



## The Estuaries Project Massachusetts Estuaries Project

### Introduction

The Massachusetts Estuaries Project, through the University of Massachusetts-Dartmouth School of Marine Science and Technology (SMAST), supports the Massachusetts Department of Environmental Protection (DEP) in the development and implementation of policies to protect nitrogen-sensitive coastal embayments. The Project collects data and develops models to manage and restore the 89 embayment systems that comprise the coastline of southeastern Massachusetts. The Project encompasses new technologies, regulatory approaches and funding mechanisms to reduce the costs of conducting estuarine restoration.

### The Problem

Coastal embayments throughout the State of Massachusetts (and along the U.S. eastern seaboard) are becoming nutrient-enriched. Many of Massachusetts' embayments have nutrient levels that approach or exceed the point at which the coastal ecosystem is threatened. The increase in nutrients is primarily caused by changes in watershed land-use due to increasing population near the coast. By reducing the ability of near-coastal waters to support sea life, this form of pollution has direct consequences for the culture and economy of Massachusetts' coastal communities.

Nitrogen is the nutrient that most threatens the Commonwealth's coastal embayments. The primary sources of this nitrogen are wastewater disposal and fertilizers, with indirect increases resulting from alterations to freshwater hydrology associated with development. Streams and rivers throughout the coastal region carry these waste products into the sea, concentrating their impact on the coastal ecosystem.

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## *The Estuaries Project*

Many municipalities have attempted to determine how much nitrogen estuaries could sustain before the coastal ecosystem sustained irreparable damage. Wastewater planning and implementation within the region is estimated to cost between \$2 billion and \$3 billion over the next 20 years. Unfortunately, their estimates were often inaccurate or incomplete, leading to poor planning assumptions and the risk of new liabilities for taxpayers.

To achieve consistent region-wide progress, it was necessary to reduce the amount of municipal and state funds dedicated to planning and implementation of new wastewater management techniques. The lack of consistent design targets for these large municipal capital projects was resulting in significant delays, and often the need for additional implementation studies. This inconsistency caused 1) increased cost burdens for communities, and 2) time-consuming debate over appropriate methodology for determining nutrient targets, rather than development of effective mitigation plans.

## **The Solution**

The Estuaries Project, through the University of Massachusetts – Dartmouth School of Marine Science and Technology (SMASST) provides technical support to the Massachusetts Department of Environmental Protection (DEP) for the development and implementation of policies on nitrogen sensitive embayments. Controlling and managing nutrient loads improves water quality and estuarine health, and has a direct influence on tourism, property values and the shellfish and finfish industries. By combining the resources of a state university renowned for its expertise on estuarine environments with the state regulatory agency responsible for the maintenance of water quality, the Project is able to produce

sophisticated scientific assessments for the benefit of all stakeholders. These assessments are made more consistently and cost-effectively than programs run directly by municipalities. Over the past five years of the Project most of the region's municipalities have formally partnered, established high level contacts and/or provided financial support to the Project. The Project has met all municipal match requirements both for the first and second years.

The purpose of the assessment process is to study estuaries' potential for assimilating nutrients, primarily nitrogen from human wastewater. Based on the assimilative capacities (nutrient threshold) of a coastal system, a multitude of infrastructure and management approaches are recommended to town governments. The planning and engineering components of this process are made clearer, more manageable and far more cost effective. Costs of municipal infrastructure improvement efforts are reduced because projects are scaled and implemented relative to a specific target nutrient load, not inaccurate estimates that tend to over-manage in some areas and under-manage in other portions of a coastal system.

The Massachusetts Estuaries Project realizes cost savings from a variety of mechanisms, most notably the utilization of university resources. The Project makes an effective application of university resources to meet environmental needs of municipalities and the citizens of Massachusetts.

The unique structure of the Estuaries Project has made it possible to conduct data collection, synthesis, modeling and management planning for less than 25% of the cost of analogous private sector projects. From the municipal standpoint, the savings will range between \$25-\$35 million over the 6 year project.

However, this number is meager in comparison to the savings anticipated from the innovative nitrogen management actions that are supported by the DEP through the Estuaries Project approach. These actions include the use of a variety of natural processes for nitrogen removal aimed at reducing the need for costly infrastructure projects, like sewers and treatment facilities. A most conservative estimate of savings based only on infrastructure reductions would be 10%, or about \$100 million for Cape Cod alone.

Due to the efficiency of the Project’s working partnerships, the State funds only about half of the cost associated with the estuary specific evaluations and resultant technical reports. The remainder of the evaluation effort is funded through municipal resources, regional governments and federal grants.

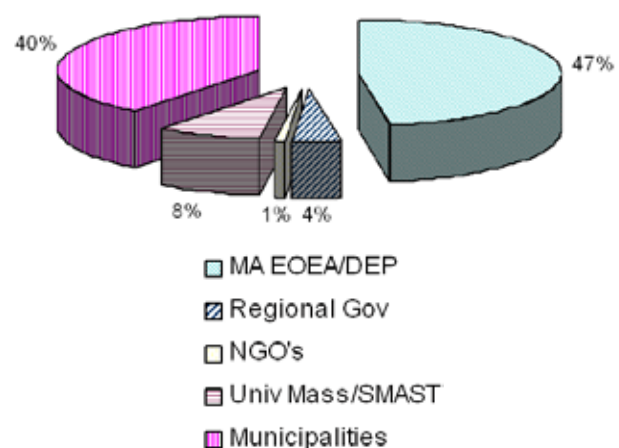
The Estuaries Project is re-energizing the water quality management efforts of many participating communities. Municipalities from Duxbury, south to the Rhode Island state line have entered into the Project’s strategic partnerships. Participating towns whose embayments have been investigated over the course of the past five years are receiving a set of reports upon which watershed nitrogen management strategies can be tailored for specific watersheds. Barnstable County has put in place a Wastewater Implementation Committee, with the task of developing a way forward on policy and procedure as the management targets of the Estuaries Project move to implementation. The Cape Cod Business Round Table has focused on the critical need for nitrogen management to protect Cape Cod’s estuaries. The Round Table has estimated costs of wastewater treatment alone will cost the region about \$1 billion over the next 20 years.

It is important to note over the past five years of the Project, diverse governmental sources of funding have been garnered. The state DEP has provided approximately \$4 million, UMass-Dartmouth has contributed \$250,000 in funds and roughly \$500,000 in indirect support, and Barnstable County has contributed \$500,000 through FY 2007.

Municipal support in the first year was primarily based upon in-kind contributions of previously collected data. The Estuaries Project philosophy has been to credit municipalities with the value of usable data that they may have collected previously. The credit is based upon the cost offset to the Project, in other words the cost that would have been incurred by the Project to perform that data collection task. Over the project period this municipal credit will reach almost \$2 million. This approach has served 3 purposes. First, the Project was made more cost efficient. Second, it jump-started the involvement of municipalities by lowering the cost of entry. Third, the Estuaries Project was shown to be true to its mission of being an overarching synthesis to support management and implementation, rather than “just another study.” Over the course of the Project, in-kind support has typically led to direct support.

The overall cost sharing for the \$12.5 million Project is shown below, based upon the initial 2 years of funding, contracts for years 2 and 3 currently in-hand, and conservative projections of municipal/private support. (These numbers are subject to change.)

**Massachusetts Estuaries Project Funding Sources**



The success of the Estuaries Project relative to the restoration/protection of the 89 embayments in southeastern Massachusetts requires working partnerships with the municipalities within the adjacent watershed areas and close coordination of their implementation efforts. In order to move from assessment, to engineering targets, to implementation of restoration plans, the Estuaries Project requires, for a given system (a) at least 3 years of baseline water quality data, (b) high level Town-side Estuaries Project Committee, and (c) Project support. As the Project enters its sixth year, it has met these criteria with most towns and has collected the high-level field data needed for the modeling and synthesis of 88 of the 89 embayment systems. Nutrient Threshold Reports have been completed in 33 of the 89 embayments listed under the project to receive data collection, modeling and synthesis.

The success of the project is demonstrated by its ability to attract municipal funding. It has not been uncommon to have multiple funding articles at Town Meetings voted down, followed by a near unanimous vote for Estuaries Project funding.

Communities in the study area have responded to the Project's promise of regulatory certainty as nutrient thresholds lead to the implementation stages of restoration. The approach has been reviewed extensively and approved by both state and federal environmental regulatory agencies. The Estuaries Project approach has reduced friction throughout the embayment watersheds of the region, the municipal watershed and infrastructure improvement master planning and permitting process.

## Relevance to Massachusetts

Although not all of the region's municipalities are fully engaged in the Estuaries Project, most of the remaining towns have already contributed by expending financial capital and initiating related community efforts towards necessary water quality monitoring. Additional communities have articles on upcoming town meeting warrants to do the same. Most have established working committees at the upper levels of town government to assist with meeting the Projects objectives at the local level. These working committees help to move Towns forward, building on the work of the Project.

## Conclusion

It is a rare circumstance when local, state and federal government groups, business and citizens can pool resources through partnerships to make a complex scientific problem understandable, manageable and correctable. The Massachusetts Estuaries Project is accomplishing just that.

