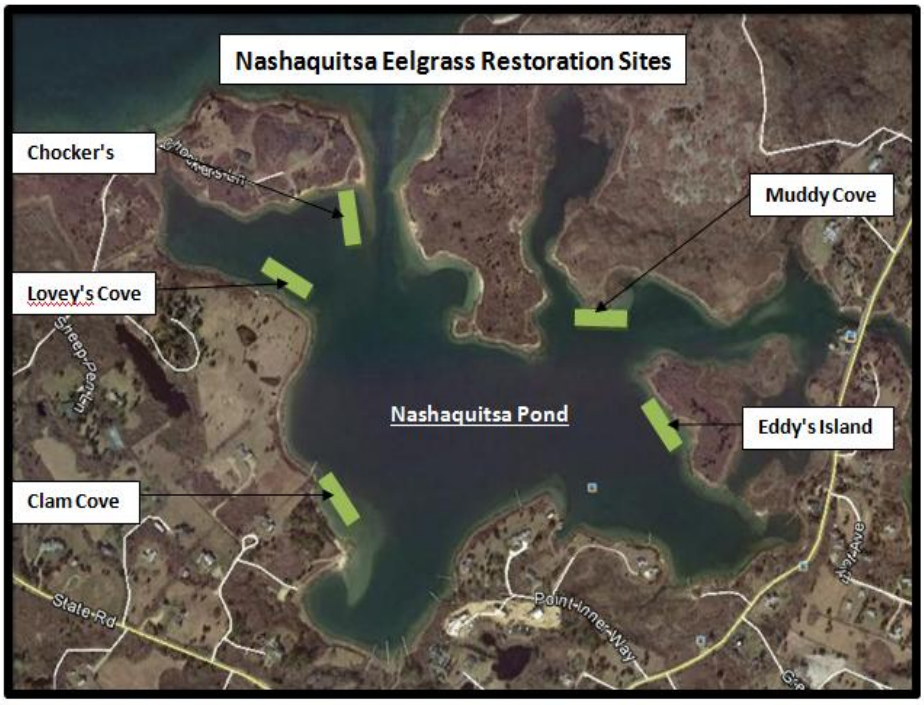
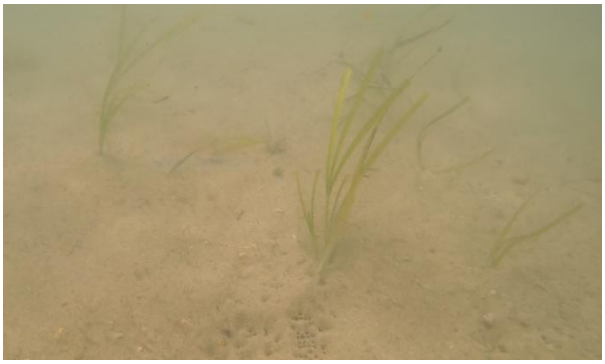
# EELGRASS RESTORATION OF NASHAQUITSA POND, CHILMARK, MA




Submitted by

Town of Chilmark
Shellfish Department

After the Shellfish Department was awarded a grant from the Edey Foundation in 2016, work began on the equipment needed for the Nashaquitsa Pond Eelgrass Restoration Project. While it was expected that a fair amount of learning would be necessary to determine how the materials would perform, the material performance was never a problem. The challenge was the fact that all the donor shoots used for the project died within two weeks of being transplanted regardless of the method employed. Phil Colorusso, the eelgrass specialist from the Boston Environmental Protection Agency (EPA), came and surveyed the area to offer advice for the project. He concluded that the equipment and materials we chose should work and the shoot mortality was likely from two causes. The first is that high water temperatures generally stress eelgrass during the summer months, which was when we were performing the work for the project. The other reason was that sediment suspension in Nashaquitsa Pond could be a problem since there was no other eelgrass present to slow water and allow particulates to settle out. The consequence of these sediments being transported around the pond is increased turbidity which can prevent light from penetrating the water to reach the eelgrass shoots. Eelgrass, like all plants, requires light to photosynthesize and flourish. Coupled with the fact that we want to transplant eelgrass into a pond that is warmer than the donor area, we have a few challenges to overcome. Next season we will continue working on eelgrass restoration during the spring and late fall. Hopefully the cooler water temperatures, better water quality and clarity, will benefit the health of the eelgrass and our restoration project. While we didn't have a lot of success with this year's endeavor, we are still committed to this project no matter how many things we need to try and how many years it takes.

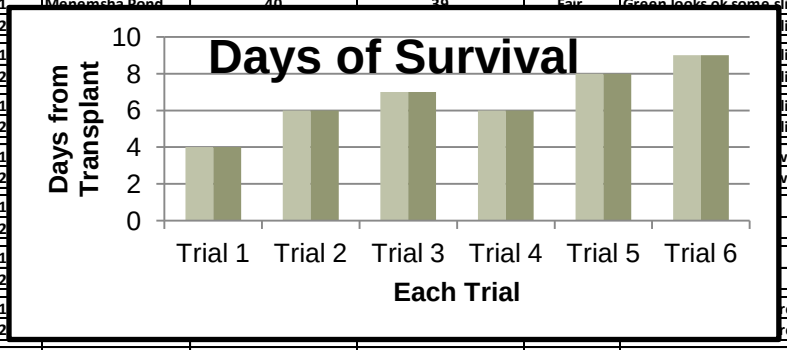


**Steel and Burlap Frames**

We began collecting eelgrass shoots that were free floating around Menemsha Pond with the rhizome still intact. This was an attractive source because they were abundant, easy to collect and would have been washed ashore to die, eventually. They were placed directly into tubs filled with water to keep them wet and reduce stress. After enough shoots were collected we traveled to the transplant site with the burlap outfitted frames that were constructed for this project. We began inserting shoots into the frames approximately 6 inches apart until the frames were completely filled. This work was done out of the water with the

frames stretched across the gunnels of the boat. During that time we were spraying seawater over the shoots to prevent them from drying out because this process took about 45 minutes to complete. After the frames were filled with shoots it was lowered over the side of the boat and placed on the bottom of Clam Cove Point. Frames were staked down and gravel mixed with sand was placed over the burlap. We gently pushed the root systems into the bottom. We decided to start out doing two frames at this site as a starting point to gather information and see how the frames would perform. The site was monitored daily when weather conditions would allow us to see the shoots on the bottom. As soon as we noticed that shoots were starting to die we made an adjustment to the method by constructing a floating jig to hold the frames in the water so we could plant shoots into the burlap while they were submerged. This was to prevent the shoots and root systems from drying out and increasing stress. As a result, we saw slightly longer survival of the eelgrass, but ultimately all the shoots died. After trying five variations to the method using the frames we decided to see if we could collect eelgrass along the channel of Menemsha Creek that was being undercut by tidal currents. There was plenty of eelgrass intact with root systems, some that looked as if they were newly uprooted. We collected it by diving and pulling gently until the clumps were dislodged without disturbing those plants that still had their root systems in the bottom. The donor shoots were placed in mesh bags and kept submerged while being transported to the transplant site. We used the same method of transplanting with the floating jig and placing the frames on the bottom using sand and small gravel to cover the frames. The majority of shoots looked much healthier and for a longer period of time, which you can see from the data sheets below. However, they eventually all died and the frames were removed.

| Time from transplant | Site | Frame # | Donar Shoot Collection Area | Number of Shoots at Start | Number of Shoots that remain | Conditions | Description of Eelgrass Health |
|---|---|---|---|---|---|---|---|
| Day 1 | CPC | 1 | Menemsha Pond | 40 | 40 | Fair | Green looks good |
| Day 1 | CPC | 2 | Menemsha Pond | 38 | 38 | Fair | Green looks good |
| Day 2 | CPC | 1 | Menemsha Pond | 40 | 40 | Fair | Green looks good |
| Day 2 | CPC | 2 | Menemsha Pond | 38 | 38 | Fair | Green looks good some sediments on blades |
| Day 3 | CPC | 1 | Menemsha Pond | 40 | 39 | Fair | Green looks ok some slightlygreen/brown |
| Day 3 | CPC | 2 | | | | | lightlygreen/brown |
| Day 4 | CPC | 1 | | | | | lightlygreen/brown |
| Day 4 | CPC | 2 | | | | | lightlygreen/brown |
| Day 5 | CPC | 1 | | | | | lightlygreen/brown |
| Day 5 | CPC | 2 | | | | | lightlygreen/brown |
| Day 6 | CPC | 1 | | | | | v brownish green |
| Day 6 | CPC | 2 | | | | | v brownish green |
| Day 7 | CPC | 1 | | | | | |
| Day 7 | CPC | 2 | | | | | |
| Day 8 | CPC | 1 | | | | | |
| Day 8 | CPC | 2 | | | | | |
| Day 9 | CPC | 1 | | | | | rown a few with some green. |
| Day 9 | CPC | 2 | | | | | rown a few with some green. |
| Day 10 | CPC | 1 | Menemsha Pond | 40 | 20 | Fair | Many dead and disappeared the rest are dying |
| Day 10 | CPC | 2 | Menemsha Pond | 38 | 18 | Fair | Many dead and disappeared the rest are dying |
| Day 11 | CPC | 1 | Menemsha Pond | 40 | No visibility | Windy | No visibility |
| Day 11 | CPC | 2 | Menemsha Pond | 38 | No visibility | Windy | No visibility |
| Day 12 | CPC | 1 | Menemsha Pond | 40 | 4 | Fair | Frame removed |
| Day 12 | CPC | 2 | Menemsha Pond | 38 | 6 | Fair | Frame removed |



**Rock Planting Method**

The rock method, which can be seen in the picture to the right, was far easier than the frame method. Despite being an easier form of restoration we saw the exact same mortality rates until finally none of the eelgrass shoots we transplanted were alive, except for one shoot that was transplanted at the end of the summer when water temperatures were cooling off. The picture to the right is the one shoot that survived as of mid October 2016. It actually seemed to recover and become green again before the water cooled off and it went dormant. We will see if it reemerges in the spring of 2017. No graphs or sample data sheets were included because they were almost identical to the data sheets for the frame method.

**Floating Seed Lines**

Seed shoots were gathered from July 10th to July 21st , 2016. Seed shoots were extremely easy to collect, especially at a slack tide when shoots were vertical in the water. The seed shoots are designed to detach from the plant, and were taller than the blades around them so handfuls could be harvested without tugging on the plant itself. The seed shoots were placed in mesh bags and attached to a floating line at each of the restoration sites. The bags were left to distribute the seeds as the seed ripened and shoots decayed. At the end of October bags were removed and the contents were evaluated to confirm that all seeds were released. Only a few seeds were left in each bags.

Collecting seed shoots and floating them over the restoration sites to distribute seeds might prove itself to be the best method, and we will know in the spring if that was successful. We did this for each intended restoration site, so thousands of seeds were released. If they survive predation and winter conditions, the sprouts should emerge in the spring of 2017.

**Summary**

Despite not having any immediate success, we learned quite a bit this past year. Now that all the materials and equipment are in place, devoting more time in the spring and early summer to transplant shoots will be possible. Our goal will be to gently uproot shoots from Menemsha Creek and possibly get all 50 frames down before water temperatures rise. During each trial this

year, we were able to keep the eelgrass shoots alive for slightly longer each time, before they eventually died. We feel like we're on the right track for this project. Hopefully by next winter we will have significant success to report.

**Use of Funds**

The entire grant that was awarded to the Chilmark Shellfish Department was spent on a temporary outdoor structure, which made construction of the materials possible, as well as rebar, welder and welding tools, burlap, and a go-pro camera. All of the time committed by the Constable and Assistant Constable to this project was funded by the Town of Chilmark. Minimal materials will be required next season, and will all come out of the general department budget.