

Eelgrass and Moorings

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Introduction

Eelgrass (*Zostera marina*) and other submerged aquatic vegetation (SAV) are recognized as providing numerous valuable environmental benefits including primary production, sediment stabilization, habitat for invertebrates and fish, and food for diving ducks. Eelgrass common to Maine is found predominantly in nearshore subtidal protected or semi-protected areas, areas where boat moorings might be placed. Traditional moorings in Maine which include a mushroom anchor or stone mooring block and chain can damage or eliminate eelgrass from a circular area around the mooring block or anchor as a boat swings around its mooring and the chain is dragged across the bottom. This paper reviews documentation of those impacts and alternative mooring designs that could mitigate for those impacts.

Impacts to Eelgrass from Moorings

Aerial photography and field studies² have demonstrated the adverse impact that traditional moorings and associated boats have on eelgrass and other SAV.

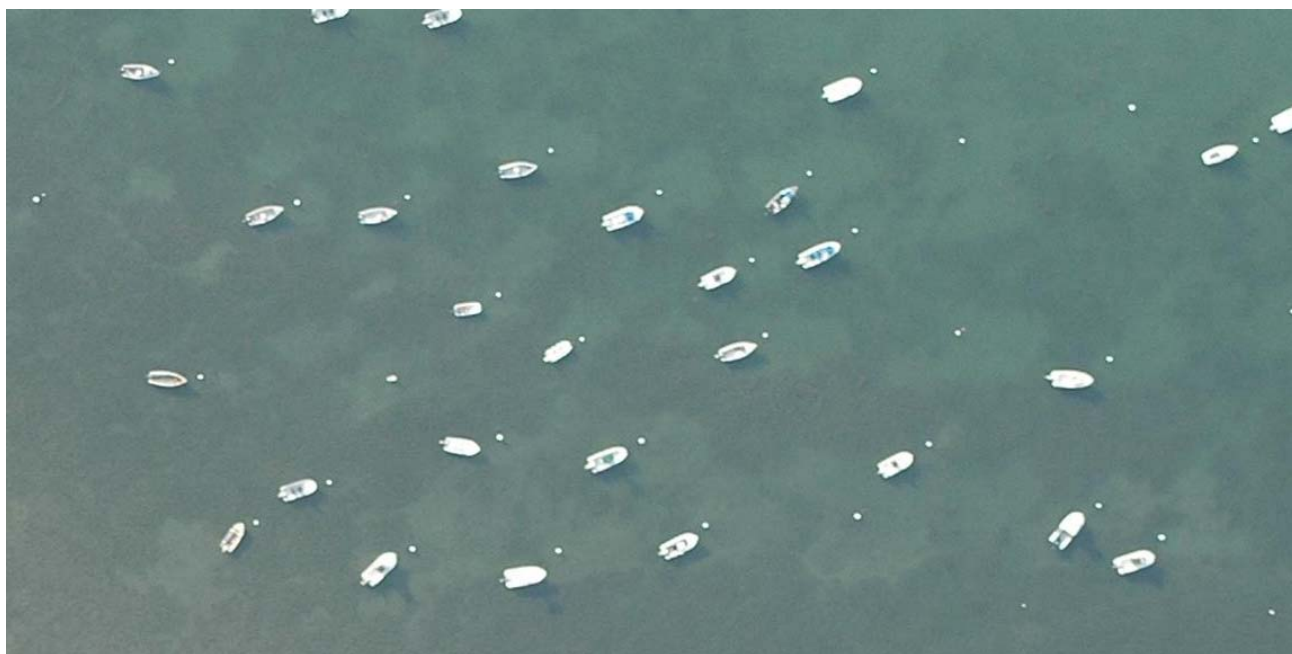


Figure 1. Aerial photograph showing damage to eelgrass from traditional moorings, Merepoint, Brunswick, Maine. Courtesy of John Sowles, Yarmouth, Maine.³

Traditional Mooring Design

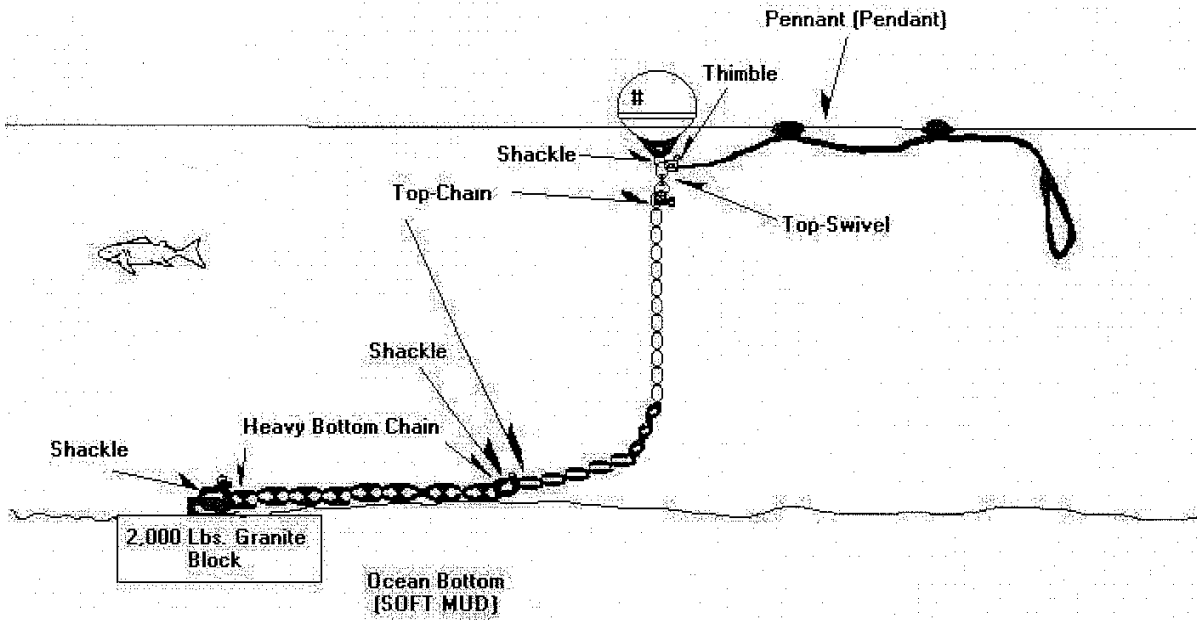


Figure 2. Mooring design typically found along the coast of Maine. Courtesy of Coastal Barge and Mooring, LLC, Brunswick, Maine.

Alternative Mooring Designs

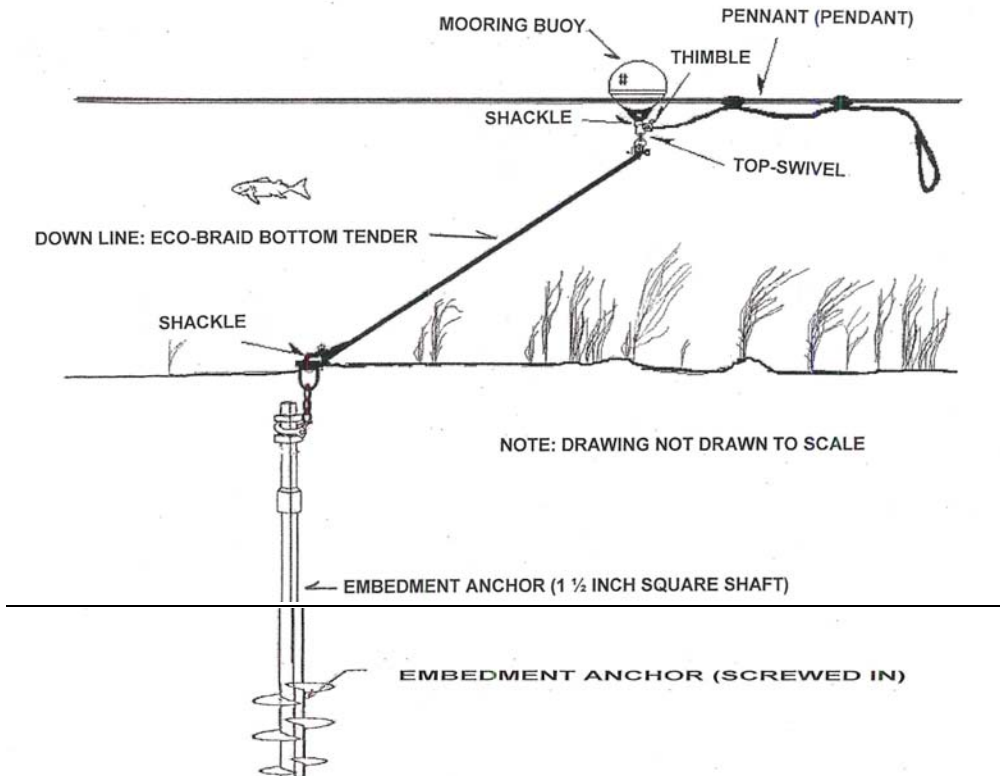


Figure 3. Helical anchor with flexible mooring cord. Courtesy of Coastal Barge and Mooring, LLC, Brunswick, Maine.

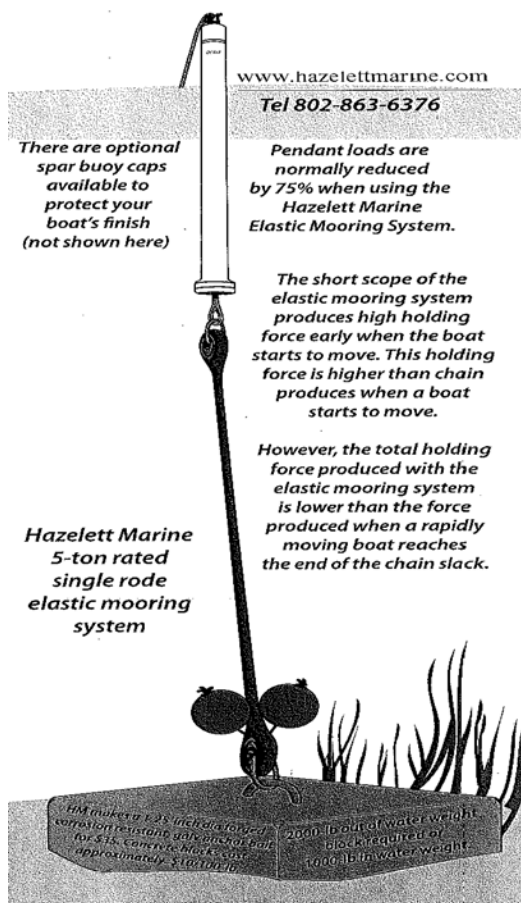


Figure 4. Elastic mooring rode with mooring block and stable. Courtesy of Hazelett Marine, Colchester, Vermont.

No coastal towns in Maine were found to require the use of conservation moorings.⁴ Some towns in Maine allow the use of helical anchored moorings. One harbormaster contacted⁵ said that he would prefer the use of the Hazelett Marine elastic mooring stating that strength and durability were pluses, and that the decreased swing radius with this type of mooring would allow a greater number of moorings in a given area. The town of Marion, Massachusetts requires that moorings for boats of 25 feet LOA or greater have a helix embedded anchor.⁶ Marion has a history of damage due to mooring failures, most notably during Hurricane Bob in 1991. It is believed that helix anchors provide greater holding strength than a mushroom or dead weight anchor in that harbor. Other towns in Massachusetts such as Manchester-by-the-Sea require new or replacement moorings in areas of eelgrass be a “helix-type mooring system or other mooring system that will have less impact on eel grass fields”.⁷

Pros and Cons of Conservation Moorings

Anecdotal evidence suggests that helix anchors have greater holding strength in certain bottom types. Elastic rode type moorings may have less chance of failure than traditional chain due to their shock absorbing capacity. These later types of moorings may also require less maintenance (a ten year replacement cycle vs. a four year replacement cycle) and less space between boats than traditional mooring block and chain arrangements due to a decrease in the necessary scope (i.e., the length of rode vs. depth of water). Both these types of moorings eliminate the need of a heavy chain and the associated potential adverse environmental impact from its dragging along the bottom. The elastic rode type mooring can utilize an existing mooring block or a helix type anchor.

The elastic rode type of mooring may be somewhat more expensive than a traditional mooring block and chain arrangement, but this might be offset over time by the decreased maintenance necessary.⁸ The helix-type mooring may also be somewhat more expensive and can only be effectively used where the sediment is of sufficient type and depth. There may also be resistance by mooring owners to replacing existing tackle, and owners and installers to employing a mooring of non traditional design which may be viewed as having questionable reliability. The Nature Conservancy and the Massachusetts Bays Program have funded a study and are currently working with the Urban Harbors Institute at the request of the Cape Cod Harbormasters' Association to look at costs and other issues associated with the use of conservation moorings.⁹

Effectiveness of Alternative Mooring Designs in Reducing Adverse Environmental Impacts

Work done in Maine indicates that recovery of an area of eelgrass adversely affected by a boat mooring after a mooring has been removed or replaced with a conservation mooring may be slow with an estimated mean recovery of 13% of the affected area after three years. Recovery may be inhibited by shading from moored boats or other effects that are causing a decline of eelgrass in the general area. In one area where a mooring had been removed and not replaced the mooring scar was seen to have expanded.¹⁰

In Massachusetts preliminary study results also indicate a relatively slow recovery of areas of eelgrass where traditional moorings have been replaced with conservation moorings. This may be due to in part to the depressions created by the traditional mooring tackle around the mooring anchor which tend to collect algae and detritus which inhibits eelgrass re-growth.¹¹

Conclusions and Recommendations

Given the number of moorings, the potential for minimization and mitigation of adverse impacts to areas of eelgrass and other benthic habitat from traditional moorings by replacing them with conservation moorings, removing them from sensitive areas, or using conservation moorings for new installations is significant. The use of conservation moorings could be promoted by offering incentives to mooring owners in the form of reduced mooring fees or waivers, or cost sharing arrangements¹² as well as placing restrictions on the installation of new traditional moorings in certain areas.

While use of conservation moorings holds promise, further study needs to be done to verify their effectiveness.

² MER Assessment Corp., Brunswick, Maine (2008) Feasibility of mitigating physical disturbances to eelgrass in northern Casco Bay: impacts and options; Betcher C, Williams B (ca. 1998) Impact of mooring buoy installation on eelgrass and macro algae, San Juan County, Washington (draft); Walker DI, Lukatelich RJ, Bastyan G, McComb AJ (1989) Effect of boat moorings on seagrass beds near Perth, Western Australia. Aquatic Botany 36:69-77; Hastings K, Hesp P, Kendrick GA (1995) Seagrass loss associated with boat moorings at Rottnest Island, Western Australia, Ocean and Coastal Management 26:225-246

³ Former Director of the Ecology and Habitat Division, Maine Dept. of Marine Resources

⁴ Harbormasters in the Towns from Elliot and Kittery to Freeport, and the Maine Department of Environmental Protection's Shoreline Zoning program were contacted.

⁵ Capt. Walter Gibson, Cape Elizabeth Harbormaster

⁶ Waterways Regulations, Marion, MA, revised 2007

⁷ Manchester Harbor Mooring and Waterways Regulations, revised March 2011

⁸ Personal communication with Tom Hill, Hazelett Marine, June 2012

⁹ Personal communication with Catherine Shetterly, The Nature Conservancy, June 2012

¹⁰ MER Assessment Corp., Brunswick, Maine (2011) Merepoint boat launch facility eelgrass mitigation measures: monitoring report

¹¹ Personal communication with Tay Evans, Massachusetts Division of Marine Fisheries, June 2012

¹² Friends of the San Juans, Washington State, have such a cost sharing program that provides financial and technical assistance to eligible participants