI.

Olsen, S.B. 2003. A Workbook to Support the Design, Administration and Assessment od Coastal Governance Programs. Distributed in English and Spanish through sponsorship of the Dutch Ministry of Transport, Public Works and Water and the Avina Foundation.

Oviatt, C., S.B. Olsen, M. Andrews, J. Collie, T. Lynch and K. Raposa. 2003. A Century of Fishing and Fish Fluctuations in Narragansett Bay. Fisheries Science, 11(3): 221-242.

Olsen, S.B. 2003. Frameworks and indicators for assessing progress in integrated coastal management initiatives. Ocean and Coastal Management, 46, (3-4):347-361.

Olsen, S.B. 2002. Assessing Progress Towards the Goals of Coastal Management. Journal of Coastal Management, 30 (4):325-345.

Olsen, S.B. 2001. Inventing Governance That Responds to Coastal Ecosystem Change. Science and Integrated Coastal Management. Edited by B. von Bodungen and R.K. Turner. Dahlem University Press.

Olsen, S. and P. Christie. 2000. What Are We Learning from Coastal Management Experience? Coastal Management, 28:5-18.

Olsen, S.B. 2000. Educating for the Governance of Coastal Ecosystems; The Dimensions of the Challenge. Ocean and Coastal Management, 43:331-341.

Malcolm L. Spaulding

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Tel: (401).874- 874-6666 / Fax: (401) 874-6139
Email: spaulding@oce.uri.edu / Webpage: http://www.oce.uri.edu/

Education:

Ph.D. Mechanical Engineering & Applied Mechanics, University of Rhode Island, 1972
M.S. Mechanical Engineering, Massachusetts Institute of Technology, 1970
B.S. Mechanical Engineering & Applied Mechanics, University of Rhode Island, 1969

Professional Experience:

1983 to Present: Professor, Dept. of Ocean Engineering, University of Rhode Island
1992 to 2002: Chair, Dept.of Ocean Engineering, University of Rhode Island
1991 to 1992: Acting Chair, Dept. of Ocean Engineering, University of Rhode Island
1977 to 1983 Associate Professor, Dept. of Ocean Engineering, University of Rhode Island
1973 to 1977 Assistant Professor, Dept, of Ocean Engineering, University of Rhode Island
1979 to Present: Founder, Applied Science Associates, Inc. (ASA).

Professional Societies/Honors:

Council for International Exchange of Scholars, FulbrightHayes Lectureship at the Leningrad Shipbuilding Institute, Leningrad, USSR, February May, 1977.
Visiting Senior Scientist Fellowship, Continental Shelf Institute (IKU), Trondheim, Norway, 1982-1983.
Visiting Senior Scientist, Proudman Oceanographic Laboratory (POL), Bidston Observatory, Merseyside, England, 1989.
Visiting Senior Scientist, Centre de Documentation de Recherche et d'Experimentations sur les Pollutions Accidentelles des Eaux (CEDRE), Plouzane, France, Fall 1996
Member, National Research Council Marine Board (1996-2001), liaison to Ocean Studies Board (1996-2001) and to Committee on Coastal Engineering. Chair of Marine Board Committee on Marine Transportation of Heavy Oil (1999), member Marine Board committee on Options for Cooperative Research in Naval Engineering.
Edward and Dorothy Marshall Faculty Excellence in Engineering Award, 1997.
Certificate of Appreciation for Outstanding Service as a Member of Marine Board, 1996-2001, National Research Council, Transportation Research Board
2001 Royal Wales Award to College of Engineering Diversity Committee
2003 Royal Wales Award for Outstanding Service Contributions to the Ocean Engineering Department and the College of Engineering

Selected Publications:

Spaulding, M. L. (ed.), 2004. Proceedings of 8th International Conference on Estuarine and Coastal Modeling, sponsored by the University of Rhode Island Conference Office, Monterey, California, November 3-5, 2003. (Refereed conference proceedings), ASCE, Reston, VA, November 2004.

Spaulding, M. L., E. Howlett, M. Ward, and C. Galagan, 2004. COASTMAP: A globally re-locatable, real time, marine environmental monitoring and modeling system, with application to Narragansett Bay and southern New England coastal waters, Proceedings of 8th International Conference on Estuarine and Coastal Modeling, sponsored by the University of Rhode Island Conference Office, Monterey, California, November 3-5, 2003. (Refereed conference proceedings), ASCE

Spaulding, M. L., E. Howlett, M. Ward, and C. Swanson, 2004. COASTMAP: An integrated coastal ocean monitoring and modeling system for marine discharges, MWWD 2004, 3rd International Conference on Marine Wastewater Disposal and Marine Environment, Catania, Italy, September 27 to October 2, 2004.

Spaulding, M. L., Matt Ward, and T. Isaji, 2004. Estimating heavy oil release rates from sunken vessels in deep marine waters, 27th Arctic and Marine Oilspill Program (AMOP) Technical Seminar, sponsored by Environment Canada, June 8 to 10, 2004, Fantasyland Hotel, Edmonton, Alberta.

Sankaranarayanan, S. and M. L. Spaulding, 2003. A study of the effects of grid non-orthogonality on the solution of shallow water equations in boundary fitted coordinates, Journal of Computational Physics, Vol.184 (1), pp.299-320.

NRC, Marine Board, 2002. Options for Cooperative Research in Naval Engineering, Transportation Research Board, Marine Board, National Research Council, National Academy Press, Washington, DC, M. L. Spaulding, committee member.

Spaulding, M. L., 2002. Proceedings of the 7th International Conference on Estuarine and Coastal Modeling, sponsored by the University of Rhode Island Conference Office, St. Pete, FL, November 5-7, 2001, (refereed conference proceedings), approximately 1300p.

Huang, W. and M. L. Spaulding, 2000. Correlation of freshwater discharge and sub-tidal salinity in Apalachicola River, Journal of Waterway, Port, Coastal, and Ocean Engineering. Vol. 126, No. 5. September/October.

Spaulding, M. L. and L. Butler (editors), 2000. Proceedings of the 6th International Conference on Estuarine and Coastal Modeling, sponsored by the University of Rhode Island Ocean Engineering Department, New Orleans, LA, November 3-5, 1999, (refereed conference proceedings), 1300p.

Personnel

Peter V. August

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Education

University of San Diego, San Diego, California (1969-1974), B.S. Biology
Texas Tech University, Lubbock, Texas (1974-1976), M.S. Zoology
Boston University, Boston, Massachusetts (1978-1981), Ph.D. Biology

Professional Experience

2000-Present: Director, The Coastal Institute, University of Rhode Island; duties include developing and directing the URI Coastal Institute, a multidisciplinary research center for advancing knowledge of coastal ecosystems and their sustainable use.

1996-1998: Chairman, Department of Natural Resources Science, University of Rhode Island; duties include administering the academic, research, and outreach programs for a department of 10 tenure-line faculty, 30 graduate students, and 270 undergraduate majors.

1995-Present: Professor, Department of Natural Resources Science, University of Rhode Island; duties include directing the Environmental Data Center, teaching, research, and service.

1989-1995: Associate Professor, Department of Natural Resources Science, University of Rhode Island; duties include directing the Environmental Data Center, teaching, research, and service.

1985-1989: Assistant Professor (Research), Department of Natural Resources Science, University of Rhode Island; duties include establishing and operating a Geographic Information System for the State of Rhode Island.

1981-1984: Assistant Professor, Department of Zoology, University of Rhode Island; duties included teaching Vertebrate Biology, Human Physiology, Conservation Biology, and graduate seminars.

1978-1981: Teaching Fellow, Boston University; duties included teaching laboratory sections in Human Physiology, Vertebrate Zoology, and General Ecology.

1976-1978: Smithsonian Institution Research Fellow, Dr. J. F. Eisenberg (Project leader); University of Florida; duties included conducting field research on ecology and behavior of small mammals in Venezuela.

Professional Societies/Honors :

Ecological Society of America, American Association for the Advancement of Science, American Society of Mammalogists, Society for Conservation Biology, American Society for Photogrammetry and Remote Sensing, Society for Conservation GIS, International Association of Landscape Ecologists

2003-2006 Chair Elect, United States Chapter, International Association of Landscape Ecologists

1998-present: Board of Trustees, The Nature Conservancy, Rhode Island

1998-2001: Councilor at Large, Association for Landscape Ecologists
1993-present: Executive Board, Rhode Island Natural History Survey
1993-1997: President Elect, Rhode Island Natural History Survey
1988-1992: Northeastern ARC/INFO Users Group Executive Committee
1988-1990: Chairperson, Northeastern ARC/INFO Users Group
1987-1991: Narragansett Bay Project Data Base Management Advisory Committee
1987-1991: Editor for Reviews, Bat Research News
1987-1988: Executive Board, RI Branch of National Cartographic Information Center, USGS
1986-1998: Committee on Information Retrieval, American Society of Mammalogists
1985-1995: Research Associate, Smithsonian Institution, National Zoological Park, Conservation and Research Center
1982-1985: Co-Chairman, ad hoc Committee on Ride For Research, American Society of Mammalogists
1975-1986: Committee on Mammal Slide Library, American Society of Mammalogists

Selected Publications

Anthony, A. and 19 other authors. In Review. Coastal Lagoons and Climate Change: Ecological and Social Ramifications in Temperate Ecosystems. Ecology and Society.

Hollister, J., P. August and J. Paul. In Press. Predicting Estuarine Sediment Metal Concentrations and Inferred Ecological Conditions: An Information Theoretic Approach. Journal of Environmental Quality.

Hollister, J., P. August and J. Paul. 2008. Effects of Scale on Landscape Structure and Sediment Metal Concentration Relationships in Small Estuarine Systems of the United States' Atlantic Coast. Landscape Ecology, 23: 91-106.

.Boothroyd, J. and P. August. 2007. General Profile and Overview of Narragansett Bay. In Ecosystem-based Management: A Case Study of Narragansett Bay. A. Desbonnet and B. Costa-Pierce, Eds. Springer-Verlag, New York.

Vacher, K., Killingbeck, and P. August. 2007. Is The Relative Abundance of Nonnative Species an Integrated Measure of Anthropogenic Disturbance? Landscape Ecology, 22: 821-835

Rodriguez, W., P. August, Y. Wang , J. Paul, A. Gold, and N. Rubinstein. 2007. Empirical Relationships between Land Use/Cover and Estuarine Condition in the Northeastern United States. Landscape Ecology, 22:403–417.

Damon, C., M. Christiano, and P. August. 2006. NarrBay.org: A Digital Gateway to Data and Information on Narragansett Bay. 41 Degrees North (RI Sea Grant Publications), 3:15.

Yang, J. Y. Wang, and P. August. 2004. Estimation of Land Surface Temperature Using Spatial Interpolation and Satellite-Derived Surface Emissivity. Journal of Environmental Informatics, 4:37-44.

Hollister, J., J. Paul, P. August, J. Copeland, and L. Gonzales. 2004. Assessing the Accuracy of the National Land Cover Dataset at Multiple Spatial Extents. Photogrammetric Engineering and Remote Sensing, 70:405-414

Paul, J., J. Copeland, M. Charpentier, P. August, and J. Hollister. 2003. Overview of GIS Applications in Estuarine Monitoring and Assessment Research. Marine Geodesy, 26:63-72.

Paton, P., L. Gould, P. August, and A. Frost. 2002. The Ecology of Block Island. Rhode Island Natural History Survey Press, Kingston, RI

Rosenzweig, L., R. Duhaime, A. Mandeville, and P. August. 2002. An ecological geography of Block Island, Rhode Island. In The Ecology of Block Island. P. Paton, L. Gould, P. August, and A. Frost, Eds., Rhode Island Natural History Survey Press, Kingston, RI

Opaluch, J., P. August, R. Thompson, R. Johnston, and V. Lee. 2002. Linking agent models and controlled laboratory experiments for managing community growth. In Agent-based Models of Land-use and Land-cover Change. Land Use and Cover Change Reports Series 6:98-100.

August, P. V., L. Iverson, J. Nugranad. 2002. Human Conversion of Terrestrial Habitats. Pages 198-224. In K. J. Gutzwiller (Editor), Applying Landscape Ecology in Biological Conservation. Springer-Verlag, New York.

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Barrette, J., P. August, and F. Golet. 2000. Accuracy assessment of wetland boundary delineation using aerial photography and digital orthophotography. Photogrammetric Engineering and Remote Sensing, 66:409-416.

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Education:

1990: B.S., Tufts University (Civil Engineering
1994: M.S., Purdue University (Civil Engineering)
1999: Ph.D., Virginia Tech (Civil Engineering)

Experience:

2000-Present: Associate Professor, Departments of Ocean/Civil and Environmental Engineering, University of Rhode Island,
2007: Post-doctoral fellow, Norwegian Geotechnical Institute/International Center for Geohazards, Oslo.
1999-2000: Post-doctoral fellow/Laboratory Manager, Marine Geomechanics Laboratory, Department of Ocean Engineering, University of Rhode Island.
1998-1999: Instructor, Department of Civil Engineering, Virginia Tech.
1994-1999: Research Assistant, Department of Civil Engineering, Virginia Tech.
1992-1994: Research Assistant, Department of Civil Engineering, Purdue University.
1990-1992: Geotechnical Engineer, GZA GeoEnvironmental, Inc., Trumbull, CT.

Selected Publications:

Grilli, S.J., Taylor, O.-D., Baxter, C.D.P., and Maretzki, S. Probabilistic Approach for Determining Submarine Landslide Tsunami Hazard along the Upper East Coast of the United States, Marine Geology (in review).

Baxter, C.D.P., Bradshaw, A.S., Ochoa-Lavergne, M., and Hankour, R. DSS Test Results Using Wire-Reinforced Membranes and Stacked Rings, Geotechnique (in review).

Baxter, C.D.P., Bradshaw, A.S., Green, R.A., and Wang J. (2008). A New Correlation Between Cyclic Resistance and Shear Wave Velocity for Silts, ASCE Journal of Geotechnical and Geoenvironmental Engineering, 134(1), pp. 37-46.

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Bradshaw, A.S. and Baxter, C.D.P (2007). Sample Preparation of Silts for Liquefaction Testing, ASTM Geotechnical Testing Journal, 30(4), pp. 324-332.

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Research expertise and interests:
Estuarine, coastal, and shelf systems, with emphasis on physical oceanography and fluid dynamics. Analysis of observations from ship-based surveys and moored instruments. Cross-disciplinary analyses of factors affecting water quality and fish habitat in estuaries, motivated by resource management needs such as development of forecasting indices.

Education:

1996 Ph.D. Oceanography, University of Washington.
1991 M.S. Oceanography, University of Washington.
1987 B.S. Applied Physics, Highest Honors, University of California Davis.

Experience:
2008-present: Adjunct professor, URI/GSO
2007-present: Assistant Marine Research Scientist, URI/GSO
2004-2007: Marine Research Associate, URI/GSO
1998-2004: Assistant Professor, University of Connecticut, Department of Marine Sciences
1997-1998: Postdoctoral Research Scientist,URI/GSO
1996-1997: Postdoctoral Fellow, Université de Grenoble, France

Selected Publications:
Stoffel, H.E., D.L. Codiga, C.R. Deacutis, S. Kiernan, and C.A. Oviatt, 2008. Characterizing Narragansett Bay hypoxic events using time series from a fixed-site monitoring network. *Est. Coasts.* In preparation.

Codiga, D.L., C.A. Oviatt, P. Nitschke, M.S. Berman, D.C. Melrose, M.R. Gibson, T.R. Lynch, 2008. Evidence for effects of hypoxia on winter flounder in Narragansett Bay. *Est. Coasts.* In revision.

Codiga, D.L. and D.A. Aurin, 2007. Residual circulation in eastern Long Island Sound: observed transverse-vertical structure and exchange transport. *Cont. Shelf Res.*, 27, 103-116. [See also *http://www.po.gso.uri.edu/~codiga/foster/main.htm.*]

Codiga, D.L., 2005. Interplay of wind forcing and buoyant discharge off Montauk Point: Seasonal changes in velocity structure and a coastal front. *J. Phys. Oceanogr.*, 35(6), 1068–1085.

Codiga, D.L. and L.V. Rear, 2004. Observed tidal currents outside Block Island Sound: Offshore decay and effects of estuarine outflow. *J. Geophys. Res.*, 109, C07S05, doi:10.1029/2003JC001804.

Codiga, D.L., 2008. A moving window trigger algorithm to identify and characterize hypoxic events using time series observations, with application to Narragansett Bay. Tech. Rpt. 2008-01. Graduate School of Oceanography, University of Rhode Island, Narragansett, RI. 101pp.

Codiga, D.L., 2004. Quality Assurance Project Plan for FOSTER-LIS. Prepared for EPA Region One, Long Island Sound Office.

Codiga, D.L. and A.E. Houk, 2002. Current profile timeseries from the FRONT moored array. Technical Report, Dept of Marine Sciences, University of Connecticut, 19 pp.

Codiga, D.L., 2000. Environmental Impact Assessment for Front-Resolving Observation Network with Telemetry (FRONT) Study. Prepared for NOAA Office of Protected Resources, Marine Mammal Permits.

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Education:

2000 : Ph.D in Climatology, University of Delaware
1984 : M.S. in Physical Oceanography, University of Liège, Belgium
1983: B.S. in Education, University of Liège, Belgium.
1983 : B.S. in Geography, University of Liège, Belgium (Highest distinction)

Experience:

2005 to Present :Research Asst.Prof., Dept. of Ocean Engineering, University of Rhode Island.
2004-2005: Post Doctoral researcher, Dept. of Ocean Engineering, University of Rhode Island.
2003-2004: Independent Consultant, Narragansett, Rhode Island.
2002-2003 : Research Scientist, ASA, Narragansett, Rhode Island.
2000-2002 : Post Doctoral researcher, Department of Ocean Engineering, URI.
1993-2000 : Independent Consultant, Narragansett, Rhode Island.
1988-1991 : Research Assistant in Climatology, University of Delaware.
1983-1987 : Research/Teaching Assistant in regional planning. Department of Geography, University of Liege (Belgium).

Professional Societies/Honors :

1992-1998 : Member of American Geographical Society
1988-1989 : Research scholarship Fondation Lefranc of the University of Liege (Belgium)

Selected Publications:

Grilli, A., R., Merrill, J., Grilli S.T., Spaulding, M.L., and Cheung, J.T. 2007. Experimental and numerical study of spar buoy-magnet/spring oscillators used as wave energy absorbers. Proc. 17th Offshore and Polar Engng. Conf. (ISOPE07, Lisbon, Portugal, July 2007), 489-496.

Spaulding M.L., Grilli A.R., 2005. Hydrodynamic Assessment of Estuarine Restoration of Pilgrim Lake, Moon Pond, and Salt Meadow, Truro, Massachussets. Ocean Engineering, University of Rhode Island. National Park Service, US Department Of Interior, Cape Cod National Seashore.

Grilli, A., Grilli, S.T., Spaulding, M.L., Ford, K. and King J. 2004. Bathymetric and Wave Climate Studies in Support of Siting a Wave Energy Power Plant at Point Judith, RI. Final Technical Report for RIREO Grant Phase I, Dept. Ocean Engng., Univ. of Rhode Island, 51 pps.

Spaulding M.L., Grilli A.R., Rhines, H. 2003. Determination of the Mean High Water tidal epoch for the Palazzolo site in Winnapaug Pond. Prepared for the State of Rhodes Island, Department of the Attorney General.

Spaulding M.L., Grilli A.R., 2001. Hydrodynamic and salinity modeling for estuarine habitat restoration at Herring River, Wellfleet, Massachussetts. Ocean Engineering, University of Rhode Island. National Park Service, US Department of Interior, Cape Cod National Seashore.

Grilli A.R., 2000. Sensitivity of sea-surface albedo to sea-state. Ph.D Dissertation, Department of Geography, University of Delaware, pp. 147.

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Education:

1985 Ph.D. Ocean Engineering, Université de Liège, Belgium with *Greatest Distinction.*
1983 M.S. Physical Oceanography, Université de Liège, Belguim.
1980 M.S. Civil Engineering, Université de Liège, Belgium.
1980 to Present Licensed Professional Civil Engineer in Belgium.

Experience:

2002 to Present, Chairman, University of Rhode Island, Dept. of Ocean Engineering (URI-OE)
1998 to Present, Distinguished Professor, URI-OE
1996-1998, Distinguished Associate Professor, URI-OE
1993-1996, Associate Professor, URI-OE
1991-1993, Assistant Professor, URI-OE
1987-1991, Research Assistant Professor, University of Delaware, Dept. of Civil Engineering.
1985-1988, Research Associate (F.N.R.S.), Université de Liège (Belgique)
1980-1985, Research Assistant (F.N.R.S.), Université de Liège (Belgique)

Professional Societies/Honors:

Member ASCE, AGU, MTS, ISOPE. Member of four editorial boards. Associate Editor : J. Waterway Port, Coastal, and Ocean Engng. (1992-2005), and Intl. J. Offshore and Polar Engineering (2003-).

Selected Publications:

Enet F. and Grilli S.T. (2005) Tsunami Landslide Generation: Modelling and Experiments. In Proc. 5th Intl. on Ocean Wave Measurement and Analysis (WAVES 2005, Madrid, Spain, July 2005), ASCE Publication, paper 88, 10 pps.

Devrard D., Marcer R., Grilli S.T., Fraunié P. and Rey V. (2005) Experimental Validation of a Coupled BEM-Navier-Stokes Model for Solitary Wave Shoaling and Breaking. In Proc. 5th Intl. on Ocean Wave Measurement and Analysis (WAVES 2005, Madrid, Spain, July 2005), ASCE Publication, paper 166, 10 pps.

Sung H.G. and Grilli S.T. (2005). A Note on Accuracy and Convergence of a Third-order Boundary Element Method for Three Dimensional Nonlinear Free Surface Flows. J. Ships and Ocean Engineering, 40, 31-41.

Grilli, S.T. and P. Watts (2005). Tsunami generation by submarine mass failure Part I : Modeling, experimental validation, and sensitivity analysis. J. Waterway Port Coastal and Ocean Engng., 131(6), 283-297.

Watts, P., Grilli, S.T., Tappin D., and Fryer, G.J. (2005). Tsunami generation by submarine mass failure Part II : Predictive Equations and case studies. J. Waterway Port Coastal and Ocean Engng., 131(6), 298-310.

Guyenne, P. and Grilli, S.T. (2006). Numerical study of three-dimensional overturning waves in shallow water. J. Fluid Mechanics, 547, 361-388.

Dalrymple, R.A., Grilli, S.T. and J.T. Kirby (2006). Tsunamis and challenges for accurate modeling. Oceanography, 19(1), 142-151.

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Corte, C. and Grilli S.T. (2006). Numerical Modeling of Extreme Wave Slamming on Cylindrical Offshore Support Structures. In Proc. 16th Offshore and Polar Engng. Conf. (ISOPE06, San Francisco, California, June 2006), 3, 394-401.

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Gilbert R.W., Zedler E.A., Grilli S.T., and Street R.L. (2007). Progress on Nonlinear-Wave-Forced Sediment Transport Simulation. IEEE Journal of Oceanic Engineering, 32(1), 236-248, doi:10.1109/JOE.2007.890979.

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Abadie, S., Grilli, S.T. and Glockner, S. (2007). A coupled numerical model for tsunamis generated by subaerial and submarine mass failures. In Proc. 30th Intl. Conf. on Coastal Engineering (ICCE30, San Diego, California, September 2006), 1420-143.

Grilli, A., R., Merrill, J., Grilli S.T., Spaulding, M.L., and Cheung, J.T. (2007). Experimental and numerical study of spar buoy-magnet/spring oscillators used as wave energy absorbers. Proc. 17th Offshore and Polar Engng. Conf. (ISOPE07, Lisbon, Portugal, July 2007), 489-496.

Harris, J.C., and Grilli S.T. (2007). Computation of the wavemaking resistance of a Harley surface effect ship. Proc. 17th Offshore and Polar Engng. Conf. (ISOPE07, Lisbon, Portugal, July 2007), 3732-3739.

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Enet, F. and Grilli, S.T. (2007). Experimental Study of Tsunami Generation by Three-dimensional Rigid Underwater Landslides. J. Waterway Port Coastal and Ocean Engineering, 133(6), 442-454.

Maretzki, S., Grilli, S.T. and Baxter, D.P. (2007). Probabilistic SMF Tsunami Hazard Assessment for the upper East Coast of the United States. Proc. 3rd Intl. Symp. on Submarine Mass Movements and their Consequences (Santorini, Greece, October 2007), Springer, 377-386.

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Taylor, O.-D.S., Bradshaw, A.S., Baxter, C.D.P., and S.T. Grilli (2008). The Effects of Basal Resistance and Hydroplaning on the Initial Kinematics of Seismically Induced Tsunamigenic Landslides. In Proc. GeoCongress 2008.

Abadie, S., Morichon, D., Grilli, S.T. and Glockner S. (2008). VOF/Navier-Stokes numerical modeling of surface waves generated by subaerial landslides. La Houille Blanche, 1 (Feb. 2008), 21-26.

Tappin, D.R., Watts, P., Grilli, S.T. (2008). The Papua New Guinea tsunami of 1998: anatomy of a catastrophic event. Natural Hazards and Earth System Sciences, 8, 243-266.

Pomeau, Y., M. Le Berre, P. Guyenne and S.T. Grilli (2008). Wave breaking and generic singularities of nonlinear hyperbolic equations. Nonlinearity, 21, T61-T79.

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Education

Ph.D., Structural Engineering/Mechanics, Rice University, 1982-1984
M.S., Structural Engineering/Mechanics, Rice University, 1980-1982
B.S., Civil Engineering, National Taiwan University, 1974-1978.

Experience:

1999 to Present: Professor, Department of Ocean Engineering, University of Rhode Island, Kingston, Rhode Island.
2004 to Present: Guest professor at Ocean University of China.

Professional Societies/Honors:

Editorial board, Journal of Ocean University of China
Editorial board, Far East Journal of Ocean Research
Committee member, Fluids Committee, Engineering Mechanics Division, ASCE.

Selected Publications:

Hu, S.J., Wang, S. and Li, H., Cross Modal Strain Energy Method for Estimating Damage Severity, Journal of Engineering Mechanics, ASCE, Volume 132, Issue 4, April, 2006, 429-437.

Li, H., Yang, H. and Hu, S.J., Modal Strain Energy Decomposition Method for Damage Localization in 3D Frame Structures, Journal of Engineering Mechanics, ASCE, Volume 132, Issue 9, September, 2006, 941-951.

Li, H., Fang, H. and Hu, S.J., Damage Localization and Severity Estimate for Three-Dimensional Frame Structures, Journal of Sound and Vibration, Volume 301, Issues 3-5, April 2007, 481-494.

Hu, S.J., Li, H. and Wang, S., Cross-model Cross-mode Method for Model Updating, Mechanical Systems and Signal Processing, Volume 21, Issue 4, May 2007, 1690-1703.

Hu, S.J and Li, H., Simultaneous Mass, Damping and Stiffness Updating for Dynamic Systems, AIAA Journal, Volume 45, Number 10, Oct. 2007, 2529-2537.

Li, H., Liu, F. and Hu, S.J., Employing Incomplete Complex Modes for Model Updating and Damage Detection of Damped Structures, Science in China, Series E (in press).

Li, H., Zhang, M. and Hu, S.J., Refinement of Reduced-models for Dynamic Systems, Progress in Natural Science (in press).

Hu, S.J and Li, H., Model Conversion Technique for Structural Dynamic Systems, Journal of Structural Engineering, ASCE (in press).

Hu, S.J and Li, H., A Systematic Linear Space Approach on Solving Partially Described Inverse Eigenvalue Problems, Inverse Problems (in press).

Brian Glenn Heikes

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Education:

1984 – PhD, Cooperative Dissertation in Atmospheric Sciences, The University of Michigan, Ann Arbor, MI, and the National Center for Atmospheric Research (Thesis #78), Boulder, CO.

1978 – MS, Atmospheric and Oceanic Science, The University of Michigan, Ann Arbor, MI.

1976 – BS, Atmospheric and Oceanic Science, The University of Michigan, Ann Arbor, MI.

Experience:

2002 - present Professor Oceanography, Tenured 1994, Graduate School of Oceanography, The University of Rhode Island (URI), Narragansett, RI.

1994 - 2002 Associate Professor Oceanography, GSO. URI, Narragansett, RI.

1988 - 1994 Assistant Professor Oceanography, GSO. URI, Narragansett, RI.

1983 - 1988 Scientist I/II, National Center for Atmospheric Research, Boulder, CO.

Professional Appointments (pre-PhD)

1980 - 1982 Graduate Research Assistant in the Advanced Study Program at NCAR.

1976 - 1980 Graduate Student Research Assistant/Teaching Assistant, Department of Atmospheric and Oceanic Science, The University of Michigan, Cloud Chemistry, Mesometeorology, Cloud Physics, Physical Climatology, Weather & Climate.

1978 Lecturer in Synoptic Meteorology, Department of Atmospheric and Oceanic Science, The University of Michigan.

Selected Publications:

Snow, J.A., B.G. Heikes, H. Shen, D.W. O'Sullivan, A. Fried, J. Walega, Hydrogen peroxide, methylhydroperoxide, and formaldehyde over North America and the North Atlantic, J. Geophys. Res., in press, 2007.

Snow, Julie A.; Heikes, Brian G.; Merrill, John T.; Wimmers, Anthony J.; Moody, Jennie L.; Cantrell, Christopher A., Winter spring evolution and variability of HO_x reservoir species, hydrogen peroxide and methylhydroperoxide, in the northern mid- to high-latitudes, J. Geophys. Res., 108(4), DOI:10.1029/2002JD002172, 2003.Lee, M., K.B. Noone, D. O'Sullivan, and B.G. Heikes, An HPLC method for the determination of C1 and C2 hydroperoxides in air, J. Atmos. & Ocean Tech., 12, 1060-1070, 1995.

Millet, Dylan B; Jacob, Daniel J; Turquety, Solene; Hudman, Rynda C; Wu, Shiliang; Fried, Alan; Walega, James; Heikes, Brian G; Blake, Donald R; Singh, Hanwant B; Anderson, Bruce E; Clarke, Antony D, Formaldehyde distribution over North America: Implications for satellite retrievals of formaldehyde columns and isoprene emission, J. Geophys. Res., 111, D24, [np]. Sep 2006.

Heikes, B.G., M. Lee, D. Jacob, R. Talbot, J. Bradshaw, H. Singh, D. Blake, B. Anderson, H. Fuelberg, A. Thompson, Ozone-oxidant, oxides of nitrogen, and hydrocarbon budgets in the marine boundary layer over the South Atlantic, J. Geophys. Res., 101, 24221-24234, 1996.

Heikes, B, J. Snow, P. Egli, D. O'Sullivan, J. Crawford, J. Olson, G. Chen, D. Davis, N. Blake, and D. Blake, Formaldehyde Over the Central Pacific during PEM-Tropics B, J. Geophys. Res.,106, 32,717-32,731, 2001.

Fried, A., …, B.G. Heikes, Tunable diode laser measurements of formaldehyde during the TOPSE 2000 study: distributions, trends, and model comparisons, TOPSE Special Section, J. Geophys. Res., 108, TOP 13/1-22, 2003.

Chang, W., M. Lee, and B.G. Heikes, One-dimensional photochemical study of H2O2, CH3OOH, and HCHO in the marine boundary layer during Pacific Exploratory Mission in the Tropics (PEM-Tropics) B (DOI 10.1029/2003JD004256), J. Geophys. Res., 109; D06307/1-11; 2004.Cohan, D., M.G. Schultz, D.J. Jacob, B.G. Heikes, and D.R. Blake, Convective injection and photochemical decay of peroxides in the tropical upper troposphere: methyl iodide as a tracer of marine convection, J Geophys. Res., 104, 5717-5724, 1999.

Grant, W.B., E. Browell, C. Butler, M. Fenn, M. Clayton, J. Hannan, H. Fuelberg, D. Blake, N. Blake, G. Gregory, B. Heikes, G. Sachse, H. Singh, J. Snow, R. Talbot, A Case-Study of Transport of Tropical Marine Boundary-Layer and Lower Tropospheric Air Masses to the Northern Midlatitude Upper Troposphere, J. Geophys. Res., 105, 3757-3769, 2000.

Synergistic Activities:

Professional Society Memberships: American Geophysical Union, American Association of University Professors, American Meteorological Society, American Chemical Society

Scientific Expeditions: Participated in 11 airborne, 5 ground, and 2 shipboard field projects.

Student Advising: Major professor for 2 PHD and 2 MS students. Past major research advisor/support or thesis committee member for 4 PHD and 6 MS students. Past research advisor/support for 3 undergraduates (SUNY-FES, U Wash, and Beloit College). Advised 3 Post-Doctoral fellows.

Significant Recent Collaborators (last 5 yr):

E. Atlas (NCAR), D. Blake (UC-Irvine), N. Blake (UNH), C. Cantrell (NCAR), J. Crawford (NASA-LRC), R. Fall (UC-Boulder), A. Fried (NCAR), H. Fuelberg (FSU), D. Jacob (Harvard), J. Merrill (URI-GSO), D. O'Sullivan (USNA), B. Ridley (NCAR), D. Riemer (UMiami), R. Shetter (NCAR), H. Singh (NASA-ARC), R. Talbot (UNH), Y. Wang (Rutgers).

Graduate and Post-Doctoral Advisors:

J. Calvert (NCAR), R. Cicerone (UC-Irvine), A.N. Dingle (UMich), A. Lazrus (NCAR), P. Sampson (UMich).

Graduate Students and Post-Doctorals Advised and Thesis Committees Served (past 5 yr):

C. Brown, P. Burrow, W. Chang, P. Egli, H. Groundwater, C. Gu, S. Howell, G. Lee, M. Lee, W. Miller, M. Roman, J. Snow, D. O'Sullivan, R. Sweetman, M. Twardowski.

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Education:

B.S. with distinction in Natural Resources (aquatic sciences), Cornell University, 1978
Ph.D. in Biological Oceanography, University of Rhode Island, 1984

Experience:

1978-present: Graduate School of Oceanography, University of Rhode Island (URI), Narragansett, RI.
Currently Associate Marine Research Scientist and Adjunct Professor in Residence.
1985-present: Visiting (summer) faculty, Shoals Marine Laboratory, Appledore Island, ME.
1984-1999; 2004-2006: Temporary (per-course) faculty, URI Depts. of Zoology, Botany, Biological Sciences, and Oceanography.

Research Support:

PI or Co-PI on URI research grants totaling over $4M since 1983-Nat. Sci. Fdn., Nat. Mar. Fish. Serv., Minerals Mgmt. Serv., Mar. Mamm. Comm., Nav. Undo Warfare Ctr., GeoMarine Inc., Jamaican Nat. Envt. & Planning Agcy.
Consulting projects-marine resource assessments and mitigation, U.S. Navy and Geo-Marine Inc.; protected species observer support (underwater demolition), CLE Eng., Cashman Equip.Corp., Testa Corp., RI DOT; environmental review, offshore LNG terminal, Normandeau
Assoc., Tetra Tech EC Inc., Excelerate Energy; observer training, Nat. Mar. Fish. Serv., Nav. Undo Warfare Ctr., US Navy, RI DEM.

Professional Societies/Honors:

Atlantic Scientific Review Group, Outfall Monitoring Science Advisory Panel, Atlantic Large Whale Take Reduction Team, Northeast Whale Recovery Implementation Team, Right Whale Recovery Team, Stellwagen Bank National Marine Sanctuary Ecosystem Alterations
Working Group, Connecticut Endangered Species Advisory Committee, New Jersey marine endangered species advisor, The Nature Conservancy (RI) senior science advisor, American Cetacean Society Science Advisory Panel.
Non-profit boards of directors and advisory committees: Rhode Island Natural History Survey (Secretary), Narrow River Preservation Association (Secretary), Friends of the National Wildlife Refuges of Rhode Island (Treasurer), Audubon Society of Rhode Island Kimball Wildlife Refuge (Chair).

Selected Publications:

Kenney, RD., C.A Mayo, and H.E. Winn. 2001. Migration and foraging strategies at varying spatial scales in western North Atlantic right whales: A review of hypotheses. Journal of Cetacean Research and Management, Special Issue 2: 251-260.

Kraus, S.D., P.K. Hamilton, R.D. Kenney, A.R Knowlton, and C.K. Slay. 2001. Reproductive parameters ofthe North Atlantic right whale. Journal ofCetacean Research and Management, Special Issue 2: 231-236.

Greene, C.H., A.J. Pershing, RD. Kenney, and J.W. Jossi. 2003. Impact of climate variability on the recovery of endangered North Atlantic right whales. Oceanography 16(4): 98-103.

Kraus, S.D., M.W. Brown, H. Caswell, C.W. Clark, M. Fujiwara, P.K. Hamilton, R.D. Kenney, A.R Knowlton, S. Landry, C.A Mayo, W.A McLellan, M.J. Moore, D.P. Nowacek, D.A

Pabst, AJ. Read, and RM. Rolland. 2005. North Atlantic right whales in crisis. Science 309(5734): 561-562.

Kenney, R.D. 2007. Right whales and climate change: Facing the prospect ofa greenhouse future. Pp. 436-459 in: S.D. Kraus and RM. Rolland (eds). The Urban Whale: North Atlantic Right Whales at the Crossroads. Harvard University Press, Cambridge, MA.

Myers, R.A., S.A Boudreau, RD. Kenney, M.J. Moore, A.A Rosenberg, S.A Sherrill-Mix, and B. Worm. 2007. Protecting endangered whales by better fIshery management. Current Biology 17: R10-R11.

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Education:

Ph.D 1983 (Geology and Geophysics), University of Minnesota
B.A. 1975 (Special Studies: biology, geology, and chemistry, with honors in biology), Franklin and Marshall College

Experience:

1984 to Present: University of Rhode Island, Professor of Oceanography, University of Rhode Island

Professional Societies/Honors:

09/88-06/93: ODP Shipboard Measurements Panel
12/88-12/90: AGU Paleoceanography Committee
09/90-09/93: Member Paleoclimate of Arctic Lakes and Estuaries
10/94-10/2000:Member/Chair, University of Minnesota, Institute of Rock Magnetism Review and Advisory Committee
10/00- 12/07:Associate Editor, Estuaries and Coasts
6/2003-present- Governors Commission on Narragansett Bay Affiliations:
American Quaternary Association, American Geophysical Union Geological Society of America, Sigma Xi

Selected Publications:

Frank, M., J. Backman, M. Jakobsson, K. Moran, M. Oregan, J. King, B. A. Haley, P. W. Kubik, D. Garbe-Schonberg, in press. Beryllium isotopes in central Arctic Ocean sediments over the past 12.3 million years: Stratigraphic and paleoclimatic implications. Paleoceanography, in press.

O'Regan, M., J. King, J. Backman, M. Jakobsson, H. Palike, K. Moran, C. Heil, T. Sakamoto, T. Cronin, and R. W. Jordan, in press. Constraints on the Pleistocene Chronology of Sediments from the Lomonosov Ridge. Paleoceanography, in press.

King, J., B.Hubeny, C.Gibson, E.Laliberte, K.Ford, M.Cantwell, R.McKinney, and P.Appleby, 2008. Antropogenic Eutrophication of Narragansett Bay: Evidence from Dated Sediment Cores. IN: Science for Ecosystem-based Management: Narragansett Bay in the 21st Century. Springer Series on Environmental Management. p 211-232.

Jakobsson, M., J. Backman, B. Rudels, J. Nycander, M. Frank, L. Mayer, W. Jokat, F. Sangiorgi, M. O'Regan, H. Brinkhuis, J. King, and K. Moran, 2007. The Early Miocene onset of a ventilated circulation regime in the Arctic Ocean. Nature, v. 447, no 7147, 21 June, p. 989 – 990.

Cantwell, M. G., J. W. King, R. M. Burgess, and P. G. Appleby. Reconstruction of contaminant trends n a salt wedge estuary with sediment cores dated using a multiple proxy approach. Marine Environmental Research, v. 64, p. 225-246.

Scholz, C. A., Johnson, T. C., Cohen, A. S., King, J. W., Peck, J. A., Overpeck, J. T., Talbot, M. R., Brown, E. T., Kalindekafe, L., Amoako, P. Y. O., Lyons, P. R., Shanahan, T. M., Castaneda, I. S., Heil, C. W., Forman, S. L., McHargue, L. R., Beuning, K. R., Gomez, J., and Pierson, J., 2007. East African megadroughts between 135 and 75 thousand years ago and bearing on early-modern human origins. Proceedings of the National Academy of Sciences, v. 104, no. 42, p. 16416 – 16421.

Cohen, A., S., Stone, J. R., Beuning, K. R. M., Park, L. E., Reinthal, P. N., Dettman, D., Scholz, C. A., Johnson, T. C., King, J. W., Talbot, M. R., Brown, E. T., and Ivory, S. J., 2007. Ecological consequences of early Late Pleistocene megadroughts in tropical Africa. Proceedings of the National Academy of Sciences, v. 104, no. 42, p. 16422 – 16427.

Brown, E., T., Johnson, T. C., Scholz, C. A., Cohen, A. S., and King, J. W., 2007. Abrupt change in tropical African climate linked to the bipolar seesaw over the past 55,000 years. Geophysical Research Letters, v. 34, L20702, doi: 10.1029/2007GL031240.

Nie, J., J. W. King, and X. Fang, 2007. Enhancement mechanisms of magnetic susceptibility in the Chinese red-clay sequence. Geophysical Research Letters, v. 34, LXXXX, 5 pp.

Shumchenia, E., and J. King, March 2007. Habitat mapping in shallow estuarine and lagoon ecosystems. Poster for NOAA GeoTools conference, Myrtle Beach, S.C.

Cantwell, M. G., King, J., Burgess, R. M., 2006. Temporal trends of Aroclor 1268 in the Taunton River estuary: Evidence of early production, use and release to the environment. Marine Pollution Bulletin, v. 52, p. 1090-1117.

Hubeny, J., J.King, A.Santos, 2006. Subdecadal to multidecadal cycles of Late Holocene North Atlantic variability preserved by estuarine fossil pigments. Geology. v34:7, p.569-572.

Hartman, P. C., J. G. Quinn, R. W. Cairns, and J. W. King, 2005. Depositional history of organic contaminants in Narragansett Bay, Rhode Island, USA. Marine Pollution Bulletin, 50, p. 388-395.

Hartmann, P.C., J.G. Quinn, R.W. Cairns, and J.W. King, 2004. The distribution and sources of polycyclic aromatic hydrocarbons in Narragansett Bay surface sediments. Marine Pollution Bulletin 48:351-358.

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Education:

BA with honors in Biology and Psychology, Hiram College, 1980
MSc in Animal Ecology, Iowa State University, 1986
PhD in Ecology, University of California at Davis, 1993

Professional Experience:

Postdoctoral Associate, Section of Evolution and Ecology and Center for Population Biology, UC Davis, 1994
Postdoctoral Fellow, Department of Wildlife Ecology, University of Wisconsin, 1994-1997
Faculty Associate, Department of Wildlife Ecology, University of Wisconsin, 1997
Assistant Professor, Department of Natural Resources Science, University of Rhode Island, 1998-2003
Associate Professor, Department of Natural Resources Science, University of Rhode Island, 2003-2008
Professor, Department of Natural Resources Science, University of Rhode Island, 2008-present

Research Support:

1995-98: Wildlife Management Institute (ecology of arctic geese)
1998-present: U.S.D.A. AES Competitive Grants (ecology of songbirds and gamebirds)
1998-present: RI Audubon (population ecology of migratory songbirds)
2000-06: National Science Foundation CAREER grant (Ecological & Evolutionary Physiology)
2001-05: National Science Foundation, Research Experiences for Undergraduates
2000-07: The Champlin Foundation (population ecology of upland game birds)
2001-03 : U.S. Environmental Protection Agency (population ecology of wintering seaducks)
2002-05: U.S. National Park Service (effects of disturbance on nesting shorebirds)
2006-10: U.S.-Israel Binational Science Foundation (physiological ecology of migrating songbirds)
2006-10: Canadian Foundation for Innovation (advanced facilities for avian research)
2008-11: National Science Foundation (physiological ecology of migrating birds)

Professional Societies/Honors:

Scientific advisor to The Nature Conservancy (Block Island), Coastal Resources Management Council (RI), Audubon Society of RI, State Wildlife Comprehensive Conservation Plan (RI), Friends of Oceanography, Marine and Environmental Advisory Council (URI)

Associate Editor, *Auk* (2006-present); Guest Editor, *Northeastern Naturalist* (2003-present); Editorial Board of *Zoology* (2002-present)

Referee for *Auk, Biology Letters, Comparative Biochemistry and Physiology, Condor, Ecology, Functional Ecology, Ibis, Journal of Avian Biology, Journal of Comparative Physiology, Journal of Experimental Biology, Journal of Ornithology, Journal of Wildlife Management,*

Northeastern Naturalist, Oecologia, Physiological and Biochemical Zoology, Proceedings of the Royal Society, Western North American Naturalist, Wildlife Biology, Wildlife Monographs, Wilson Journal of Ornithology, Zoology.

Reviewer of grants for National Science Foundation (three programs: Ecological and Evolutionary Physiology Program in the Division of Integrative Biology and Neurobiology; Ecology Program in the Division of Environmental Biology; International Doctoral Dissertation Enhancement Project Program in the Office of International Science and Engineering), National Fish and Wildlife Foundation, Maine Agricultural Experiment Station, National Research Foundation (South Africa), Netherland Science Foundation.

Research Fellow, Max-Planck Institute for Ornithology, Seewiesen, Germany

Research Scientist Excellence Award (College Award), University of Rhode Island

Elective Member (for significant contributions to Ornithology), American Ornithologist's Union

Outstanding Contribution to Research (University Award), University of Rhode Island

Senior Fellow, Coastal Institute, University of Rhode Island

Science, Math, Engineering Teaching Fellow at University of Rhode Island

Selected Publications:

McWilliams, S. R., S. Kearney, and W. H. Karasov. 2002. Dietary preferences of warblers for specific fatty acids in relation to nutritional requirements and digestive capabilities. JOURNAL OF AVIAN BIOLOGY 33:167-174.

Pierce, B.J. and S.R. McWilliams. 2004. Diet quality and food limitation affect the dynamics of body composition and digestive organs in a migratory songbird (*Zonotrichia albicollis*). PHYSIOLOGICAL AND BIOCHEMICAL ZOOLOGY 77(3):471-483.

McWilliams, S.R. and D.G. Raveling. 2004. Energetics and time allocation of cackling Canada geese during spring. Pages 97-108 in T.J. Moser, R.D. Lien, K.C. VerCauteren, K.F. Abraham, D.E. Andersen, J.G. Bruggink, J.M. Coluccy, D.A. Graber, J.O. Leafloor, D.R. Luukkonen, and R.E. Trost, editors. PROCEEDINGS OF THE 2003 INTERNATIONAL CANADA GOOSE SYMPOSIUM, Madison, Wisconsin, USA.

McKinney, R.A., S.M. Glatt, and S.R. McWilliams. 2004. Allometric length-weight relationships for benthic prey of aquatic wildlife in coastal marine habitats. WILDLIFE BIOLOGY 10:241-249.

Pierce, B.J., S.R. McWilliams, A.R. Place, M.A. Huguenin. 2004. Diet preferences for specific fatty acids and their effect on composition of fat reserves in migratory Red-eyed Vireos (*Vireo olivaceous*). COMPARATIVE BIOCHEMISTRY AND PHYSIOLOGY 138:503-514.

McWilliams, S.R., B.J. Pierce, C. Guglielmo, M. Klaassen. 2004. Flying, fasting, and feeding in birds during migration: a physiological ecology perspective. JOURNAL OF AVIAN BIOLOGY 35:377-393.

Podlesak, D., S.R. McWilliams, K. Hatch. 2005. Stable isotopes in breath, blood, feces and feathers can indicate intra-individual changes in diet of migratory songbirds. OECOLOGIA 142:501-510.

McWilliams, S.R. and J.O. Leafloor. 2005. Effects of elevated CO_2 on keystone herbivores in Arctic ecosystems. Pp. 369-393, In: J. Ehleringer, T. Cerling, and D. Dearing (eds) A history of atmospheric CO_2 and its effects on plants, animals, and ecosystems. Springer-Verlag.

McWilliams, S.R. and W.H. Karasov. 2005. Migration takes guts: digestive physiology of migratory birds and its ecological significance. Pp. 67-78, In: P. Marra and R. Greenberg (eds) BIRDS OF TWO WORLDS. Smithsonian Institution Press, Washington, D.C.

Karasov, W.H. and S. R. McWilliams. 2005. Digestive constraints in mammalian and avian ecology. Pp. 87-112, In: J.M. Starck and T. Wang (eds). Physiological and ecological adaptations to feeding in vertebrates. Science Publishers Inc., Enfield, New Hampshire.

Servello, F.A., E. C. Hellgren, and S. R. McWilliams. 2005. Techniques for wildlife nutritional ecology. Pp. 554-590, In C.E. Braun, ed. Techniques for Wildlife Investigations and Management. Sixth Edition. The Wildlife Society, Bethesda, Maryland

Pierce, B.J., S.R. McWilliams, T. O'Connor, A.R. Place, C. Guglielmo. 2005. Effect of dietary fatty acid composition on depot fat and exercise performance in a migrating songbird, the red-eyed vireos. JOURNAL OF EXPERIMENTAL BIOLOGY 208:1277-1285.

Pierce, B.J. and S.R. McWilliams. 2005. Seasonal changes in composition of lipid stores in migratory birds: causes and consequences. CONDOR 107:271-281.

McKinney, R.A. and S.R. McWilliams. 2005. A new model to estimate daily energy expenditure for wintering waterfowl. WILSON BULLETIN 117:44-55.

Endrulat, E.G., S.R. McWilliams, and B.C. Tefft. 2005. Habitat selection and home range size of ruffed grouse in Rhode Island. NORTHEASTERN NATURALIST. 12:411-424.

Podlesak, D. and S.R. McWilliams. 2006. Metabolic routing of dietary nutrients in birds: effects of diet quality and macronutrient composition revealed using stable isotopes. PHYSIOLOGICAL AND BIOCHEMICAL ZOOLOGY 79:534-549.

Muller, M., S.R. McWilliams, D. Podlesak, J. Donaldson, and R. Lindroth. 2006. Tri-trophic direct and indirect effects of plant defenses: Black-capped chickadees choose to eat gypsy moth caterpillars based on host leaf chemistry. OIKOS 114:507-517.

McKinney, R.A., S.R. McWilliams, and M.A. Charpentier. 2006. Waterfowl-habitat associations during winter in an urban eastern North Atlantic estuary. BIOLOGICAL CONSERVATION 132:239-249.

McWilliams, S.R., T. Sloat, C.A. Toft, and D. Hatch. Effects of prescribed burning on a wet meadow plant community in northeastern California and its use by migrating geese. WESTERN NORTH AMERICAN NATURALIST. 67:299-317.

Podlesak, D. and S.R. McWilliams. 2007. Metabolic routing of dietary nutrients in birds: effects of dietary lipid composition on d13C of depot fat. AUK 124:916-925.

Schneider, E. G., and S. R. McWilliams. 2007. Using nest temperature to estimate nest attendance of piping plovers. JOURNAL OF WILDLIFE MANAGEMENT 71:1998-2006.

Smith, S.B., S.R. McWilliams, and C. Guglielmo. 2007. Effect of diet composition on plasma metabolite profiles in a migratory songbird. CONDOR 109:49-58.

Smith, S.B., K.H. McPherson, J. Backer, B.J. Pierce, D. Podlesak, S.R. McWilliams. 2007. Fruit quality and consumption by songbirds during autumn migration. WILSON JOURNAL OF ORNITHOLOGY 119:419-428.

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Education:

B.A., University of California, 1968 (Physics)
M.S., University of Illinois, 1970 (Physics)
Ph.D., University of Colorado, 1976 (Atmospheric Science, AstroGeophysics Department)

Experience:

1995-present: Professor, University of Rhode Island, Graduate School of Oceanography. Associate Dean, 1998-2002.
1987-1995 - Associate Professor, University of Rhode Island. Research faculty, 1987-1990.
1981-1987 - Associate Marine Scientist, University of Rhode Island.
1977-1981 - Assistant Professor, Division of Meteorology and Physical Oceanography, Rosenstiel School of Marine and Atmospheric Sciences, University of Miami.
1976-1977 - Research Associate, University of Miami.
1972-1976 - Graduate Research Assistant, University of Colorado, Boulder, Colorado. Cooperative Institute for Research in Environmental Sciences. Physicist (summers), NOAA/ERL, Wave Propagation Laboratory, Boulder.

Synergistic Activities:

I collaborate with Prof. Shermane Austin, Computer Science Department, Medgar Evers College/CUNY, Brooklyn, training students in carrying out and interpreting ozone profile observations and related meteorological analyses. I have been active in the UNIDATA community, which develops tools for enhanced Earth-system education and research, with an emphasis on real-time data delivery, and was chair of their Policy Committee, 1996-2004. I have served as a faculty mentor in the NSF-sponsored Summer Undergraduate Research Fellowship in Oceanography, a site REU program, most recently in 2004. I have served on and recently ended my term as chair of the UCAR University Relations Committee. UCAR manages the National Center for Atmospheric Research. I participated in a training workshop in research ethics at URI and lead development of educational activities in responsible conduct of research at the School of Oceanography.

Selected Publications:

Merrill, J. and J. Kim, “Meteorological events and transport patterns in ACE-Asia,” J. Geophys. Res., 109 (D19S18), doi: 10.1029/2003JD004124, 2004.

Kahn, R., et al., Environmental snapshots for satellite multi-angle aerosol retreival validation during the ACE-Asia field campaign, J. Geophys. Res., 109 (D19S14), doi: 10.1029/2003JD004339, 2004.

Bates, T. S., P. Quinn, D. Coffman, D. Covert, T. Miller, J. E. Johnson, G. Carmichael, I. Uno, S. Guazzotti, D. Soderman, K. Prather, M. Rivera, L. Russell and J. Merrill, “The characterization of Asian aerosols and their radiative impacts on climate,” J. Geophys. Res., 109 (D19S19), doi: 10.1029/2003JD004094, 2004.

Milne, P. A., A. I. Prados, R. R. Dickerson, B. G. Doddridge, D. D. Reimer, R. G. Zika, J. T. Merrill, and J. L. Moody, "Nonmethane hydrocarbon conentrations in continental outflow air from eastern North America: Export of ozone and ozone precursors to Bermuda," J. Geophys. Res., 105, (D8), 9981-9900, doi: 10.1029/1999JD901117, 2000.

Merrill, J. T., R. E. Newell and S. Bachmeier, "A meteorological overview for the Pacific Exploratory Mission - West, Phase B," J. Geophys. Res., 102, 28,223-28,253, 1997.

Snow, J. A., B. G. Heikes, J. T. Merrill, A. J. Wimmers, J. L. Moody and C. A. Cantrell, "Winter-spring evolution and variability of HOx reservoir species, hydrogen peroxide and methylhydroperoxide in the northern mid- to high latitudes," J. Geophys. Res., 108 (D4), 8362, doi: 10.1029/2002JD002172, 2003.

Schollaert, S. E and J. T. Merrill, "Cooler North Atlantic sea surface correlated to dust events west of the Sahara Desert," Geophys. Res. Lett., 25, 3529-3532, 1998.

Merrill, J. T. and J. L. Moody, "Synoptic meteorology and transport during the North Atlantic Regional Experiment (NARE) Intensive," J. Geophys. Res., 101, 28,903-28,921, 1996.

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Education

6/83 - 8/87 MASSACHUSETTS INSTITUTE OF TECHNOLOGY
WOODS HOLE OCEANOGRAPHIC INSTITUTION,
Cambridge and Woods Hole, Massachusetts
Joint Program in Oceanographic Engineering
Doctor of Science.
Dissertation: "Estimation of Sea Surface Spectra using Acoustic Tomography"
Supervisor: Dr. James F. Lynch.

Experience:

8/95 - present	University of Rhode Island, Narragansett, Rhode Island
1/06 – present	Professor of Ocean Engineering and Oceanography
7/99 – 12/05	Professor of Ocean Engineering
7/97	Tenure Awarded
8/95 – 6/98	Associate Professor of Ocean Engineering
8/87 - 8/95	Naval Postgraduate School, nterey, California
7/92 - 8/95	Associate Professor of Electrical and Computer Engineering
7/94	Tenure Awarded
8/87 - 7/92	Assistant Professor of Electrical and Computer Engineering
3/81- 6/83	The Analytic Sciences Corporation (TASC), ading, Massachusetts. Member of Professional Staff

Education:

81 STANFORD UNIVERSITY, Stanford, California
Master of Science in Electrical Engineering.
Emphasis in Signal Processing.

9/75 - 6/79 WORCESTER POLYTECHNIC INSTITUTE., Worcester, Massachusetts
Bachelor of Science in Electrical Engineering with Distinction.
Emphasis in Control Engineering.

Professional Societies/Honors:

2007-present, Chair, Acoustical Oceanography Technical Committee, Acoustical Society of America
2001-present, Scientific Advisory Team, Discovery of Sound in the Sea Website
2006 General Chair, 151st Meeting of the Acoustical Society of America, June 5-9, 2006, Providence, Rhode Island
2004 URI Albert E. Carlotti Faculty Excellence Award for Research
2003 Fellow of the Acoustical Society of America

2001-2003 Member of National Academy of Sciences Panel on Noise in the Ocean
2003-2005 Marine Mammal Commission Subcommittee on Synthesis of Current Knowledge
2002-2003 Member of NMFS Panel on Acoustic Criteria for Marine Mammal
2000 Member of the ONR Review Panel for the Bahamas Stranding Event
1999 URI Marshall Award for Faculty Excellence in Engineering
1993 NPS Menneken Faculty Award for Excellence in Scientific Research
1992-1996 Associate Editor for Underwater Sound - Journal of the Acoustical Society of America
Sigma Xi, Tau Beta Pi, Eta Kappa Nu, IEEE, ASA, MTS
Consultant on underwater acoustics to a number of corporations and government agencies.
Lecturer: ASA Short Courses in Marine Mammal Bioacoustics, 1995 and 1999.
48 refereed publications in underwater acoustics
93 other publications in underwater acoustics
6 PhD students graduated or in progress
42 MS students graduated or in progress

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Education:

Lewis and Clark College, B.S. Biology, 1978
Colorado State University, M.S. Wildlife Biology, 1985
Utah State University, Ph.D. Wildlife Biology, 1994

Experience:

1995-Present: Assistant Professor, Associate Professor (since 2001), Chair of Department of Natural Resources Science (since 2004), and Professor (since 2006), University of Rhode Island, Kingston RI; duties include teaching Conservation Biology, Field Ornithology, Wetland Wildlife Management, and Management of Migratory Birds, direct research for graduate students, and Chair of NRS since 2004 (13 faculty, 35 graduate students, 180 undergraduate students, 40 staff and research associates).

1994-1995: Research Scientist, Alaska Bird Observatory, Fairbanks, Alaska; duties include developing an inventory and monitoring program for birds in Denali National Park.

1990-1994: Graduate Student, Utah State University; dissertation research focused on breeding ecology of Snowy Plovers at Great Salt Lake.

1984-1990: Wildlife Biologist, Redwood Sciences Lab, Arcata, California; studied impact of logging on vertebrates, including spotted owls and marbled Murrelets

1982-1984: Graduate Research Assistant,, Dept. of Fisheries and Wildlife Colorado State University. Investigated techniques to minimize the adverse effects of cattle egrets as an air-strike hazard in Hilo, Hawaii.

1980-1982: Research Associate: Dept. of Fisheries and Wildlife, University of Missouri-Columbia; Assisted in assessing the breeding ecology of the threatened Hawaiian Hawk.

1979-1980: Wildlife Biologist, U.S. Forest Service and U.S. Fish and Wildlife Service, Volcano, HI; studied endangered forest birds in the Hawaiian Islands.

1978: Biologist, Point Reyes Bird Observatory, Point Reyes, CA: assisted with bird banding operations

Research Support:

PI or Co-PI on URI grants over $2.5 million since coming to URI in 1995 from agencies including National Science Foundation, NOAA, Environmental Protection Agency, US Fish and Wildlife Service, National Park Service, CSREES NRI.

Professional Societies/ Honors:

American Ornithologists Union (elective member), Cooper Ornithological Society, Society of Conservation Biologists, Rhode Island Natural History Society (President since 2006), Society for the Study of Reptiles and Amphibians, Wilson Ornithological Society, The Wildlife Society,

Selected Publications (60+ peer-reviewed publications):

Paton, P., L. Gould, P. August, and A. Frost (editors). 2002. Ecology of Block Island. Rhode Island Natural History Survey, Kingston, RI.

Paton, P.W.C. 1994. The effect of edge on avian nest success: how strong is the evidence? *Conservation Biology* 8:17-26.

Paton, P.W.C. and T.A. Pogson. 1996. Relative abundance, migratory strategy, and habitat use of birds breeding in Denali National Park, Alaska. *Canadian Field-Naturalist* 110:599-606.

Paton, P.W.C. and T.C. Edwards, Jr. 1996. Effects of site quality and prior nest success on interyear movement patterns of Snowy Plovers. *Auk*. 113:534-543.

DiQuinzio, D., **P.W.C. Paton**, and W. R. Eddleman. 2001. Site fidelity, philopatry, and survival of promiscuous Saltmarsh Sharp-tailed Sparrows in Rhode Island. *Auk* 118:888-

Paton, P.W.C. and W. Crouch. 2002. Using phenology of pond-breeding amphibians to develop conservation strategies. *Conservation Biology* 18:194-204.

DiQuinzio, D., **P.W.C. Paton**, and W. R. Eddleman. 2002. Nesting ecology of saltmarsh sharp-tailed sparrows in a tidally restricted salt marsh. *Wetlands* 22:179-185.

Egan, R. S., and **P.W.C. Paton.** 2004. Within-pond parameters affecting oviposition by wood frogs and spotted salamanders. Wetlands 24:1-13

Paton, P.W.C. 2005. A review of vertebrate community composition in seasonal forest pools of the northeastern United States. Wetlands Ecology and Management 13:235-246.

Paton, P.W.C., R.J. Harris, and C.L. Trocki. 2005. Distribution and abundance of breeding birds in Boston Harbor. Northeastern Naturalist 12:145-168.

Trocki, C.L., and **P.W.C. Paton**. 2006. Comparison of two foraging habitats used by Glossy Ibis during the breeding season in Rhode Island. Northeastern Naturalist 13:93-102.

Trocki, C.L. and **P.W.C. Paton**. 2006. Assessing habitat selection by foraging egrets in salt marshes at multiple spatial scales. Wetlands 26:307-312.

Montieth, K. and **P.W.C. Paton**. 2006. Emigration behavior of spotted salamanders on golf courses in southern Rhode Island. Journal of Herpetology 40:195-205.

Skidds, D. E., F.C. Golet, **P.W. C. Paton**, and J. C. Mitchell. 2007. Habitat correlates of reproductive effort in Wood Frogs and Spotted Salamanders in an urbanizing watershed. Journal of Herpetology 41:439-450.

Caron, C.M., and **P.W. C. Paton**. 2007. Population trends and habitat use of Harlequin Ducks in Rhode Island. Journal of Field Ornithology 78:254-262.

McDonough, C., and **P.W. C. Paton**. 2007. Salamander dispersal across a forested landscape fragmented by a golf course. Journal of Wildlife Management 71:1163-1169.

Mitchell, J.C., **P.W.C. Paton,** and C. J. Raithel. 2008. The importance of vernal pools to reptiles, birds and mammals. Pp. 169-187 in A.J.K. Calhoun and P.G. deMaynadier. Science and conservation of vernal pools in Northeastern North America. CRC Press, Boca Raton, FL.

Paton, P.W.C., C. McDonough-Haughey, and K. Montieth. *In press*. Migration ecology of spotted salamanders on golf courses in southern New England. In Amphibians in Urban Environments. J. Mitchell and R. Jung (eds). SSAR Special Publication.

Egan, R. S. and **P.W.C. Paton**. *In press*. Multiple scale habitat characteristics of pond-breeding amphibians across a rural-urban gradient. In Amphibians in Urban Environments. J. Mitchell and R. Jung (eds). SSAR Special Publication.

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Education:

1995-2000: Ph. D in Ocean Engineering, Univ. of Rhode Island
1985-1987: M. S in Ocean Engineering, IIT Madras, India
1980-1985: B. S in Civil Engineering, Univ. of Kerala, India

Experience:

Assistant Research Professor, University of Rhode Island	2004-present
Assistant Marine Scientist, University of Rhode Island	2000-2004
Graduate Research Assistant, University of Rhode Island	1995-2000
Project Associate, Indian Institute of Technology, Madras 1	985-1987

Research Projects:

Won 8 Research Grants in the last 5 years as Co-Principal Investigator totaling over $750,000.00. In addition participated in other research projects in the USA and in India as research associate or science team member.

Professional Societies/Honors:

Best student paper awards in Acoustical Oceanography at the Acoustical Society of America Spring meetings in Atlanta, Georgia (2000) and in Norfolk, Virginia, (1998)
Organized special sessions and Chaired sessions at Acoustical Society of America Meetings
Member, Technical Committee on Acoustical Oceanography of Acoustical Society of America (ASA).
Member, Specialty Committee on Ocean Observatories
Reviewer, Journal of Acoustical Society of America and IEEE Journal of Oceanic Engineering (JOE).
Member, Acoustical Society of America, Institution of Engineers (India).

Selected Publications:

Knobles D. P., Yudichak, T. W., Koch R. A., Cable P. G., Miller J. H., Potty, G. R., “Inferences on seabed acoustics in the East China Sea from distributed acoustic measurements,” IEEE J. Oceanic. Eng., 31(1), 129-144, 2006.

Rajan, Potty, Miller, Lynch, Becker and Frisk, “Modal inverse techniques for inferring geoacoustic properties in shallow water,” in Geoacoustic inversion in Underwater Acoustics, Alex Tolstoy ed., Research Signpost, (2008).

Potty, G and Miller, J. H., “Dispersion of broadband acoustic normal modes in the context of long range sediment tomography,”, in Acoustic Inversion Methods and Experiments for assessment of Shallow Water Environment, Chapman, Caiti, Hermand. eds., Kluwer Publishers. (2007).

J. H. Miller, L. Bartek, G. R. Potty, D. J. Tang, J. Na and Y. Qi, " Sediments in the East China Sea," IEEE J. Oceanic. Eng., 29(4), 940-951, 2004.

Potty, G., Miller, J. H., Dahl, P. H., and Lazauski C. J., "Geoacoustic inversion results from the ASIAEX East China Sea Experiment," IEEE J. .Eng., 29(4), 1000-1010, 2004.
Yang Kunde, Ma Yuanliang, Sun Chao, James Miller and G. R. Potty, “Multi-step matched field inversion for broadband data from ASIAEX2001,” IEEE J. Oceanic.Eng., 29(4), 964-972, 2004.
Gopu Potty, James Miller and James Lynch, “Inversion for Sediment Geoacoustic Properties at the New England Bight,” J. Acoust. Soc. Am., 114(4), Pt. 1, 1874-1887, 2003.
Gopu Potty and James Miller, “Tomographic Mapping of Sediments in Shallow Water,” IEEE J. Oceanic. Eng., 28(2), 186- 191, 2003.
K. B. Smith, C. W. Miller, A. F. D’Agostino, B. Sperry, J. H. Miller and G. R. Potty, “Three-dimensional propagation effects near the mid-Atlantic Bight shelf break (L), “," J. Acoust. Soc. Am. 112(2), 373-376, 2002.
Gopu Potty and James Miller, "Non-linear optimization techniques in Geoacoustic Tomography," in Inverse Problems in Underwater Acoustics, edited by M. Taroudakis and G. Makrakis (Springer Verlag, New York, 2001).
Gopu Potty, James Miller, James Lynch and Kevin Smith, "Tomographic Inversion for sediment parameters in shallow water," J. Acoust. Soc. Am. 108(3), Pt.1, 973-986, 2000.
Gopu Potty and James Miller, "Geoacoustic Tomography – Range dependent inversions on a single slice," Journal of Computational Acoustics, Vol. 8, No. 2, 325-345, 2000.

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Education:

Ph. D., Physical Oceanography, 1996, State University of New York at Stony Brook.
M. S., Physical Oceanography, 1984, State University of New York at Stony Brook.
B. E., Mechanical Engineering, 1981, Stevens Institute of Technology.

Research expertise and interests

Coastal physical oceanography with emphasis on observational approaches to characterize circulation and mixing in the coastal ocean and estuaries.

Experience:

2008-present, Professor in Residence, University of Rhode Island.
2006-present, Associate Marine Research Scientist, University of Rhode Island.
2002-2007, Adjunct Professor, University of Rhode Island.
1999-2006, Assistant Marine Research Scientist, University of Rhode Island.
1997-1998, Post-doctoral Researcher, University of Rhode Island.
1996, Adjunct Assistant Professor, SUNY Maritime College.

Selected publications:

Mau-J.C., D.-P. Wang, D. S. Ullman, and D. L. Codiga, 2007. Comparison of observed (HF radar, ADCP) and model barotropic tidal currents in the New York Bight and Block Island Sound, *Estuarine Coastal and Shelf Science,* 72: 129-137, doi: 10.1016/j.ecss.2006.10.011.

O'Donnell, J., D. Ullman, C. Edwards, T. Fake, and A. Allen, 2007. The operational prediction of circulation and Lagrangian trajectories in the coastal ocean, *J. Atmos. Oceanic Technol.,* (accepted with revisions).

Ullman, D. S., J. O'Donnell, J. Kohut, T. Fake, and A. Allen, 2006. Trajectory prediction using HF radar surface currents: Monte carlo simulations of prediction uncertainties, *J. Geophys. Res.,* 111, C12005, doi: 10.1029/2006JC003715.

Ullman, D. S. and D. L. Codiga, 2004. Seasonal variation of a coastal jet in the Long Island Sound outflow region based on HF radar and Doppler current observations, *J. Geophys. Res.,* 109, C07S06, doi: 10.1029/2002JC001660.

Stegmann, P. M. and D. S. Ullman, 2004. Variability in chlorophyll and sea surface temperature fronts in the Long Island Sound outflow region as detected from satellite observations, *J. Geophys. Res.,* 109, C07S03, doi: 10.1029/2003JC001984.

Ullman, D. S., A. C. Dale, D. Hebert, and J. A. Barth, 2003. The front on the Northern Flank of Georges Bank in spring. Part II: Cross-frontal fluxes and mixing, *J. Geophys. Res.,* 108, 8010, doi: 10.1029/2002JC001328.

Selected reports:

Ullman, D., J. O'Donnell, C. Edwards, T. Fake, D. Morschauser, M. Sprague, A. Allen, and B. Krenzien, 2003. Use of Coastal Ocean Dynamics Application Radar (CODAR) technology in U.S. Coast Guard search and rescue planning, U.S. Coast Guard Report CG-D-09-03.

Ullman, D., S. Fontana, and D. Hebert, 2001. U.S. Globec: ADCP Observations on Georges Bank during R/V Oceanus Cruises 340 (28 March to 12 April 1999) and 343 (14 June to 1

July 1999), GSO Technical Report, 00-1, Graduate School of Oceanography, University of Rhode Island, 219pp.

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Education:

B.S. Education, summa cum laude, Miami University, Ohio, 1994
M.S. Biological Oceanography, University ofRhode Island, 1998

Expereience:

1997 - Present: Senior Research Scientist, Marine Acoustics, Inc.
2006 - Present: Research Assistant to Gail Scowcroft, Office ofMarine Programs, Graduate School of Oceanography, University ofRhode Island.
2006 - 2007: Research Assistant to Dr. Frank Golet, Department ofNatural Resources Science, University of Rhode Island.
Fall 2006: Teaching Assistant to Professor Paul Jordan, University of Rhode Island.
Spring 2006: Teaching Assistant to Dr. Thomas Husband, University of Rhode Island.
Fall 2005: Teaching Assistant to Dr. Peter August, University of Rhode Island.

Research Support:

PI or Co-PIon research grants totaling over $2M since 2002 - National Science Foundation, National Oceanic and Atmospheric Administration, Office ofNaval Research.

Relevant Experience:

Researched and prepared environmental impact documentation addressing the effects of underwater sounds from acoustic systems, aircraft, and explosive weapon impacts on the marine environment, with emphasis on marine mammals and bioacoustics. Created an educational website "Discovery of Sound in the Sea" (http://www.dosits.org) with outreach scientists at the University ofRhode Island. Led visual and passive acoustic monitoring teams on research cruises. Conducted biological research and analyses to derive distribution and abundance estimates for acoustic experiments around the world. Performed analytical and experimental modeling to predict and quantify sound exposures of marine mammals using MAI's Acoustic Integration Model©. Project manager for the North Pacific Acoustic Laboratory Environmental Impact Statement and its associated regulatory environmental documentation.

Selected Publications:

Vigness Raposa, K.J. 2007. Does the spatial pattern ofhumpback whales in the North Atlantic Ocean provide insight into their population structure? 22nd Annual Conference ofthe U.S. Chapter of the International Association for Landscape Ecology (US-IALE), Tucson, AZ.

Vigness Raposa, K.J., Scowcroft, G., Johnen, J., Knowlton, C., and Worcester, P. 2006. Discovery of Sound in the Sea website: An educational resource. 151st Meeting of the Acoustical Society of America, Providence, R.I.

Vigness Raposa, K.J. 2006. Assessing the potential effects of underwater sound on marine animals. National Marine Educators Association Conference, New York, N.Y.

Johnen, J. and Vigness Raposa, K.J. 2006. Discovery of Sound in the Sea. National Marine Educators Association Conference, New York, N.Y.
Scowcroft, G., Vigness Raposa, K.J., and Johnen, J. 2005. Discovery of Sound in the Sea: An educational resource. National Science Teachers Association Annual Meeting, Dallas, TX.
Scowcroft, G., Vigness Raposa, K.J., and Johnen, J. 2004. Discovery of Sound in the Sea: An educational resource. National Science Teachers Association Annual Meeting, Atlanta, GA.
Vigness, K.J. 1999. Factors affecting abundance estimates of marine mammal populations. 13th Biennial Conference of the Society for Marine Mammalogy. Maui, HI.
Vigness, K.J. 1999. Visual and acoustic surveys of whales: A Monte Carlo model. 138th Meeting ofthe Acoustical Society of America. Columbus, OH.
Vigness Raposa, K.J. 2007. The spatial patterns ofhumpback whale (Megaptera novaeangliae) sightings and survey effort in the North Atlantic Ocean. 17th Biennial Conference on th Biology of Marine Mammals, Cape Town, South Africa.
Vigness Raposa, K., Scowcroft, G., Knowlton, C., and Worcester, P. 2007. Discovery of Sound in the Sea website: An educational resource. The Effects of Noise on Aquatic Life International Conference, Nyborg, Denmark.
Vigness Raposa, K., Damon, C., Ellison, W.T., Frankel, A. S., LaBash, C., and August, P.V. 2006. Marine Wildlife Behavior Database for predicting and minimizing environmental impacts. ESRI Users Conference, San Diego, CA.
Vigness Raposa, K., Damon, C., Ellison, W.T., Frankel, A. S., LaBash, C., and August, P.V.
2006. Marine Wildlife Behavior Database for predicting and minimizing environmental impacts NOAA Fisheries and MIT Sea Grant Conference on Geographic Information Systems and Ocean Mapping in Support of Fisheries Research and Management, Boston, MA.
Vigness Raposa, K., Scowcroft, G., Johnen, J., Knowlton, C., and Worcester, P. 2005. Discovery of Sound in the Sea: An online educational resource. Sixteenth Biennial Conference on the Biology of Marine Mammals, San Diego, CA.