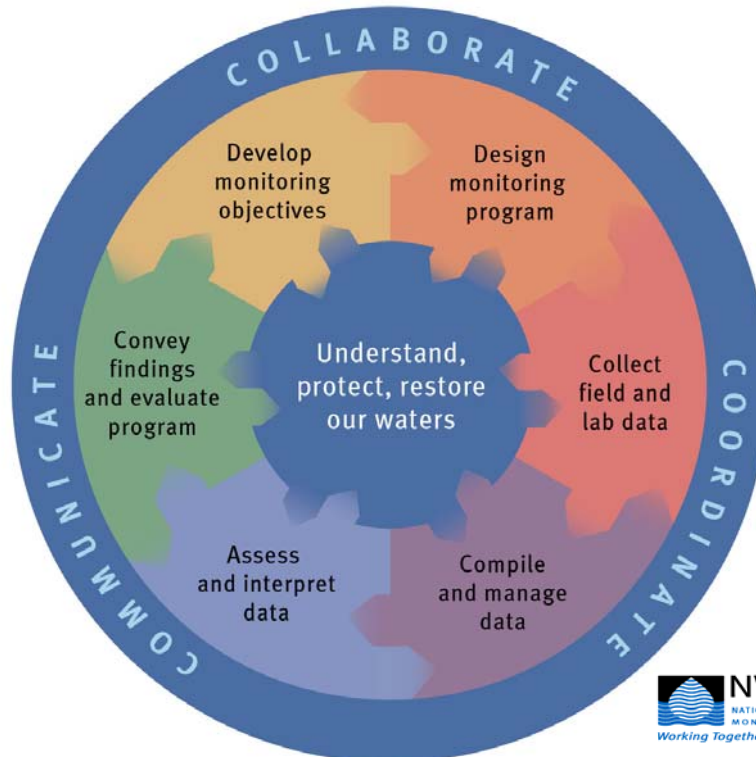




STATE OF RHODE ISLAND  
**BAYS, RIVERS, & WATERSHEDS COORDINATION TEAM**

**FY 2008 Integrated Environmental and  
Economic Monitoring Proposal**



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## Introduction


*The General Assembly recognizes and declares that the health of the waters of the state, including, but not limited to, Narragansett Bay and its watersheds needs to be monitored comprehensively on a long-term basis in order to be proactive in planning and responsive to potential problems in the marine [and freshwater] environment. The availability of consistent environmental [and economic] data supports systems level planning and provides resource managers, decision-makers and citizens with information on how marine [and freshwater] habitats are responding to management programs [and sustainable development efforts] and what adjustments need to be made to existing programs or what new programs must be implemented to achieve a healthy [aquatic] environment. (RIGL 46-23.2-2(2))*


To more effectively manage Rhode Island's fresh and marine waters and their human uses requires comprehensive economic and environmental monitoring. Applying ecosystem-based management to Rhode Island's waters requires the collection and assessment of comprehensive observational data that provides systemic insight into the current and future functioning of our aquatic ecosystems. Without good monitoring, we will never be able to respond credibly to urgent questions and concerns regarding the health of publicly-owned aquatic resources and their capacity to support current and future human uses. Is public health being adequately protected from pollution? How are Rhode Island's aquatic resources impacted by watershed development? How will they respond in the future to large-scale forces such as climate change?


Of equal importance is the development and implementation of an economic monitoring strategy to inform the "promotion of sustainable economic development of the water cluster" (RIGL 46-31). "Economic activities in our bays, rivers, and watersheds take place across a spectrum of reliance upon these water resources. In aggregate, economic activities tied to our water resources accounted for approximately 36,000 direct jobs (7.5% of Rhode Island's employment) and \$1.8 billion in wages (10% of the state's total). Economic monitoring that generates insightful, useful, and credible data will improve our understanding of Rhode Island's water-dependent economy and enable us to formulate better state and local policies for the management and sustainable development of our fresh and marine aquatic resources.


Monitoring is essential for evaluating the performance of state and municipal government: Are aquatic resource protection, management, and sustainable development programs meeting their statutory requirements and strategic goals? How could state resource management and development efforts programs be improved to maximize their beneficial outcomes? Where should we direct future public investments in resource management and development? Comprehensive, integrated environmental and economic monitoring is essential for ensuring management accountability and determining if our programs are achieving their desired outcomes.


In 2004, the Rhode Island General Assembly created The Rhode Island Bays, Rivers, and Watersheds, Coordination Team, the Environmental Monitoring Collaborative, and the Economic Monitoring Collaborative to establish a comprehensive monitoring system for our aquatic resources and the economic, social, and public health values that depend upon them. This proposal identifies and justifies the key environmental and economic monitoring priorities agreed upon by the Rhode Island Coordination Team and the two Monitoring Collaboratives.


<p><b>1- Assessing the Marine Economy</b></p> <p><b>Issue</b></p> <p>RI's water-related economy generates 36,000 direct jobs and \$1.4 billion in wages. What actions should government and business take to ensure the vibrancy of these industries in the future? How can environmental and economic policies and programs reinforce each other? Without up-to-date comprehensive assessments of the water-related economy's current conditions and trends, executive officials and legislators, businesses, and the public will lack the fundamental information required for informed collaboration and decision-making.</p> 	<p><b>Monitoring and Planning Solutions</b></p> <p>FY08 monitoring will explore key issues identified during the FY07 work:</p> <ul style="list-style-type: none"> <li>• Economic and resource use analyses of summertime activities with a focus on tourism, marinas and sailing.</li> <li>• Develop benchmarks for FY07 baseline measures.</li> <li>• Outreach to public and industry, enlisting their help and giving them access to the latest information.</li> <li>• Push for statewide system to track land use change.</li> </ul>
<p><b>Agencies Involved</b></p> <p>The RI Economic Policy Council, the Economic Monitoring Collaborative, the RI Economic Development Corp.</p>	<p>FY 2008 Cost:       \$ 200,000</p> <p>OSPAR Funds:       \$ 30,000</p> <p>Other Funds:       \$ 120,000</p> <p>Requested Funds:   <b>\$ 50,000</b></p>


<p><b>2- Stream-flow Gage Network</b></p> <p><b>Issue</b>  How much water is there at any time in a river or stream or in a watershed? The state's stream-flow gage network consists of up to 35 gages but as of 2005 only 19 were operational. Re-establishing a functional network of stream-flow gages is critical for making numerous planning and management decisions in government and business.</p> 	<p><b>Monitoring Solution</b>  A fully operational, comprehensive stream-flow gage network will provide essential data for:</p> <ul style="list-style-type: none"> <li>• Drought management</li> <li>• Water supply development</li> <li>• Setting permit requirements</li> <li>• Assessing environmental impacts</li> <li>• Designing bridges and culverts</li> <li>• Computing pollutant loads</li> </ul> <p>This program would re-activate or continue operation of 29 of the 35 top priority gage stations, building on support provided by the Coordination Team in 2006. New stream-flow gage stations would be established in the Blackstone, Hunt, Pawtuxet, Westport and Pawcatuck River Watersheds.</p> <p>Data from the gages will be available on the Internet.</p>								
<p><b>Agencies Involved</b>  The RI Water Resources Board and RI DEM currently fund 25 gages, three of which are made possible by Coordination Team support. The Providence Water Supply Board and Ocean State Power each fund one stream gage. The WRB will fund an additional three gages as part of its Big River Groundwater Development Project. All operated and maintained through an agreement with USGS.</p>	<table> <tr> <td>FY 2008 Cost:</td> <td>\$ 269,000</td> </tr> <tr> <td>OSPAR Funds:</td> <td>\$ 67,000</td> </tr> <tr> <td>Other Funds:</td> <td>\$ 137,000</td> </tr> <tr> <td>Requested Funds:</td> <td><b>\$ 65,000</b></td> </tr> </table>	FY 2008 Cost:	\$ 269,000	OSPAR Funds:	\$ 67,000	Other Funds:	\$ 137,000	Requested Funds:	<b>\$ 65,000</b>
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<p><b>3- Bay-Wide Water Quality Monitoring</b></p> <p><b>Issue</b>  Bay-wide water quality monitoring is essential to measuring RI's progress toward reducing hypoxia (low dissolved oxygen conditions) and to developing a better understanding of how Narragansett Bay functions ecologically.</p> 	<p><b>Monitoring Solution</b>  The recently developed, fixed-site buoy serves as an early warning system for hypoxia in the upper bay and provides the data for RI DEM's weekly bay water quality assessments during the summer. It generates continuous, synchronous data on key water quality parameters (including temperature, dissolved oxygen, salinity, and biological productivity) at 13 strategic locations across Narragansett Bay.</p> <p>Data from the entire network is processed and publicly released via the Internet.</p>
<p><b>Agencies Involved</b>  RI DEM-Office of Water Resources, URI Graduate School of Oceanography (GSO), URI Coastal Institute, the Narragansett Bay Commission (NBC), the Narragansett Bay National Estuarine Research Reserve (NBNERR), and Roger Williams University. The network has been developed and recently supported by federal funds from the Bay Windows Project (which may not be available in FY 2008) and US EPA.</p>	<p>FY 2008 Cost:       \$ 370,000</p> <p>OSPAR Funds:       \$ 33,000</p> <p>Other Funds:       \$ 130,000</p> <p>Requested Funds:   <b>\$ 207,000</b></p> <p>This supports a contract between GSO &amp; DEM to provide labor &amp; support to maintain 8 stations (\$170,000), NBNERR contractual staff (2 stations), DEM seasonal staff, supplies and equipment replacement.</p>


<p><b>4- Large River Water Quality Monitoring</b></p> <p><b>Issue</b>          To measure improvements in Narragansett Bay water quality due to forthcoming reductions of nitrogen discharges from sewer plants, it is essential to monitor Rhode Island's largest rivers that receive wastewater discharges and empty into Narragansett Bay and other RI coastal waters. In particular, monitoring is needed to track pollutants originating in the Massachusetts portion of the Narragansett Bay watershed and entering RI waters via the Blackstone River.</p> 	<p><b>Monitoring Solution</b>          This project will enable RI DEM to resume its partnership with the US Geological Survey (USGS) to sample eight riverine locations monthly for 17 chemical and physical parameters, and metals on a quarterly basis. Sampling stations will be located on the:</p> <ul style="list-style-type: none"> <li>• Blackstone River</li> <li>• Pawtuxet River</li> <li>• Pawcatuck River</li> </ul> <p>The data collected in this program are used to assess compliance with water quality standards. The information is published in regional USGS reports and made available on a website.</p>
<p><b>Agencies Involved</b>          The RI Department of Environmental Management (DEM) contracts with the USGS for performance of this work. Work is coordinated with MA and Coordination Team as appropriate.</p>	<p>FY2008 Cost:       \$ 255,000</p> <p>OSPAR Funds:       \$ 70,000</p> <p>Other Funds:       \$ 30,000</p> <p>Requested Funds:   <b>\$ 85,000</b></p> <p>Remaining Need:   \$ 70,000</p> <p>Other funds: \$30,000 in match from USGS.</p>

<p><b>5- Rotating Assessment of Rivers &amp; Streams</b></p> <p><b>Issue</b>  In addition to data gaps regarding Rhode Island's 300 ponds and lakes, we lack critical data on water quality conditions in rivers and streams. This data is required for assessing ecological conditions, identifying pollution problems, and measuring progress in restoring water quality. Without this information, it is impossible to ascertain which rivers and streams are polluted and which are safe for fishing, swimming, and other human activities.</p> 	<p><b>Monitoring Solution</b>  RI DEM's current program will be expanded to support statewide assessment of <u>all</u> rivers and streams every five years. Up to 100 stations on 350 miles of river and streams will be sampled in targeted watersheds annually. This comprehensive approach will assess:</p> <ul style="list-style-type: none"> <li>• Physical measurements</li> <li>• Habitat condition</li> <li>• Stream organisms indicative of healthy and polluted systems</li> <li>• Water chemistry</li> <li>• Pathogens (enterococci)</li> </ul> <p>These enable will enable RI DEM to assess the fresh water quality and river and stream habitat quality across entire watersheds.</p>										
<p><b>Agencies Involved</b>  RI DEM implements this program with contractual support from URI Civil and Environmental Engineering and Environmental Sciences Services Group, Inc. Local watershed groups and other environmental organizations assist in identifying sampling locations.</p>	<table border="0"> <tr> <td>FY2008 Cost:</td> <td>\$ 435,000</td> </tr> <tr> <td>OSPAR Funds:</td> <td>\$ 50,000</td> </tr> <tr> <td>Other Funds:</td> <td>\$ 150,000</td> </tr> <tr> <td>Requested Funds:</td> <td><b>\$ 195,000</b></td> </tr> <tr> <td>Remaining Need:</td> <td>\$ 40,000</td> </tr> </table> <p>Watersheds to be sampled in FY2008: Pawtuxet River, Moshassuck River, and Woonasquatucket River.</p>	FY2008 Cost:	\$ 435,000	OSPAR Funds:	\$ 50,000	Other Funds:	\$ 150,000	Requested Funds:	<b>\$ 195,000</b>	Remaining Need:	\$ 40,000
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<p><b>6- Freshwater Fish Contamination Monitoring</b></p> <p><b>Issue</b>          Very little is known about extent of pollutant contamination in fish inhabiting Rhode Island's rivers, streams, lakes and ponds. This represents the state's largest data gap in documenting progress toward achieving fishable and swimmable clean water goals. It also poses of substantial public health risk, particularly for immigrant communities that engage in subsistence fishing, but also for recreational fishers in general.</p> 	<p><b>Monitoring Solution</b>          Standardized monitoring of freshwater fish contamination will entail measuring fish tissue levels of:</p> <ul style="list-style-type: none"> <li>• Mercury, cadmium, lead, arsenic, PCBs, chlordane</li> <li>• Other toxics as warranted (e.g., dioxin)</li> </ul> <p>These data are essential for determining when it is safe to consume fish caught in Rhode Island waters. Data will be used by Department of Health to issue fish consumption advisories as needed to protect public health. Data will made available in watershed reports and via a website.</p>
<p><b>Agencies Involved</b>          RI DEM will implement this program in cooperation with the Department of Health. Local and volunteer organizations will provide information on fishing activity within Rhode Island's watersheds and freshwater bodies</p>	<p>FY 2008 Cost:        \$130,000</p> <p>Other Funds:         \$ 38,000</p> <p>Requested Funds:    <b>\$ 23,000</b></p> <p>Remaining Need:     \$ 69,000</p>

<p><b>7- Invasive Species Monitoring</b></p> <p><b>Issue</b>  Invasive, non-native plants and animals can destroy the value of Rhode Island's fresh and marine waters for fishing, boating, swimming, and industry. They displace native species and permanently alter the look and utility of our landscape. Once a new species is established, annual economic losses and control costs can reach millions of dollars. Many potentially destructive species are not yet established in RI and there are prudent steps to take now to prevent their introduction and/or control their impact.</p> 	<p><b>Monitoring and Planning Solution</b>  The Rhode Island Invasive Species Monitoring and Response Plan will:</p> <ul style="list-style-type: none"> <li>• Create a coordinated monitoring system with trained observers, a reporting system, and rapid response plans.</li> <li>• Review prevention and control assets and vulnerabilities and prioritize improvements</li> <li>• Monitor invasions in nearby jurisdictions and coordinate with regional partners.</li> <li>• Outreach to public and industry, enlisting their help and giving them access to the latest information.</li> </ul>
<p><b>Agencies Involved</b>  The Rhode Island Natural History Survey (RINHS) will lead this effort in close partnership with RI DEM, Coastal Resources Management Council, and URI.</p> <p>Key federal stakeholders include USEPA, USDA, NOAA, and USFWS.</p>	<p>Requested Funds: <b>\$ 25,000</b></p>

<p><b>8- Un-assessed Lakes and Ponds Monitoring</b></p> <p><b>Issue</b> Water quality monitoring volunteers currently monitor only about <u>70</u> of RI's 300 lakes and ponds. This project will enable URI Watershed Watch staff, students, and volunteers to monitor a number of the currently un-assessed lakes and thus help close the gap in lake/pond water quality data and information.</p> 	<p><b>Monitoring Solution</b> Watershed Watch will assess basic water quality and human health indicators including: Water clarity &amp; acidity, temperature and dissolved oxygen, Nutrient levels, Algae levels &amp; aquatic plants Pathogens (enterococci)</p> <p>All results will be available via the Internet and entered into RIDEM water quality databases.</p>
<p><b>Agencies Involved</b> URI Watershed Watch, a program of the University of Rhode Island's College of the Environment and Life Sciences is a scientist-led program that provides and organizes monitoring equipment, volunteer training, volunteer monitors, water samples analyses, and results reporting.</p>	<p>Anticipated Funds: \$ 20,000</p>

<p><b>9- Upper Narragansett Bay Dissolved Oxygen Surveys</b></p> <p><b>Issue</b>  Measuring the extent and severity of low dissolved oxygen in the upper half of Narragansett Bay is critical to be able to distinguish impacts due to excess nutrients from year-to-year natural variability.</p>  <p>Information on the extent and severity of hypoxia (&lt; 2.9 DO mg/L) occurring in Narragansett Bay is required to assess and guide treatment upgrades in upper bay wastewater treatment plants and related facilities.</p>	<p><b>Monitoring Solution</b></p> <ul style="list-style-type: none"> <li>• Monthly summertime (June-Sept.) surveys of dissolved oxygen.</li> <li>• Summer neap tide DO surveys</li> <li>• Data processing, map making, and information dissemination</li> </ul> <p>The DO seasonal survey will reveal which regions of Narragansett Bay experience hypoxia (&lt; 2.9 DO mg/L) and anoxia (&lt; 1-2 DO mg/L). DO monitoring data will be made available via a dedicated web site managed by Brown University.</p>
<p><b>Agencies Involved</b>  The Narragansett Bay Estuary Program, Brown University, RI DEM.</p>	<p>Anticipated Funds: \$10,000</p>

<p><b>10- Freshwater Beach Water Quality Monitoring</b></p> <p><b>Issue</b>  95 of the 349 beach closure days in 2006 occurred at state freshwater beaches. In contrast to state marine beaches, Rhode Island does not conduct water quality monitoring at its public freshwater beaches.</p>  <p>Currently, the managers of all RI's 53 licensed freshwater beaches are required to collect beach water samples and have them certified as protective of public health. But RI lacks the monitoring program needed to identify and help eliminate fecal contamination sources.</p>	<p><b>Monitoring Solution</b>  The Department of Health will conduct risk-based sampling surveys to identify the sources of fecal contamination that lead to freshwater beach closures. Freshwater beach monitoring will reduce bathing related illnesses caused by waterborne pathogens</p> <p>The Department of Health will work closely with the Department of Environmental Management (RI DEM) and local officials to eliminate pathogen sources that directly impact beach water quality.</p> <p>Monitoring data and beach closure information will be immediately available to the public on the Department of Health's website.</p>
<p><b>Agencies Involved</b>  The Department of Health's Beach Monitoring Program partners with the US Environmental Protection Agency; RI DEM; the University of Rhode Island; community leaders, Recreation and Public Works Directors; beach managers; community groups; and consultants.</p> <p>The Department of Health will evaluate conditions at freshwater beaches, notify the public of beach closures and re-openings, and conduct sanitary surveys to identify sources of contamination, and promote remediation efforts.</p>	<p>FY 2008 Cost: \$100,000</p> <p>Requested CT Funds: <b>\$100,000</b></p> <p>This funding will also support the laboratory analyses of collected samples.</p>



## RI Bays, Rivers, and Watersheds Coordination Team

### **Mission:**

*To define, coordinate, and implement interagency goals and policies for the ecosystem-based protection, management, restoration, and sustainable development of the fresh and marine waters and watersheds of Rhode Island and southern New England.*

### **Purpose:**

No single state executive agency possesses the statutory authority or management capacity to address comprehensively the full range of complex, inter-locking issues pertaining to the protection and restoration of the bays, rivers, and watersheds of Rhode Island.

Through interagency coordination of all government functions, programs, and regulations that affect the well-being and sustainable use of Rhode Island's bays, rivers, and watersheds, the Coordination Team joins together the discrete responsibilities of its member agencies to address the challenges Rhode Island faces in aquatic resource and watershed management, to balance and integrate environmental and economic development goals to enhance environmental and economic sustainability, and to develop interagency capacities to anticipate and plan for emerging environmental and regional economic issues.

The Coordination Team provides supports the legislative and executive branch oversight responsibilities of the Rhode Island General Assembly, via policy analyses, strategic planning, budgeting and program evaluation, and increased executive agency performance accountability.

### **2007 Goals:**

- Develop and lead implementation of a strategic, interagency Plan that establishes long-term, over-arching state goals and priorities for aquatic environmental management and sustainable development.
- Develop the capacity and means as a Team to identify and resolve immediate and urgent on-the-ground issues and challenges.
- Enhance the conduct, assessment, integration and utilization of environmental and economic monitoring.

**Rhode Island Bays, Rivers, and  
Watersheds Coordination Team**

Ames B. Colt, Ph.D.  
*Chair*

Kevin Flynn  
*Associate Director  
RI Division of Planning*

Saul Kaplan  
*Executive Director  
RI Economic Development  
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Juan Mariscal, P.E.  
*General Manager  
RI Water Resources Board*

Raymond Marshall, P.E.  
*Executive Director  
Narragansett Bay  
Commission*

Sharon Pavignano  
*Chair  
RI Rivers Council*

W. Michael Sullivan, Ph.D.  
*Director  
RI Department of  
Environmental Management*

Michael M. Tikoian  
*Chair  
RI Coastal Resources  
Management Council*

**Coordination Team Sub-Committees**

**Environmental Monitoring Collaborative**  
Peter August, Ph.D., Chair  
*URI Coastal Institute*

Thomas Uva, Vice-Chair  
*Narragansett Bay Commission*

Susan Kiernan, Vice-Chair  
RI Depart. of Environmental Management

**Economic Monitoring Collaborative**  
Kip Bergstrom, Chair  
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**Public Advisory Committee**  
Chip Young, Chair  
*URI Coastal Resources Center*

**Science Advisory Committee**  
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*Brown Univ. Center for Environmental  
Studies*