4-25-2005

Eelgrass Distribution in the Great Bay Estuary 2003

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A Final Report to

The New Hampshire Estuaries Project

Submitted by

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April 25, 2005

This report was funded by a grant from the New Hampshire Estuaries Project, as authorized by the U.S. Environmental Protection Agency pursuant to Section 320 of the Clean Water Act.

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Introduction

Eelgrass (*Zostera marina*) is an essential habitat for the Great Bay Estuary (GBE) because it provides food for wintering waterfowl and habitat for juvenile fish. Eelgrass is the basis of an estuarine food chain that supports many of the recreationally, commercially and ecologically important species in the estuary. Additionally, eelgrass filters estuarine waters, removing both nutrients and suspended sediments from the water column. Eelgrass in the Great Bay Estuary is the largest monoculture in the State of New Hampshire and is considered a vital resource to the State's marine environment. The UNH Seagrass Ecology Group has mapped the distribution of eelgrass in Great Bay every year from 1986 to 2001 (Short, unpublished data). Eelgrass in the entire Great Bay Estuary system (Great Bay, Little Bay, tidal tributaries, Piscataqua River, and Portsmouth Harbor) was mapped in 1996, and from 1999 through 2003.

Eelgrass cover in Great Bay has been relatively constant for the past 10 years at approximately 2,000 acres. Earlier, in 1989, there was a dramatic decline in eelgrass beds to only 300 acres (15% of normal levels). The cause of this crash was an outbreak of a slime mold, *Labryrinthula zosterae*, commonly called "wasting disease". Recently, the greatest extent of eelgrass in the GBE was observed in 1996. The University of New Hampshire provided digitized eelgrass distribution information in Great Bay Estuary for the years 1999-2001 to NHEP database. Additionally, the 2002 eelgrass coverages are now in the NHEP database.

In 2004, the NHEP funded annual monitoring for eelgrass in GBE. We collected aerial photography of eelgrass coverage for 2004 and mapped eelgrass distribution for 2003 from the information gathered the previous year. The present report presents the eelgrass distribution information for 2003.

Project Goals and Objectives

UNH has now completed the 2004 project under contract to the NH Estuaries Project. The project goals and objectives of the contract were to:

(1) map eelgrass distribution in GBE for 2003 based on aerial photography and ground truth;
(2) acquire aerial photography of the Great Bay Estuary in 2004;
(3) conduct eelgrass ground truth observations of the 2004 aerial imagery..

The final work product is ArcInfo files of eelgrass distribution throughout the Great Bay Estuary in 2003, including all necessary documentation/metadata for the ArcInfo files, and this final report describing the results and any deviations from the protocols established in the QA Project Plan.

Methods

The methods for this project followed the procedures specified in the approved QA Project Plan (Short and Trowbridge, 2003).

Results and Discussion

The shapefiles containing the eelgrass distribution data were provided to the NHEP Coastal Scientist by email. Metadata for the shapefiles is as follows:

Codes for cover classes:

- p = 10 to 30 % cover
- h = 30 to 60 % cover
- sb = 60 to 90 % cover
- d = 90 to 100 % cover

Eelgrass percent cover below 10% cannot be detected in the aerial photography.

In 2003, eelgrass distribution and percent cover generally increased in most areas of the Great Bay Estuary over 2002. Eelgrass was present throughout much of its expected range in the estuary. There was higher percent cover than in 2002, representing an overall decrease in eelgrass abundance.

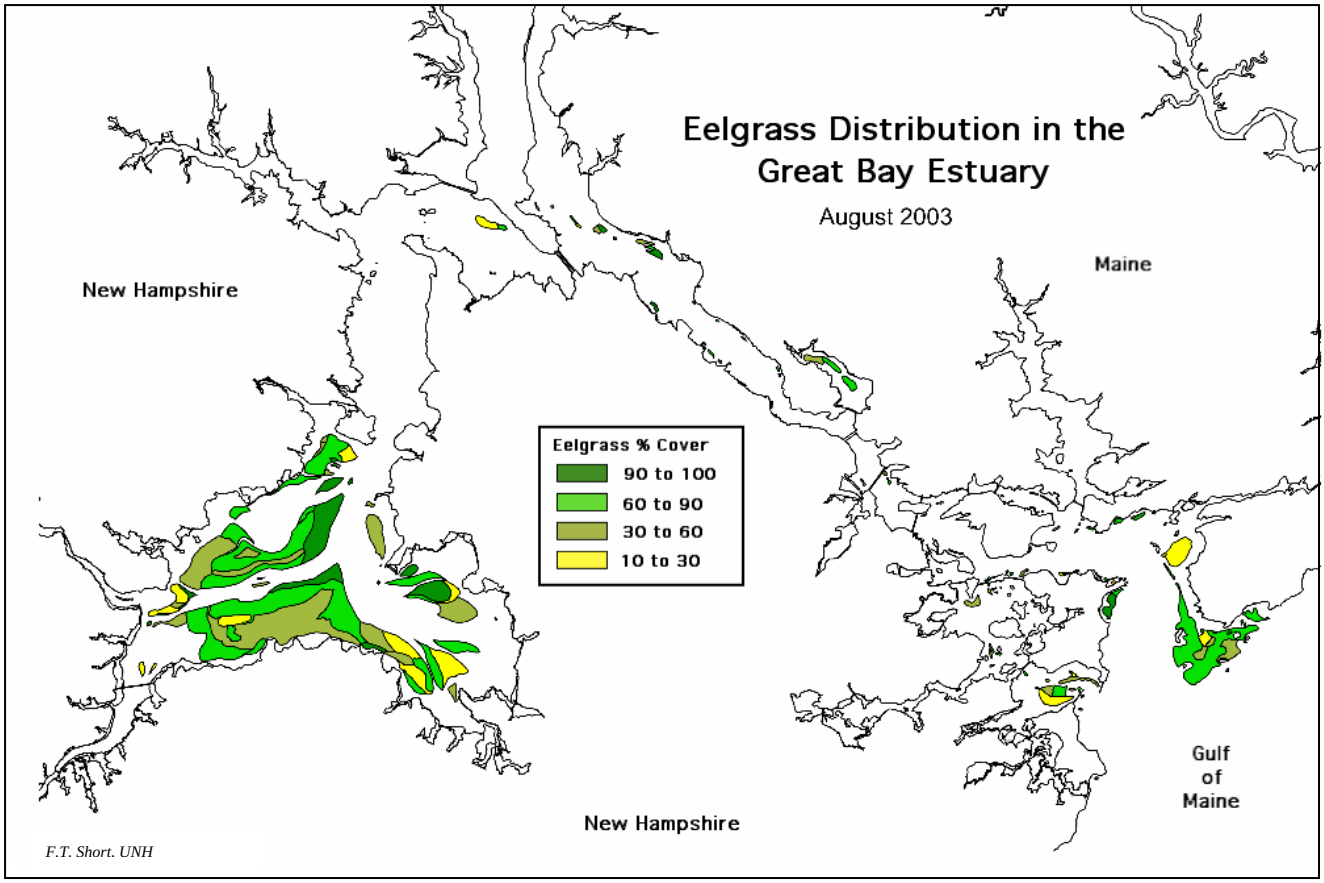
Eelgrass in the central part of Great Bay increased in density and extent over 2002 conditions. Many of the eelgrass beds lost between 2001 and 2002 in the northwest area of the Great Bay adjacent to Adams Point were reestablished in 2003, although some at fairly low cover. Further south, along the western side of Great Bay, a large flat of eelgrass was lost due to wasting disease. The eelgrass bed along the eastern side of Great Bay near Thomas Point increased in size. In Greenland Bay, some areas showed an increase in density while other areas of loss were apparent. Losses in Great Bay were the result of ongoing wasting disease outbreak. Ironically, there was loss of eelgrass habitat, albeit small, in Great Bay to the construction of experimental oyster reefs; more careful siting would avoid such impacts.

In Little Bay between 2002 and 2003, the eelgrass beds showed some recovery in both distribution and density. There was no eelgrass present in the Oyster River. There are still large areas of Little Bay and the Bellamy River which historically supported eelgrass that remain unvegetated.

There was recovery and expansion of eelgrass in the Piscataqua River in 2003. The two new eelgrass beds on the Maine side of the river across from the General Sullivan Bridge expanded in 2003 and new, small eelgrass beds appeared in that area. On the New Hampshire side of the Piscataqua River, the predominant eelgrass beds remain those restored in the 1993 – 95 New Hampshire Port Mitigation Project. These restored eelgrass beds expanded from 2002 to 2003.

In Portsmouth Harbor and Little Harbor, most eelgrass beds increased in density. The exception was the near total loss of the eelgrass meadow between Gerrish and Fishing Islands in Portsmouth Harbor, which was destroyed by grazing Canada geese.

Of all the areas surveyed for 2003, only Great Bay itself retains eelgrass in amounts similar to historic levels; Little Bay, the Piscataqua River, and Portsmouth Harbor, while seeing some increases between 2002 and 2003, all have vastly decreased eelgrass beds compared to historic distributions and densities.



Conclusions and Recommendations

1. Continue annual monitoring of eelgrass in the Great Bay Estuary.
2. Restore eelgrass in Little Bay and the Oyster and Bellamy Rivers.
3. Conduct quantitative monitoring of the wasting disease in the Great Bay Estuary.
4. Institute best management practices in the Great Bay Estuary to reduce boating and mooring impacts to eelgrass.
5. Create a map of potential eelgrass habitat for the Great Bay Estuary.
6. Avoid both actual and potential eelgrass habitat when siting other restoration activities in the estuary.

References

Short and Trowbridge (2003) UNH Eelgrass Monitoring Program, Quality Assurance Project Plan, Version 1, Final. University of New Hampshire and NH Estuaries Project, June 30, 2003.