Submerged Aquatic Vegetation (SAV) Restoration Using Innovative Seed Based Technology

Project # 10-60

Background:

The Chesapeake Bay and other shallow water coastal systems have historically supported large areas covered by submerged aquatic vegetation, or SAV. These beds provide critical ecosystem functions including sediment stability (thereby reducing erosion), habitat (for blue crabs and other valuable finfish species), and water quality improvement (through the direct uptake of nutrients from the water column). Through the deterioration of water quality (and clarity), SAV in the Chesapeake Bay and other coastal systems has declined considerably over the past 50 years (~10% of the original 600,000 acres). Since the landmark 1983 Chesapeake Bay Agreement (further ratified by the 2000 Chesapeake Bay Agreement), efforts have been made to remove excess nutrients and sediments from coastal waterways in order to improve conditions to a level that will allow SAV to recover. The DoD, as a signatory to the Chesapeake Bay Agreement, has committed to helping restore the Bay, and through this project will be able to do their part by restoring eelgrass, a vital Chesapeake Bay habitat.

Objective:

The objective of this study was to use an innovative technology to coat eelgrass (*Zostera marina*) seeds for seagrass restoration at two sites in the Chesapeake Bay watershed. By utilizing this technology, and honing in on the best mixture for the seed coating, we will make seagrass restoration more efficient and cost effective for not only installation natural resource managers, but also the general public.

Summary of Approach:

Our approach uses an innovative agricultural model that treats seeds to improve handling and increase germination rates by adding weight to the seeds to allow them to sink and settle in specified areas and discouraging predation, which can potentially double or triple the success rate of restoration over standard measures currently employed. Seeds were treated in September/October 2010 and planted in October 2010 at Bloodsworth Island (NAS Patuxent River) and JEB Little Creek. We planted seeds in the Fall of 2010 using a 1 meter diameter planting ring and dispersed 100 seeds per ring at 22 (11 treated seeds/11 untreated seeds) areas within a planting site.

To assess germination, we monitored the Bloodsworth Island site using a viewscope to count seedlings in each of the 22 planting areas. We were not able to monitor the plating site at JEB Little Creek due to access issues.

Benefit:

The seed coating/treatment process has been shown to improve germination rates in laboratory experiments. This project was using the technology in the field to restore eelgrass. By using this technology, we will be able to make eelgrass restoration more efficient (less time spent) and cost effective. This project specifically addressed several goals of the “Department of Defense 2008-2012 Strategic Action Plan for the Chesapeake Bay, a work plan that prioritizes and identifies measures towards fulfilling the DoD’s commitment to restoring and protecting the Chesapeake Bay Ecosystem. It also supports the Chesapeake Bay Executive Order (13508). Results from this work will help us to better understand the use of terrestrial products in the aquatic environment and allow us to transfer this technology to other species.

Accomplishments:

As detailed in our approach, we carried out seed-based eelgrass restoration projects at two locations in the Chesapeake Bay watershed (Bloodsworth Island and JEB Little Creek). We have coated the seeds using the new technology and planted them in 2010. Monitoring results showed limited germination at Bloodsworth Island due to a resurgence of widgeon grass (*Ruppia maritima)*. Widgeon grass appears to have out-competed eelgrass seedlings at this location, which may have been due to highly variable environmental conditions that widgeon grass tolerates better than eelgrass. We were not able to monitor the site at JEB Little Creek for germination results due to access issues, and are still in the process of getting access to the site to determine project success.

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