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A Final Report to

The Piscataqua Region Estuaries Partnership

submitted by

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Introduction

Eelgrass (*Zostera marina* L.) is an essential habitat for the Great Bay Estuary (GBE) because it is the basis of an estuarine food web that supports many of the recreationally, commercially and ecologically important species in the estuary and beyond. Eelgrass provides food for ducks, geese and swans, as well as food, nursery habitat, and shelter for juvenile fish and shellfish. Eelgrass filters estuarine waters and improves water clarity, removing both nutrients and suspended sediments from the water column; its roots and rhizomes bind and hold sediments in place, thereby reducing turbidity. Historically, eelgrass has been the primary habitat in the Great Bay Estuary, for many decades covering the most area of any of the three major habitats: eelgrass, salt marsh, and mud flat. Eelgrass in the Great Bay Estuary is a vital resource to the State of New Hampshire's marine environment, and eelgrass habitat is essential to the health of the estuary (Trowbridge 2006, Short 2014). The report was written for the Piscataqua Region Estuaries Partnership (PREP), and covers the entire Great Bay Estuary, from the Atlantic Coast to the Great Bay, and including the estuarine portions of the tributaries.

Project Goals and Objectives

UNH has now completed the 2015 eelgrass mapping project under contract to PREP. The project goal, and the objective of the contract, was to map eelgrass distribution by cover class in the Great Bay Estuary for 2015 based on aerial photography and ground truth, as well as to report on eelgrass biomass.

The final work products are ArcInfo shapefiles of eelgrass distribution throughout the Great Bay Estuary for 2015, including all necessary documentation/metadata for the ArcInfo files, and this final report describing the results of the findings for 2015.

Methods

The methods for this project followed the procedures specified in the approved QA Project Plan (Short and Trowbridge, 2010). Biomass estimate methods are described on Page 238 of the "Final Environmental Data Report December 2012: Technical Support Document for the 2013 State of Our Estuaries Report" (PREP 2012).

The present report describes and interprets the eelgrass distribution, percent cover and biomass data collected in 2015 for the Great Bay Estuary. "Distribution" refers to acres of estuary where eelgrass is present; that is, there is at least 10% cover of eelgrass. "Biomass" refers to an estimate of the dry weight of eelgrass in the estuary (in tons), including above and below ground plant matter.

Results

The shapefiles containing the eelgrass distribution data for 2015 have been provided to the PREP Coastal Scientist by email and are available through NH Granit (granit.unh.edu) or through the NH DES "Eelgrass Viewer" at:

<http://nhdes.maps.arcgis.com/apps/webappviewer/index.html?id=2792e57da2704867b164c17aee2dc43e>

Metadata for the shapefiles is as follows:

Codes for cover classes:

10 to 30% cover = P (Patchy or sparse)

30 to 60% cover = H (Half)

60 to 90% cover = SB (Some Bottom)

90 to 100% cover = D (Dense)

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

Table 1. Eelgrass distribution in acres for various components of the Great Bay Estuary, going to back to 1996, the peak year for eelgrass distribution since mapping began in 1984 (Short et al. 1986). (Data from F. T. Short, UNH, partially funded by PREP since 2004).

Year	Great Bay	Little Bay	Oyster River	Piscataqua River	Portsmouth Harbor	Little Harbor	Total for Great Bay Estuary
1996	2503	33	14	33	238	74	2894
1997	2305	-	-	-	-	-	-
1998	2398	-	-	-	-	-	-
1999	2130	26	0	12	238	53	2459
2000	1945	8	0	13	256	63	2285
2001	2392	11	0	22	262	48	2735
2002	1795	4	0	18	262	65	2145
2003	1627	14	0	35	262	58	1996
2004	2042	14	0	21	204	70	2349
2005	2175	26	0	25	227	55	2507
2006	1321	12	0	23	213	54	1623
2007	1245	0	0	6	194	44	1489
2008	1395	0	0	4	176	44	1619
2009	1701	0	0	6	151	32	1890
2010	1722	0	0	4	125	44	1895
2011	1624	48	0	7	123	34	1836
2012	1599	35	0	7	136	38	1813
2013	1266	0	0	7	150	26	1448
2014	1466	0	0	4	125	25	1620
2015	1319	2	2	5	129	36	1493

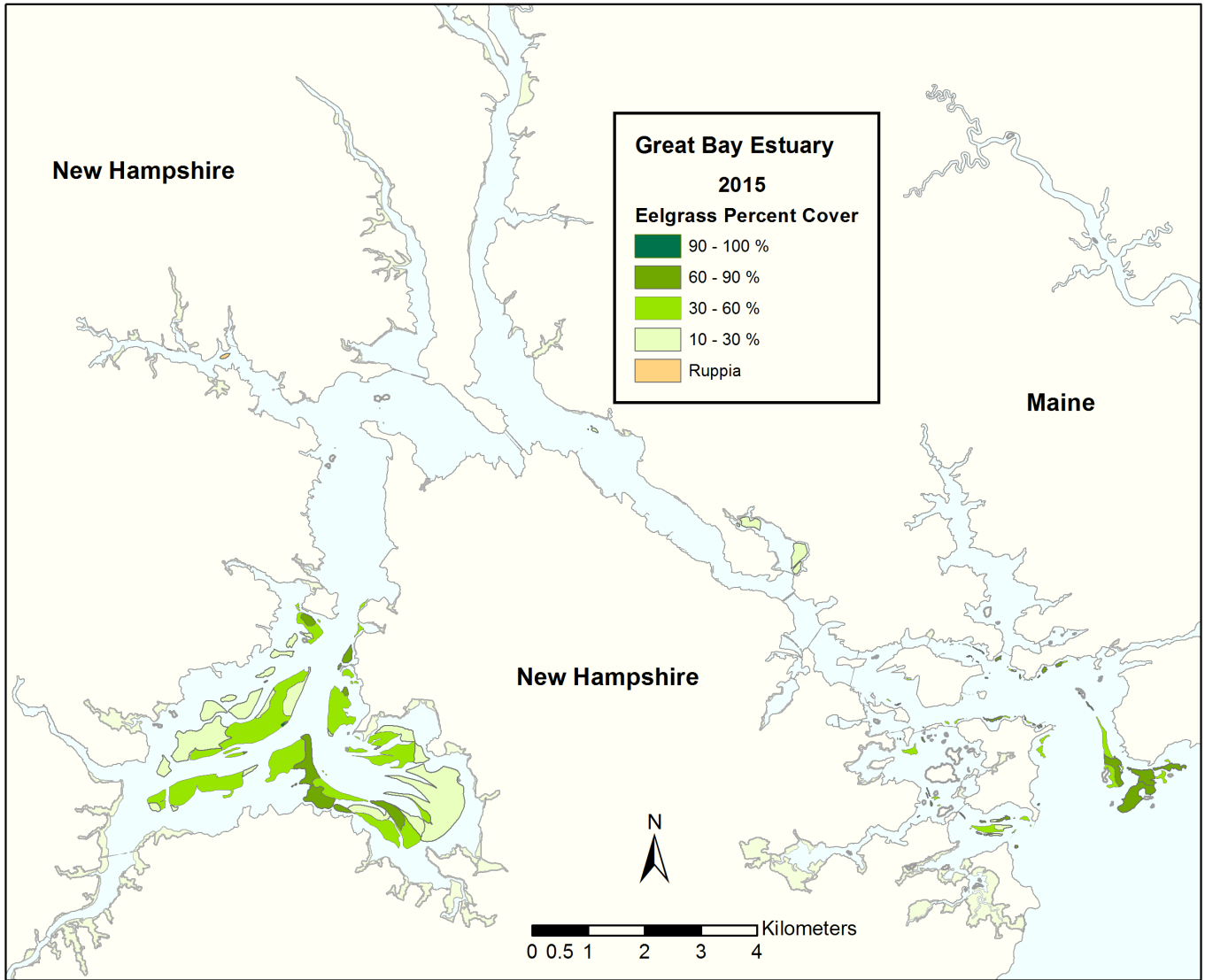


Figure 1. Eelgrass distribution in the Great Bay Estuary based on aerial photography from August 15, 2015 and ground truth surveys.

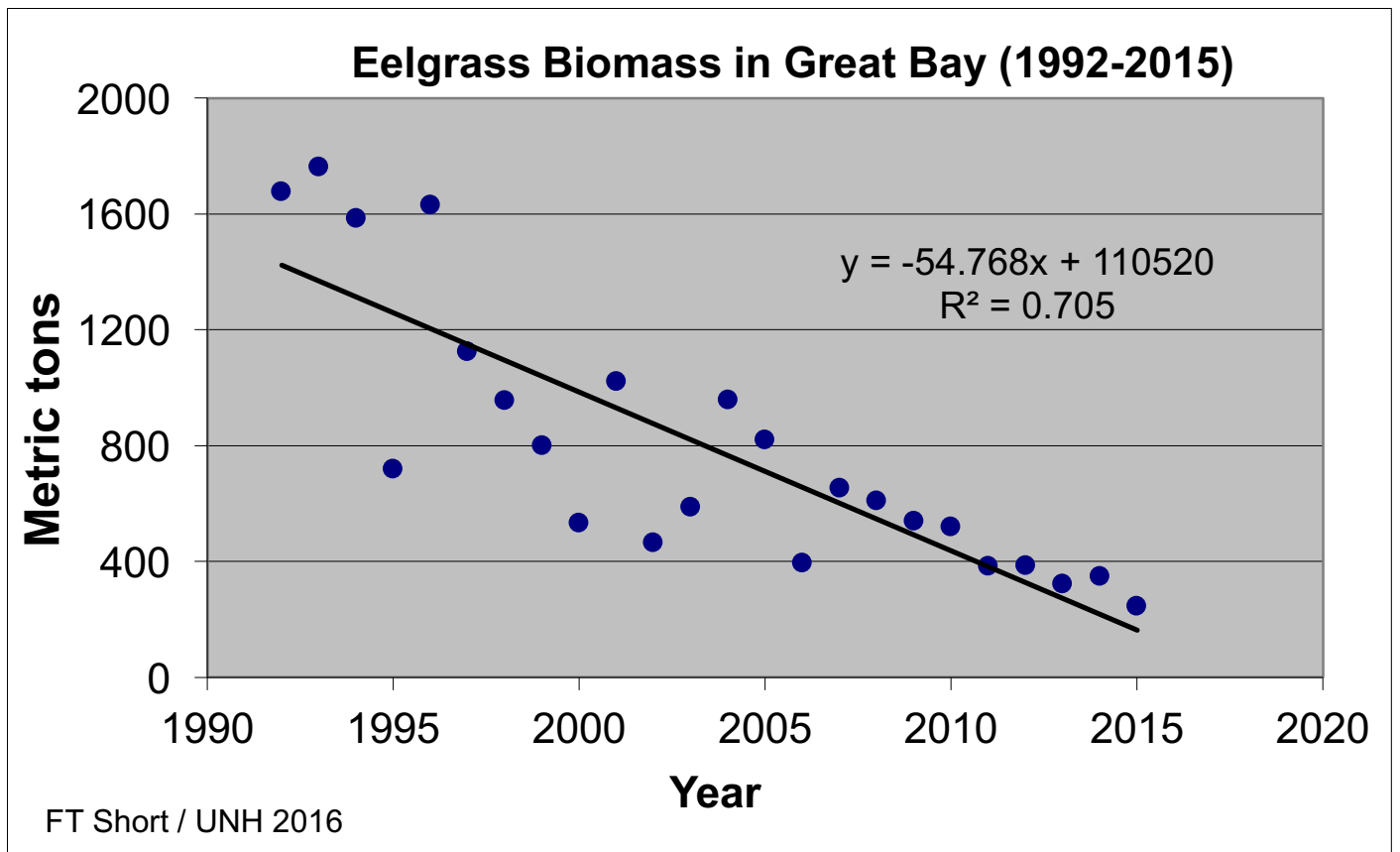


Figure 2. Downward trend in annual eelgrass biomass in Great Bay from 1992 through 2015. Eelgrass biomass in Great Bay decreased 30% from 2014 to 2015, from 348 to 245 metric tons.