

Division of Marine Fisheries HubLine Eelgrass Restoration

2013 Progress Report

By

Massachusetts Division of Marine Fisheries

Submitted to

The Department of Environmental Protection

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Summary

This progress report includes a summary of data from the 2013 field season and financial information up to the end of the 2014 fiscal year. In 2013, *Marine Fisheries* completed the planting of two acres of eelgrass in Massachusetts Bay, partially fulfilling the requirements of the HubLine eelgrass mitigation as stated in our contract with DEP. Throughout the 2013 season, the main focus was on completing plantings in Boston Harbor at sites where test plots had shown success. We planted approximately 1 acre of eelgrass throughout several sites around the Boston Harbor outer Islands and continued monitoring at reference sites in Nahant. In Salem Sound we continued monitoring the three sites that were planted during the previous two field seasons as well as our reference beds. To date the project cost is \$624,985. To complete a final season of monitoring and any needed plantings in FY 2015, DMF plans to expend the remaining \$100,000 in payments made by Algonquin Gas Transmission, LLC (“AGT”), which has been held in DMF’s *Marine Fisheries Research and Conservation Trust*, for use by DMF if needed.

Test Plots

Marine Fisheries planted test plots at Long Island East and Lovell Island in 2011 and 2012. The test plots were not successful as described in our 2012 Mid-project Progress Report (Evans et al. 2013). Six sites (Green Island, Great Brewster Island, Gallop Island, Long Island, Governors Island Flats, and Deer Island) were further investigated using site selection models from *Marine Fisheries* and Battelle, and field collected information on light, substrate conditions and fetch, followed by site reconnaissance dives to determine if a site would be a potential planting candidate. Based on the information obtained, in 2013 test plots were planted at each of the above sites in the early spring. The Gallop Island, Long Island, and Deer Island Flats were deemed unsuitable for full scale restoration due to failed test plots. Great Brewster Island, Governors Island Flats, and Green Island, were selected for full restoration. Approximately 1/3 acre of eelgrass, 3,900 shoots in six 5m² plots, was planted at each site in the fall of 2013. The methods are described in detail in the Division of Marine Fisheries HubLine Eelgrass Restoration Mid-project Progress Report (Evans et. al. 2013).

2013 Planting sites

Great Brewster Island

We field screened a sandy area on the west side of Great Brewster Island in 2012 (Figure 1). The site depth ranges from 5 ft to 9 ft MLW. The area is a mix of coarse and fine sand with small sand waves, approximately 1 cm – 2 cm high, indicating that the site experiences some wave and current energy. The site is protected to the south, east, and north with exposure to the west.

Overall site conditions met our planting criteria so a test plot was planted there in spring 2013. The test plot was successful and we continued to plant the entire 1/3 acre plot in September 2013 using the Pickerell Burlap Disk method.



Figure 1. Great Brewster Island restoration

Green Island



Figure 2. Green Island restoration

A protected cove on Green Island was investigated for planting suitability (Figure 2). The site is fairly shallow, ranging in depth from about 3 ft to 8 ft MLW. The bottom is mostly gravel and cobble with some large boulders. The bottom type is suitable for a modified Pickerell Burlap Disk method/ Rock Method, where the disks are buried and secured with rocks. Due to its location among the Boston Harbor Outer Islands, the site receives good flushing but is also well protected on the north, south and east sides. A test plot was planted in May 2013 and full restoration planting was completed by October 2013. The site was planted with five plots spaced throughout the 1/3 acre instead of the usual six plots at other sites due to the presence of boulders. A sixth plot will be planted at a different location at the site in 2014, if the existing plantings are progressing well.

Governors Island Flats

An area on Governors Island Flats adjacent to one of Battelle’s original test plots was selected for full scale planting (Figure 3). Reconnaissance of the site was performed and a test plot was planted in June 2013. The substrate is silty and at times there is high current causing poor visibility. The depth throughout the site is 5– 6 ft MLW. After the reconnaissance, and based on the success of Battelle’s test plot and the *Marine Fisheries*’ test plot, we planted the site in a full

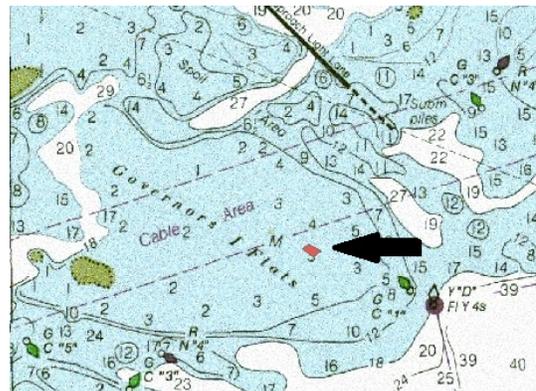


Figure 3. Governor’s Island Flats Restoration site.

scale restoration. Volunteers from the New England Aquarium Live Blue Ambassadors program assisted us in weaving eelgrass shoots onto burlap disks in August 2013. Plants were harvested and woven on the same day and stored overnight in lobster cars underwater. Planting of the entire site occurred over the following two days. Due to the amount of disks woven by the volunteers, a smaller seventh plot was added to the site.

Salem Sound Monitoring

Annual monitoring in Salem Sound took place in July 2013. The monitoring included the restoration sites at Woodbury Point, Middle Ground, and Fort Pickering (Figure 4), as well as at reference beds at the SeagrassNet site in Manchester and a reference bed off Peach’s Point in Marblehead.

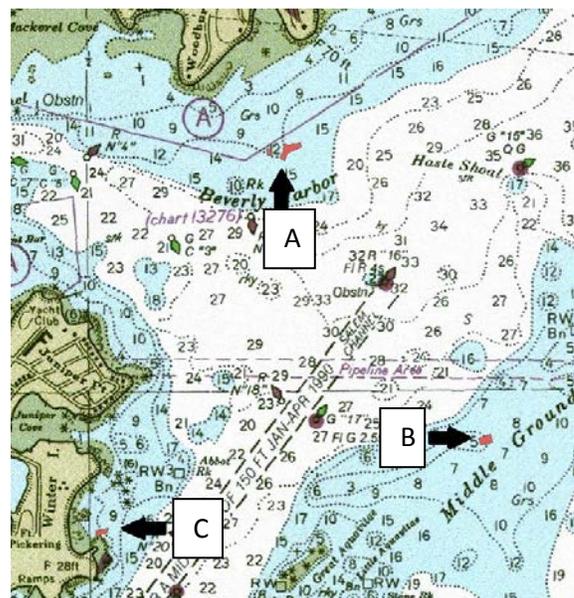


Figure 4. Salem Sound restoration sites. A) Woodbury Point; B) Middle Ground; and C) Fort Pickering. Planting areas shown in red

Woodbury Point

The final monitoring at Woodbury Point in 2012 showed a sharp decline in shoot density in October, coincident with Hurricane Sandy. By 2013, eelgrass shoot density at 5 of the 6 plots had increased. The annual monitoring in 2013 revealed a 14% increase overall in shoot density at Woodbury Point compared to the previous year. In 2013 individual plots at the site ranged from 81% of the original shoot density to 111% with three of the six plots above 100%. The plot that did not rebound in 2013 was on the deeper north transect (Figure 5).

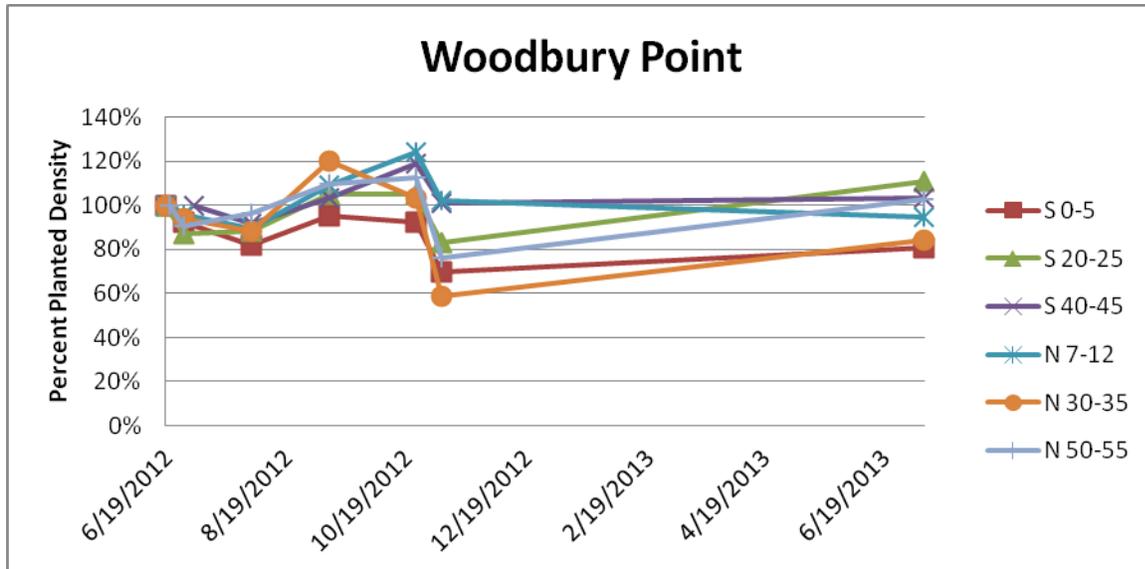


Figure 2. Monitoring data for the Woodbury Point restoration site. S and N refer to the transect planted and the corresponding number refers to the meter mark planted along the transect.

Middle Ground

As with Woodbury Point, the final monitoring of Middle Ground in 2012 showed a large decline in shoot density likely due to storm damage from Hurricane Sandy. The 2013 annual monitoring showed an increase in density for five plots with one plot showing a decline to 2% survival. The five healthy plots range from 153% of the original shoot density to 171% with the overall site showing a 143% of the original planted shoot density despite the failed plot (Figure 6). The failure of the sixth plot could potentially be due to lobster gear that is often seen throughout the area. Overall Middle Ground has been a successful site so far.

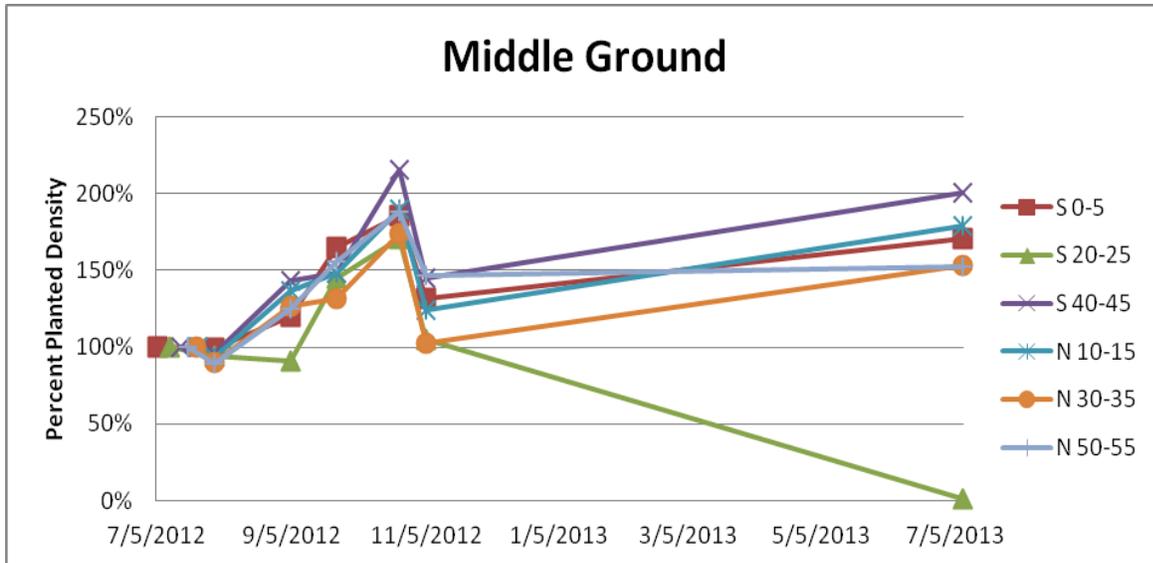


Figure 3. Monitoring data for the Middle Ground restoration site. S and N refer to the transect planted and the corresponding number refers to the meter mark planted along the transect.

Fort Pickering

Fort Pickering is the final restoration site planted in Salem Sound in 2012. Unfortunately, by summer 2013, all but one of the plots was completely gone and the remaining plot only showed a 5% survival (Figure 7). Self-established eelgrass adjacent to the restoration site also appeared to be in decline. Large algae mats were present on the north transect and a lobster trawl was stretched across both transects at the deep end of the site. There was no grass remaining in the test plot areas.

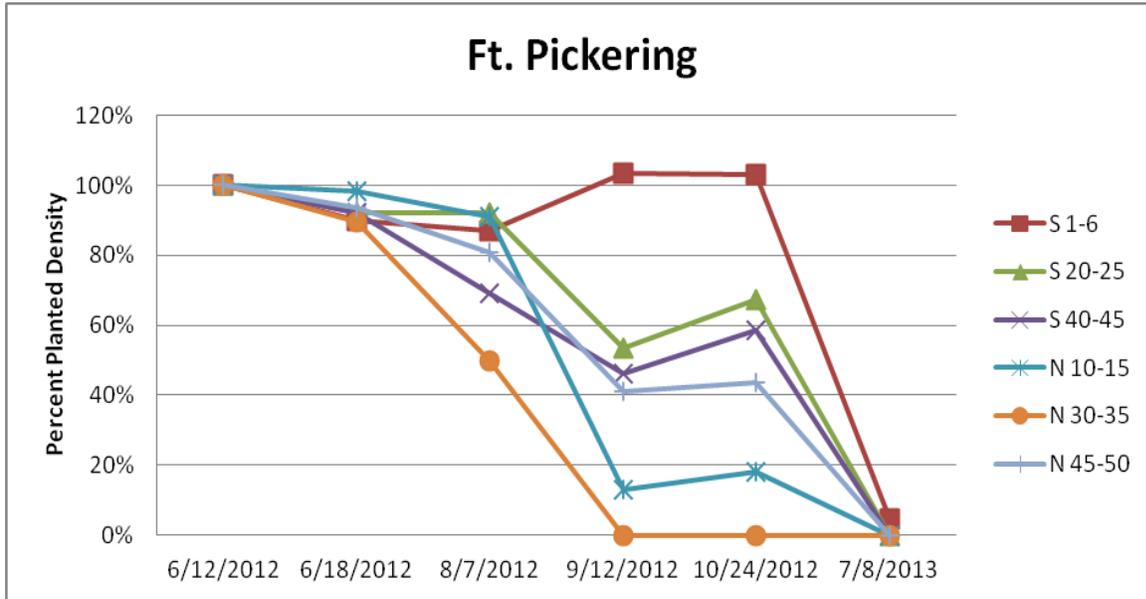


Figure 4. Monitoring data for the Fort Pickering restoration site. S and N refer to the transect planted and the corresponding number refers to the meter mark planted along the transect.

Reference Sites

Reference beds at the SeagrassNet site and Peaches Point were monitored in July 2013. These sites will be used to monitor regional trends compared to the trends observed at the restoration sites and to provide a baseline for comparison to determine success of the transplant and measure the time it takes for transplanted beds to reach functional equivalence with self-established meadows.

Boston Harbor Monitoring

The monitoring protocol requires initial monitoring of the planted plots one month after transplanting and then annually for three to five years together with reference sites for comparison. The reference sites are in Broad Sound, Nahant Cove, and at the northeast edge of the Logan meadow. Shoot density at the Boston Harbor restoration sites all declined in the initial monitoring, one month after they were transplanted. Decline of up to 50% is typical in the first month even for successful plots (Kopp and Short 2001). The Governors Island Flats site shows a range of 38% to 59% survival (Figure 8). Annual monitoring will begin in the summer of 2014.

Governors Island Flats

The Governors Island Flats site shows a range of 38% to 59% survival (Figure 8). Annual monitoring will begin in the summer of 2014.

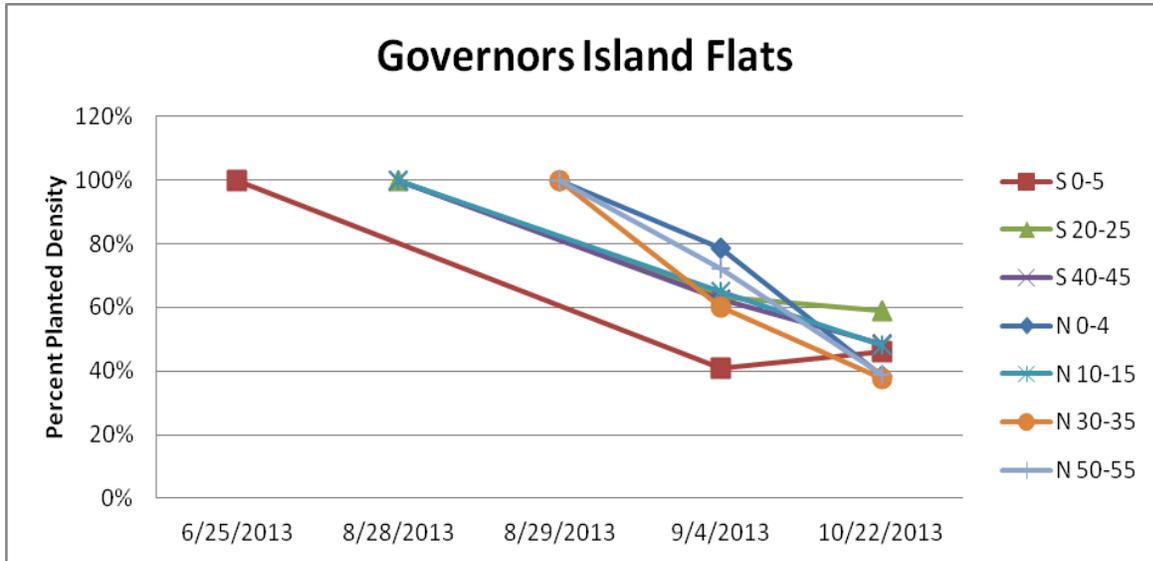


Figure 5. Monitoring data for the Governors Island Flats restoration site. S and N refer to the transect planted and the corresponding number refers to the meter mark planted along the transect.

Great Brewster Island

Great Brewster Island was only monitored once after planting was completed. While the north transect shows the expected decline after transplanting, the three south plots show drastic decline and one plot was completely devoid of plants (Figure 9). This site will be monitored in 2014 and assessed further at that time.

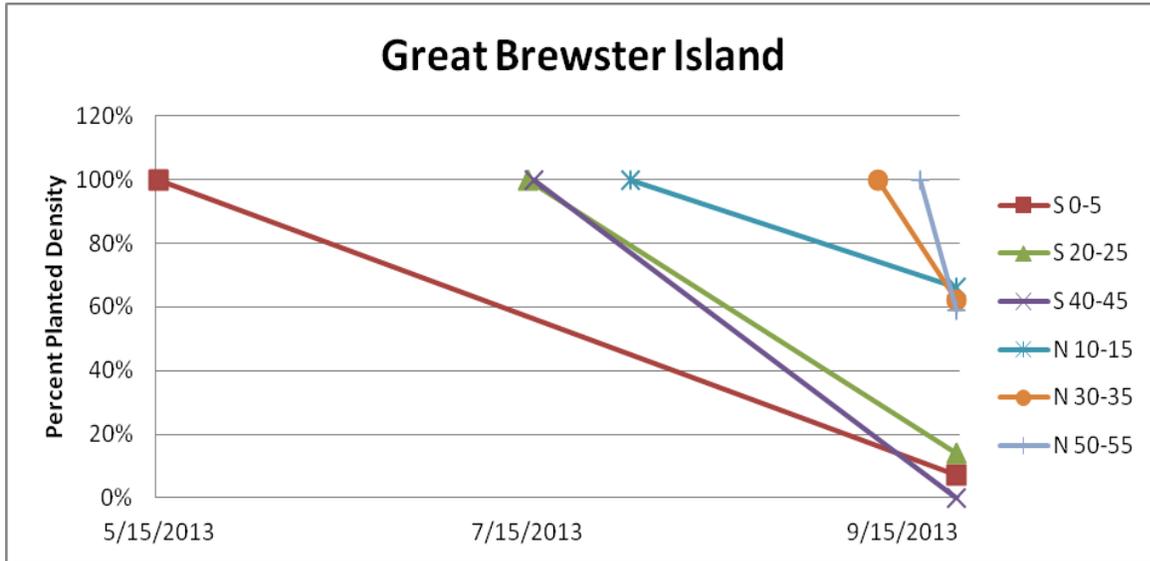


Figure 6. Monitoring data for the Great Brewster Island restoration site. S and N refer to the transect planted and the corresponding number refers to the meter mark planted along the transect.

Green Island

The Green Island site was monitored approximately one month after planting of the site was complete. All of the plots showed a slight decline between 10%-20% that can be attributed to normal decline after transplanting (Figure 10).

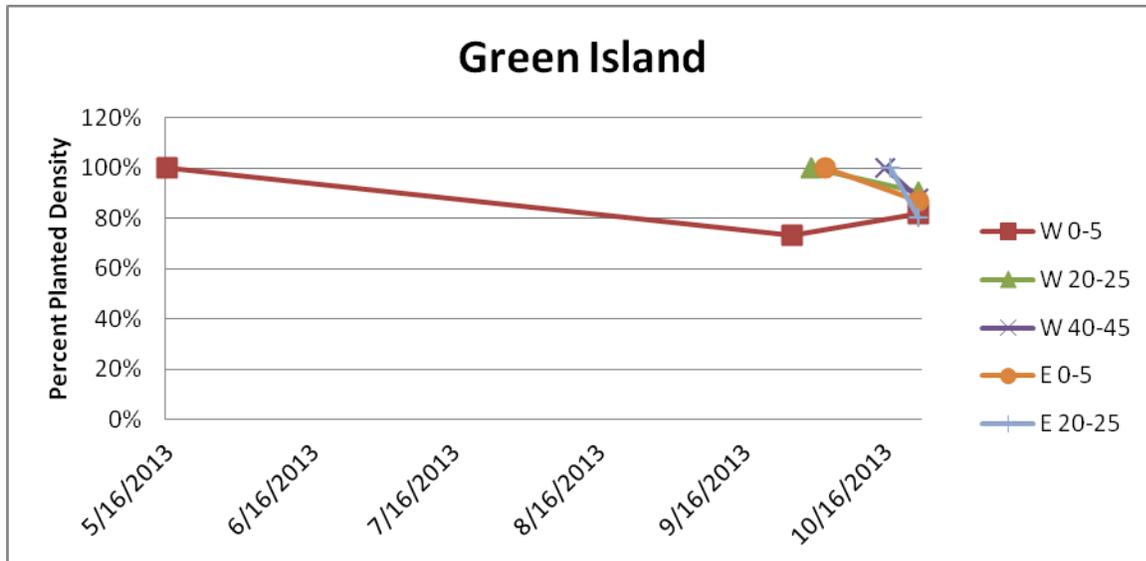


Figure 7. Monitoring data for the Green Island restoration site. W and E refer to the transect planted and the corresponding number refers to the meter mark planted along the transect.

Reference Sites

As with Salem Sound, reference sites in Boston Harbor will be used to compare trends of the self-established meadows in Boston Harbor to those of the restoration sites. Annual monitoring of the reference sites began in the spring of 2013.

Expenditures to date

The Hub3 funds are divided into three main categories, 1. personnel, including salary and benefits, dive pay and travel costs, 2. equipment and supplies, including field gear such as tape measures, screw anchors and buoys, dive gear, boat and truck fuel and, 3. permitting expenses. In 2013 personnel included a project manager (Tay Evans), an Aquatic Biologist (Wesley Dukes), and two Fisheries Technicians (Jillian Carr) and (Katelyn Ostrikis).

At the end of fiscal year 2014 we have spent \$624,985. We expect to exhaust the remainder of the \$700,000 by November 2014. To complete the last season of monitoring and any additional plantings that may be needed next spring, DMF plans to expend the remaining \$100,000 in payments made by Algonquin Gas Transmission, LLC ("AGT"), which has been held in DMF's *Marine Fisheries Research and Conservation Trust*, for use by DMF if needed.

Below is a detailed table outlining the costs for each category.

Item	Fiscal Year					Total
	2010	2011	2012	2013	2014	
Personnel	\$66,799	\$76,239	\$148,158	\$137,431	\$166,098	\$594,761
Equipment and supplies	\$2,463	\$9,696	\$10,141	\$3,301	\$3,552	\$29,153
Permitting	\$0	\$683.40	\$386.99	\$0	\$0	\$1,070.39
Total	\$69,262.75	\$86,619.33	\$158,687.00	\$140,733	\$169,649	\$624,985

2014 Plans

Annual monitoring of all restored sites and reference beds is currently underway. Further planting will be done if needed in the fall of 2014 and Spring of 2015.

References

Evans NT, WT Dukes, JL Carr (2013) Division of Marine Fisheries HubLine Eelgrass Restoration Mid-project Progress Report. June 2013. Submitted to The Department of Environmental Protection.

Kopp BS and FT Short (2001) Status report for the New Bedford harbor eelgrass habitat restoration project, 1998-2001. Submitted to the New Bedford Harbor Trustee Council and the NOAA Damage Assessment and Restoration Program: 1-64.