INDICATOR 14

Has eelgrass habitat in Casco Bay changed over time?

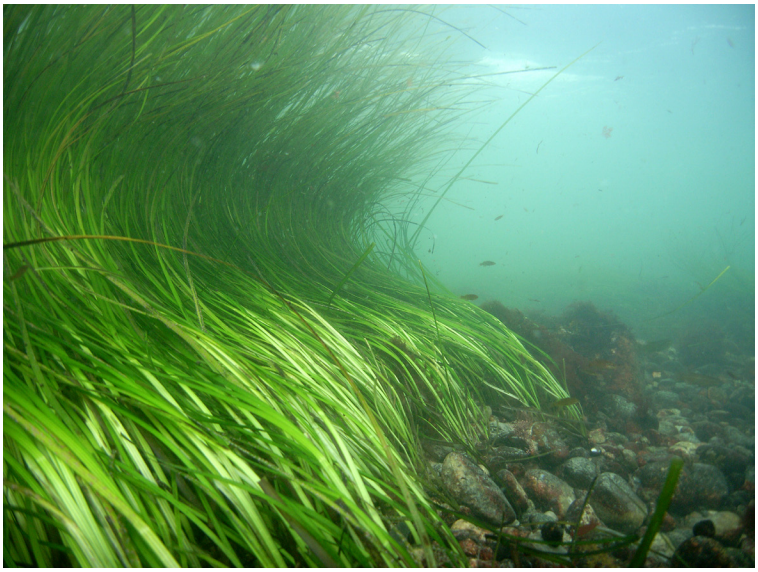
CBEP Goal: Minimize adverse environmental impacts to ecological communities from the use and development of land and marine resources.

Why Is Eelgrass Habitat Important?

Eelgrass (*Zostera marina*) is a flowering seagrass that lives in low intertidal and subtidal marine environments. It forms extensive beds that provide critical habitat for fish, shellfish and other marine organisms throughout Casco Bay. Eelgrass leaves filter nutrients and suspended particles from the water column, and its root system stabilizes sediments. As a primary producer, eelgrass forms part of the base of estuarine food webs, and provides nursery habitat for a variety of commercially important species, as well as food for migratory winter waterfowl and fish.

In addition to their habitat values, eelgrass beds are an important indicator of the health of an estuarine ecosystem because they both contribute to – and depend upon – good water quality. Eelgrass flourishes where water quality conditions permit adequate light to penetrate to its slender leaves. Excess nutrient levels (nitrogen), along with suspended sediments from natural sources, or associated with coastal development, can lead to decreased water clarity, and increase epiphytic macroalgae growth, both of which stress individual plants.

Portland Harbor is a local example of how turbidity, and subsequent poor light penetration through the water column, can lead to the decline and loss of eelgrass beds (Tyrell 2005). Damage from dredging, boat propellers, moorings and mooring chains, anchors, docks, and shellfish dragging are additional anthropogenic causes of eelgrass decline and loss. Eelgrass beds are also susceptible to periodic infestation by slime molds, sometimes referred to as eelgrass wasting disease. Concerns are also emerging in southeastern New England about threats to eelgrass by invasive marine tunicates, which have been documented in eelgrass beds off Martha's Vineyard by scientists at the Woods Hole Oceanographic Institution (Carmen and Grunden 2010).

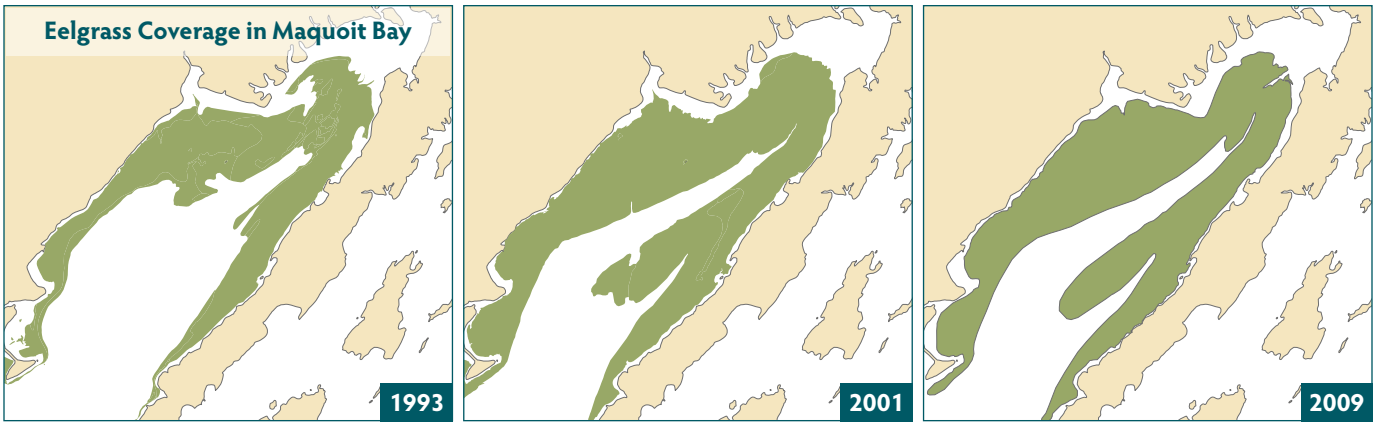


www.SeagrassLI.org

Beds of eelgrass serve as an important habitat for fish and source of food for waterfowl.

John Sowles

Healthy eelgrass beds like those off Little Flying Point in Maquoit Bay depend on good light penetration through the water column. Excess sediments create turbid water conditions and reduce water clarity, causing stressed eelgrass plants to grow long and thin, stretching toward the surface to reach adequate sunlight.



Data: 1993/2001 - Maine DMR; 2009 - J. Sowles. 2009 photointerpretation by S. Barker, Maine DMR.

Status and Trends

Maquoit Bay

Resource managers have not conducted a Casco Bay-wide assessment of eelgrass coverage since the 2005 *State of the Bay* report, but aerial photographs of Maquoit Bay in November 2009 provide a snapshot of coverage in one of Casco Bay's most significant eelgrass beds. Although it is not possible to fully characterize the density or percentage of cover using those photographs – which encompass the southernmost tip of Little Flying Pont across to the southernmost tip of Mere Point – there appears to be little overall change in distribution of eelgrass in Maquoit Bay since the previous analysis in 2001 (Barker 2010).

Hillary Neckles, of USGS Patuxent Wildlife Research Center, deploys an underwater video camera to measure eelgrass cover.

In 2009, a collaborative team, comprising Friends of Casco Bay, the Casco Bay Estuary Partnership, the US Geological Survey, and Bates College, began to develop a baseline of boat-based rapid assessment eelgrass data at randomly selected monitoring stations within Maquoit Bay and off Mackworth Island. Initial analysis of the 2009 data provided valuable information to help guide future eelgrass surveys in Casco Bay, and generally suggested that eelgrass is present and healthy where expected, based on previous macro-scale assessments and habitat modeling. Additional boat-based data collection should expand understanding of eelgrass conditions within Casco Bay.

Solution and Actions

Eelgrass is vulnerable to a number of human activities, including boating. In Casco Bay, sheltered coves and bays that provide excellent mooring conditions often also support eelgrass beds. As chains drift during tide cycles, however, scour can leave a circular scar on eelgrass beds. That scouring effect can also increase turbidity in the water column, decreasing available light to adjacent plants. Although individual mooring impacts to eelgrass beds may seem insignificant, the cumulative impact of a mooring field can be locally damaging.

At the annual "Status, Trends, and Conservation of Eelgrass in Atlantic Canada and the Northeastern United States" workshop held in Portland in February 2009, attendees learned about new conservation mooring technologies that hold promise for reducing the impacts of moorings on eelgrass. Incorporating flexible rods, the moorings suspend mooring chains off the bottom to reduce scour. Under the Cooperative Habitat Protection Partnership, an initiative of the National Marine Fisheries Service, state and federal agencies are working with Massachusetts communities to promote use of the moorings, while studying their effectiveness at reducing the impacts of mooring fields on eelgrass beds. Researchers hope to determine whether the conservation moorings can indeed protect eelgrass, and whether resource managers should promote their use.

References

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