A citizen science approach to mapping eelgrass (*Zostera marina* L.) loss in Maine

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Citizen scientists used a new database-driven web application to contribute data and help map eelgrass loss in Maine.

In Maine, eelgrass (*Zostera marina* L.) emerges each spring from rhizomes in the sub-tidal sediment. It propagates by vegetative and sexual means throughout the summer, and usually dies back to the rhizome in fall or early winter. Eelgrass died back in late August 2012 in upper Frenchman Bay and did not emerge from rhizomes in spring 2013. There also was no apparent germination of seeds. This was determined by underwater videography and direct observation from kayaks at low tide. In order to understand the extent of the eelgrass loss, we developed a new database-driven web application that invited the public to report locations where eelgrass is and is not growing (*www.eelgrassinmaine.org*). We used a variety of approaches to distribute information about the site, including e-mails to groups, media coverage and personal contacts. Numerous individuals, kayak tour participants, and students at summer camps used the site to report their observations. In total, 59 observations were reported from locations in Maine. The presence of eelgrass was reported for 46 locations; eelgrass loss was reported for 13 locations, most of them in Frenchman Bay. Combining our own observations with those reported on-line, we were able to generate maps like those depicted in Figure 1. Our findings indicated that while other bays such as Maquoit Bay in southern Maine experienced similar expansive declines in eelgrass coverage, the decline was not uniform statewide. Our experience demonstrates there is potential for crowd-sourced technological solutions in gathering data on emerging environmental problems. Anecdotal information can play a role in revealing broad patterns of ecosystem change and direct scientists toward new studies. We are building on our experience by creating a new on-line data portal for community observations that will function as a collaborative naturalist's notebook.

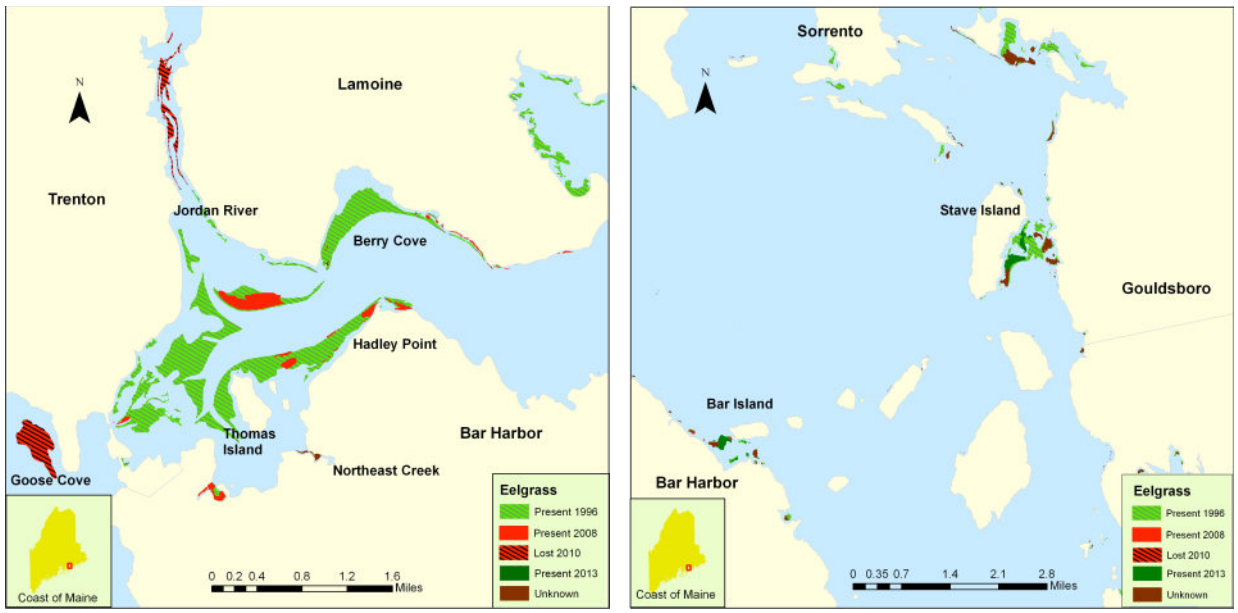

Figure 1. Eelgrass loss in upper Frenchman Bay (left) and outer Frenchman Bay (right). Eelgrass lost is indicated by hatch marks. Eelgrass present in 2008 in upper Frenchman Bay (red) was not present in 2013. Some eelgrass present in 2008 in outer Frenchman Bay was also present in 2013, indicated by a dark green in color. Original 1996 and 2008 data layers were produced by Seth Barker, Maine DMR.

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