

2015

Update on a Continuing Saga: Eelgrass and Green Crabs in Casco Bay, Maine (Poster)

Hilary A. Neckles
USGS Patuxent Wildlife Research Center

Angela D. Brewer
Maine Department of Environmental Protection

John W. Sowles

Seth Barker

Curtis C. Bohlen PhD
Casco Bay Estuary Partnership

See next page for additional authors

Follow this and additional works at: <https://digitalcommons.usm.maine.edu/cbep-graphics-maps-posters>

Recommended Citation

Neckles, Hilary A.; Brewer, Angela D.; Sowles, John W.; Barker, Seth; Bohlen, Curtis C. PhD; Craig, Matthew; Doan, Michael; and Lary, Sandra, "Update on a Continuing Saga: Eelgrass and Green Crabs in Casco Bay, Maine (Poster)" (2015). *Graphics, Maps, and Posters*. 36.
<https://digitalcommons.usm.maine.edu/cbep-graphics-maps-posters/36>

This Book is brought to you for free and open access by the Casco Bay Estuary Partnership (CBEP) at USM Digital Commons. It has been accepted for inclusion in Graphics, Maps, and Posters by an authorized administrator of USM Digital Commons. For more information, please contact jessica.c.hovey@maine.edu.

Authors

Hilary A. Neckles, Angela D. Brewer, John W. Sowles, Seth Barker, Curtis C. Bohlen PhD, Matthew Craig, Michael Doan, and Sandra Lary

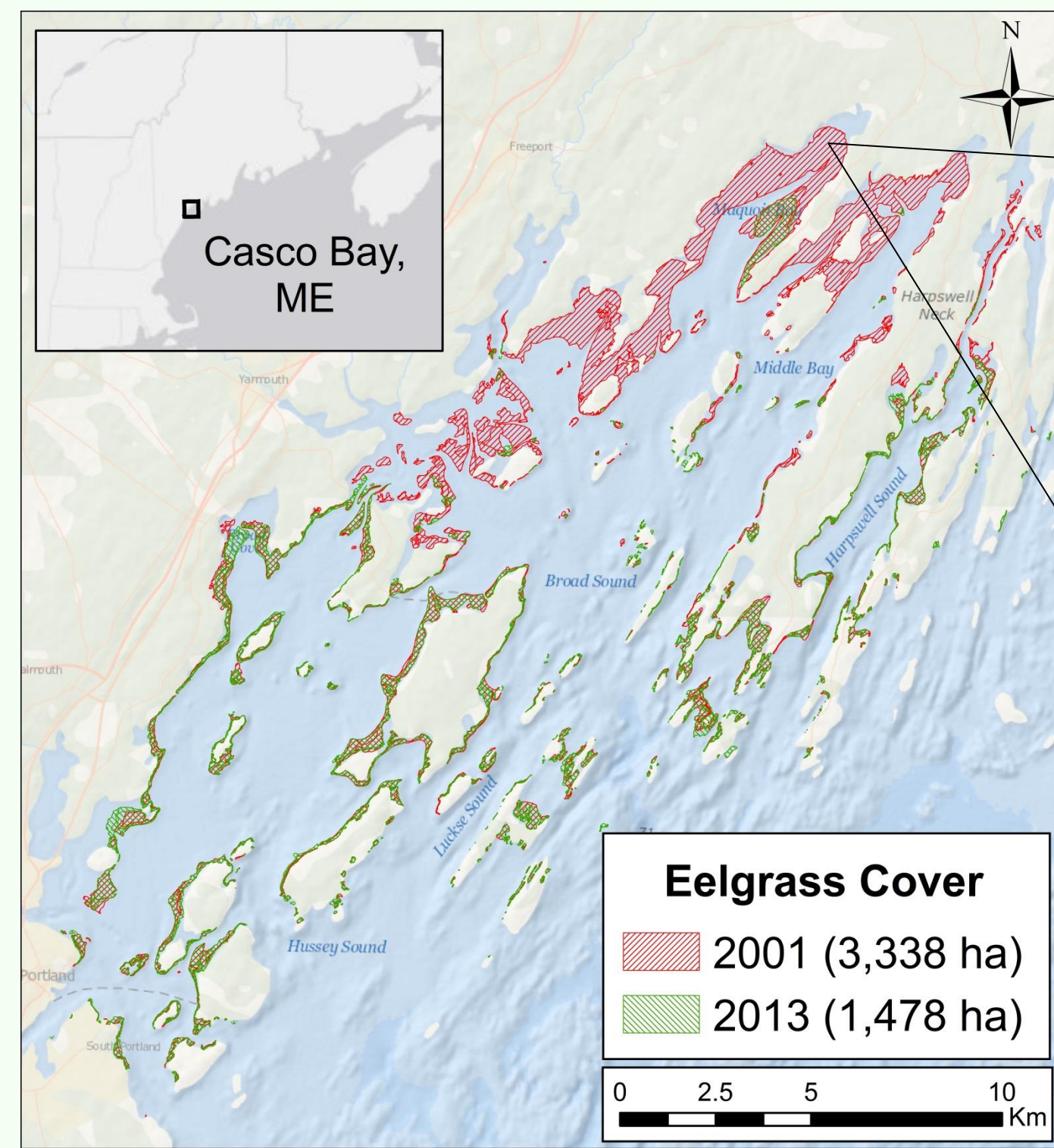
Update on a Continuing Saga: Eelgrass and Green Crabs in Casco Bay, Maine



Hilary A. Neckles¹, Angela D. Brewer², John W. Sowles³, Seth Barker⁴, Curtis C. Bohlen⁵, Matthew Craig⁵, Michael Doan⁶, and Sandra Lary⁷

¹USGS Patuxent Wildlife Research Center, Augusta, ME; ²ME Department of Environmental Protection, Augusta, ME; ³North Yarmouth, ME; ⁴Boothbay, ME; ⁵Casco Bay Estuary Partnership, Portland, ME; ⁶Friends of Casco Bay, South Portland, ME; ⁷USFWS Gulf of Maine Coastal Program, Falmouth, ME

Recent Loss of Eelgrass in Casco Bay Caused By Green Crabs

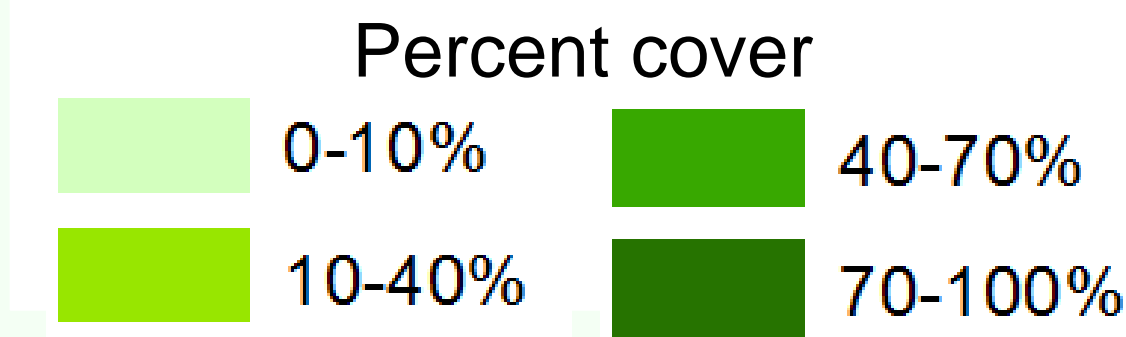


- Eelgrass area declined by 56% between the mapping intervals
- The majority of loss occurred from 2012 to 2013
- Bioturbation by green crabs identified as a leading cause

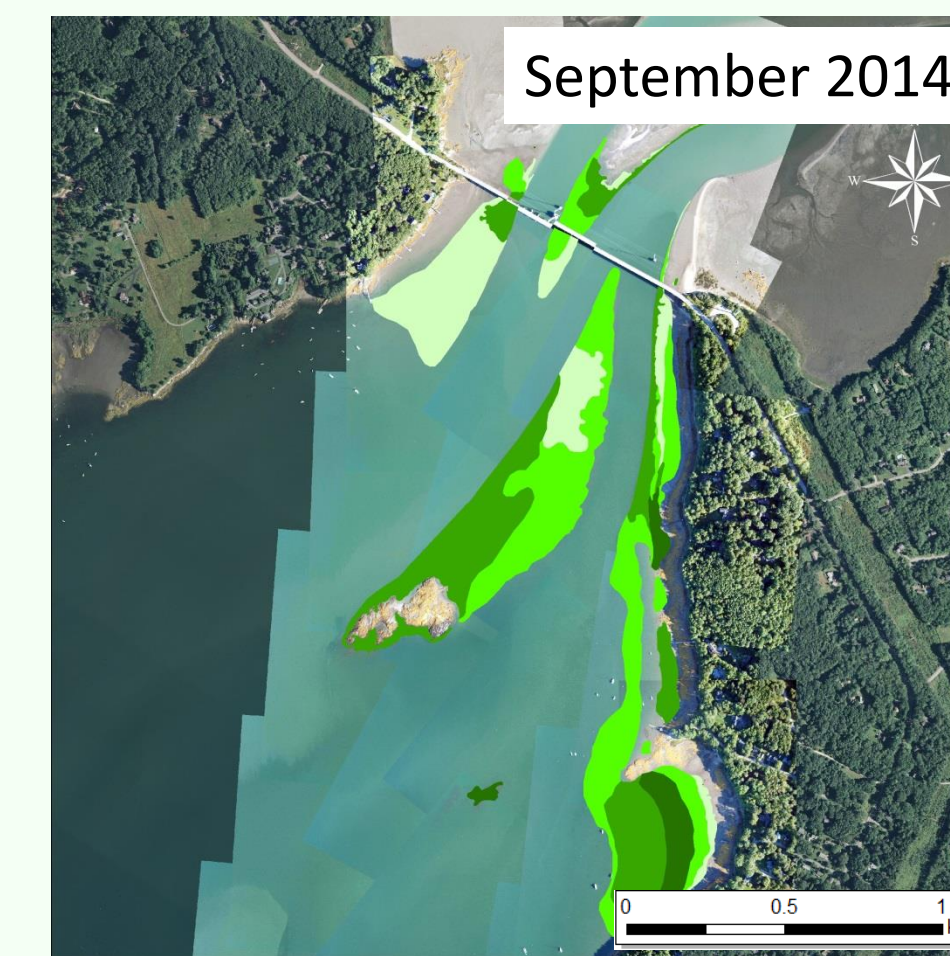
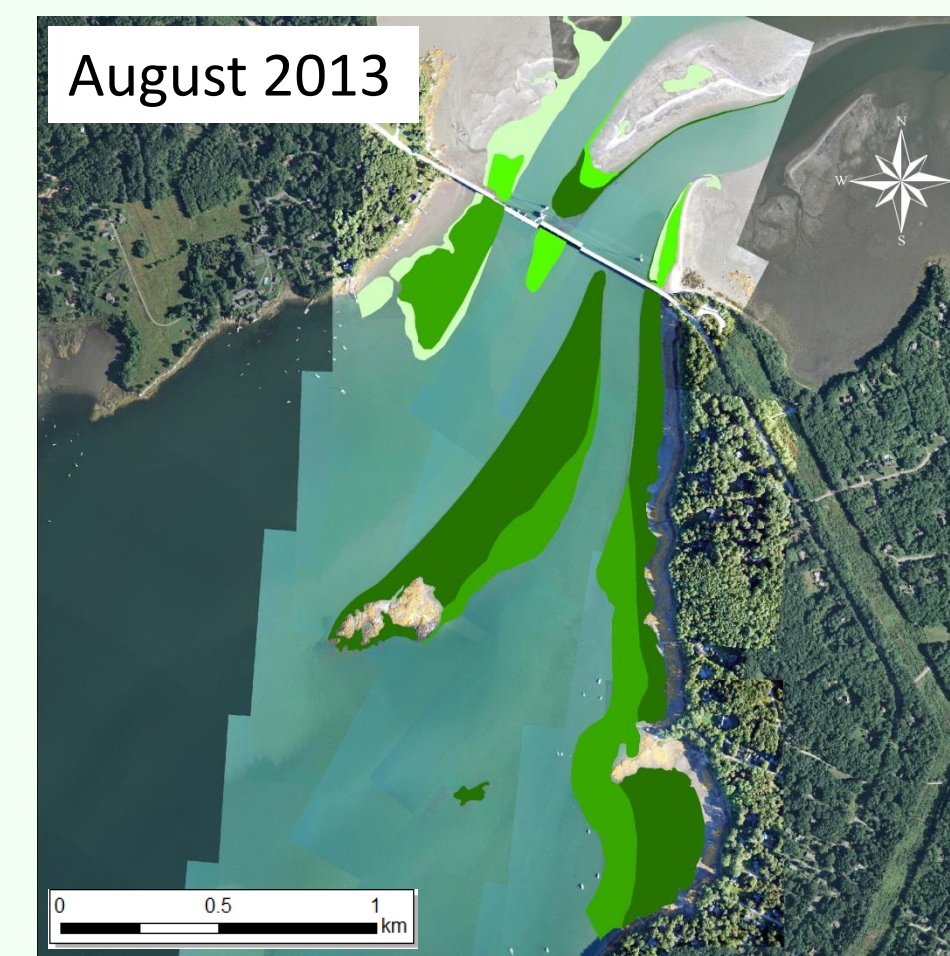
Mapping by Seth Barker, produced by: Maine DMR (2001) Maine DEP & Casco Bay Est. Partnership (2013)

Large-Scale Eelgrass Change: 2013 – 2014

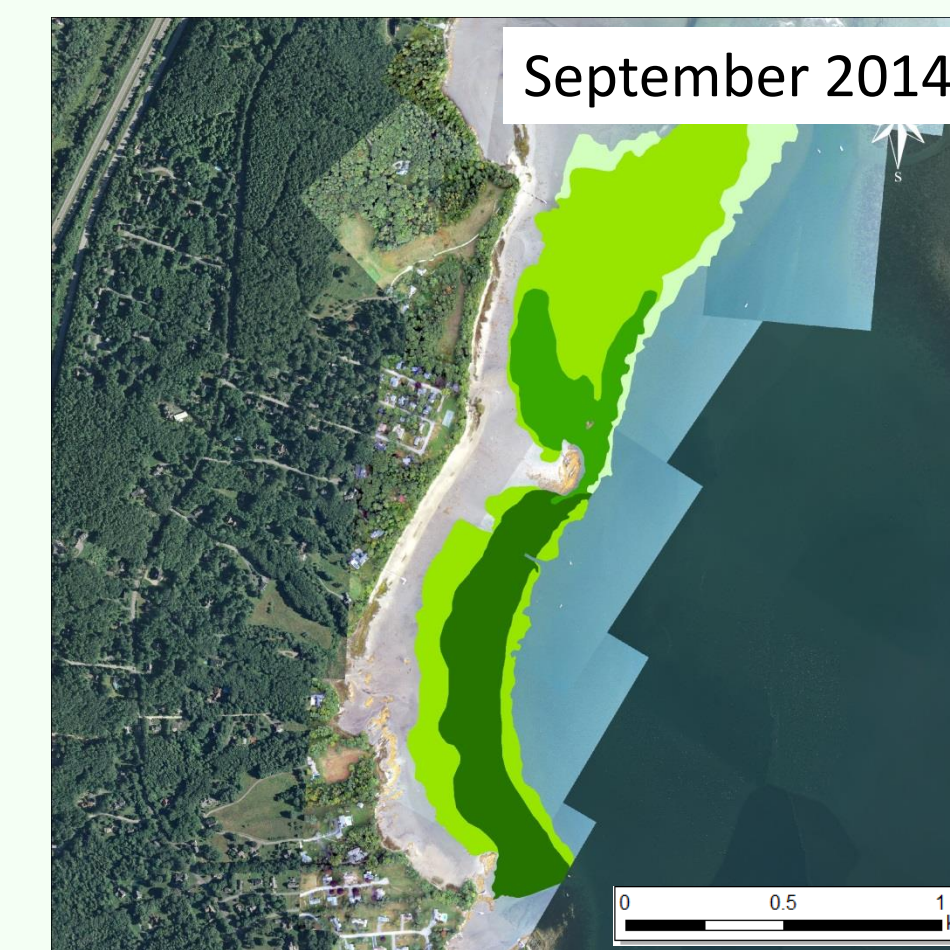
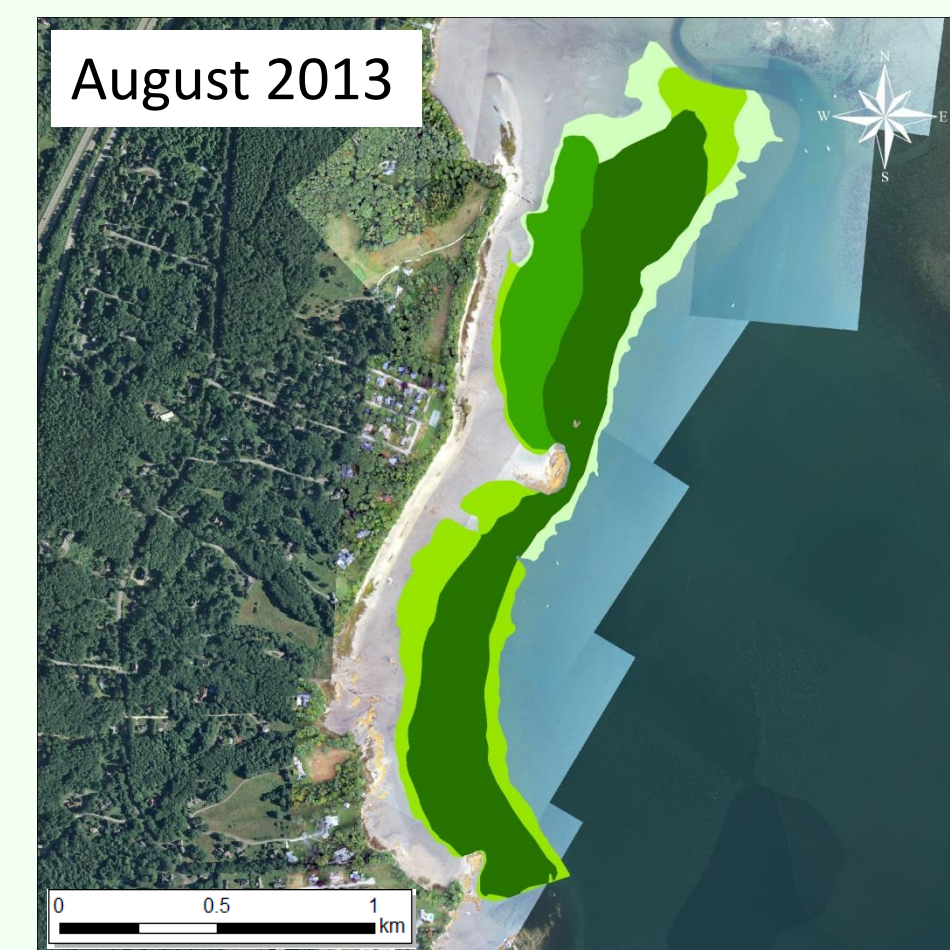
- Percent cover decreased at all sites
- Dramatic loss of area mapped in the highest cover category at CI & MI
- Overall loss of eelgrass area at LCI



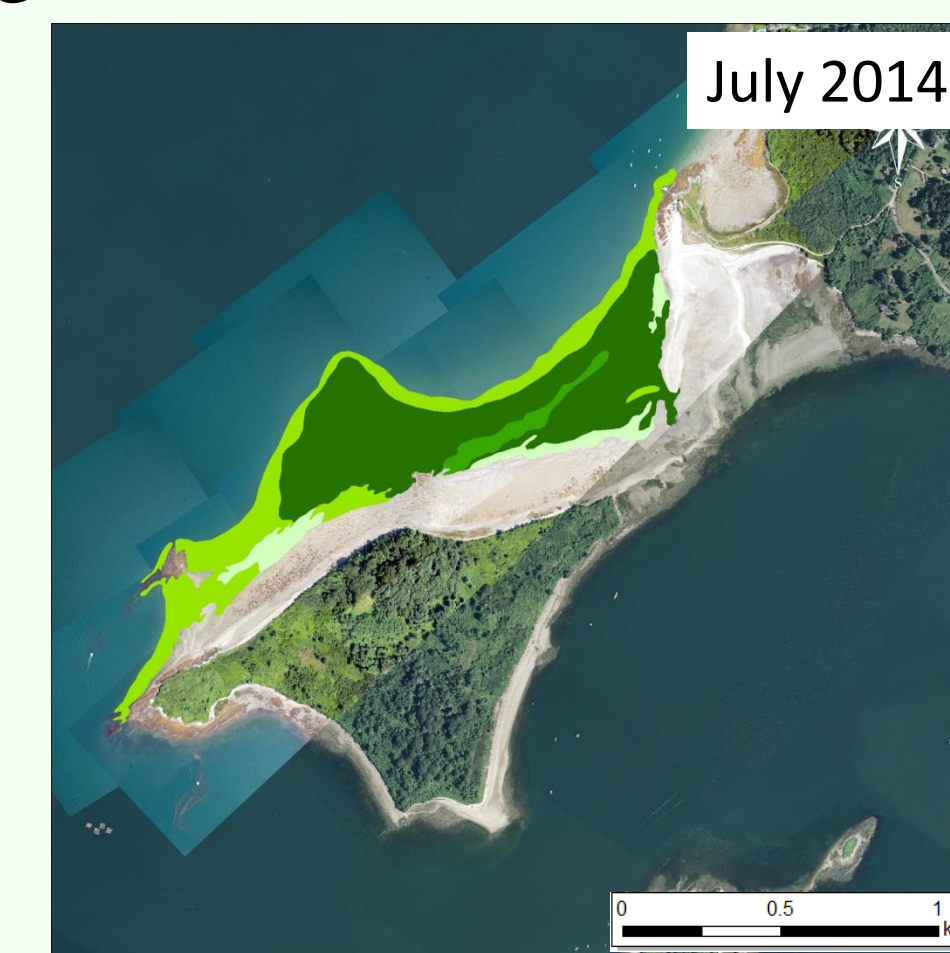
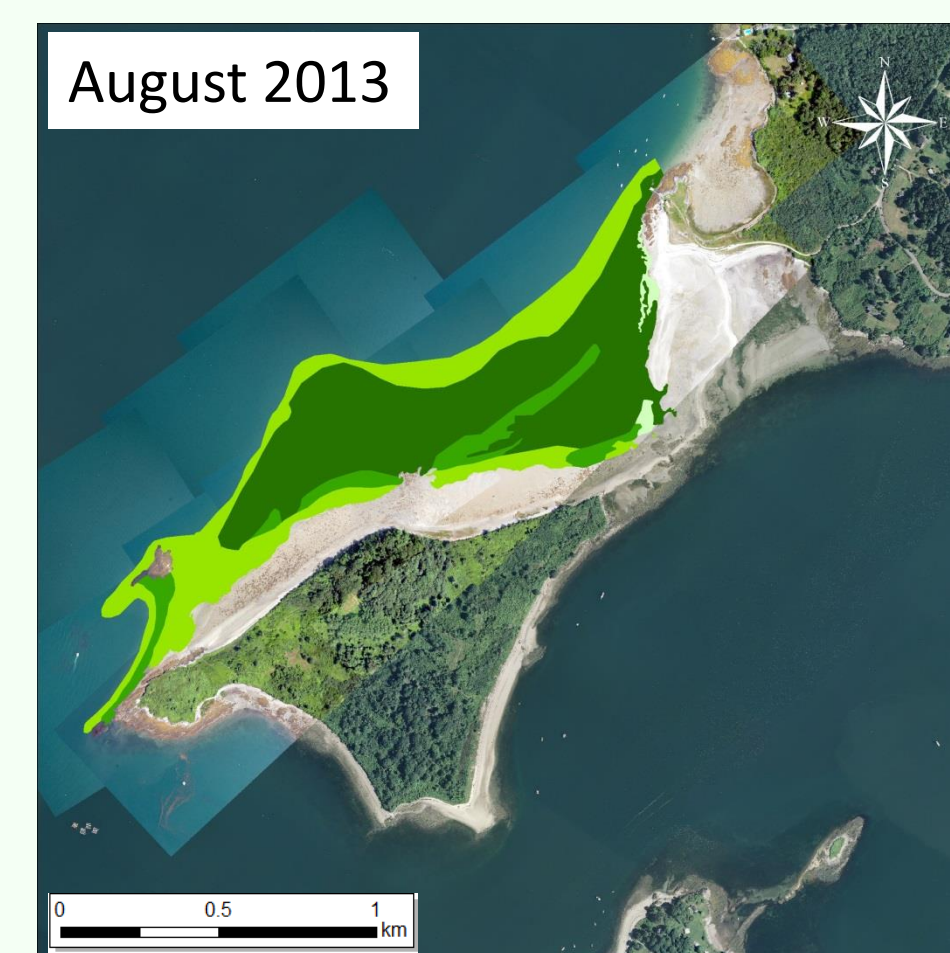
Cousins Island



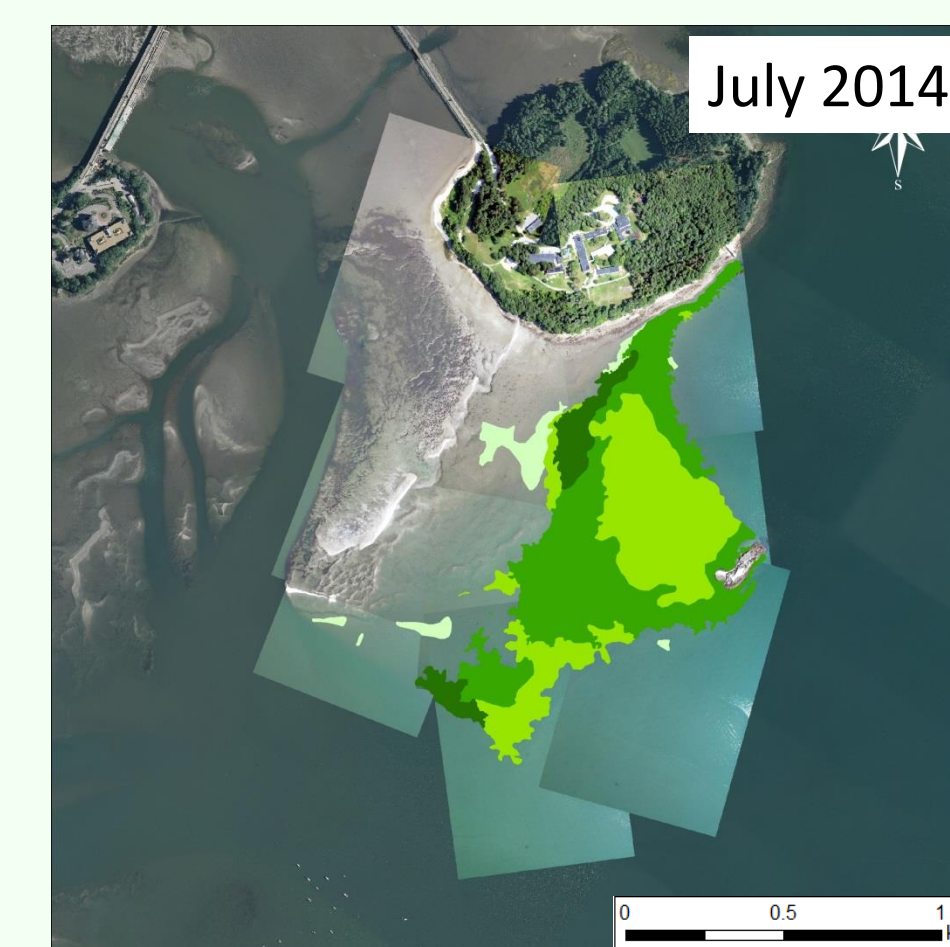
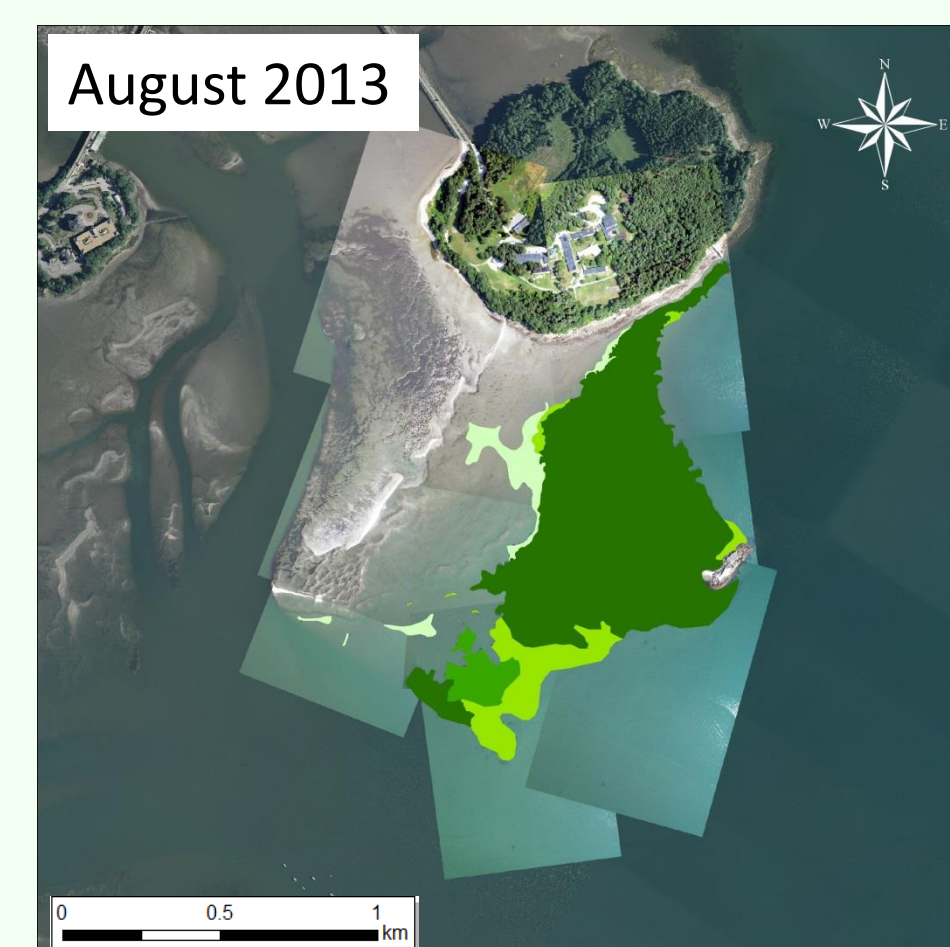
Broad Cove



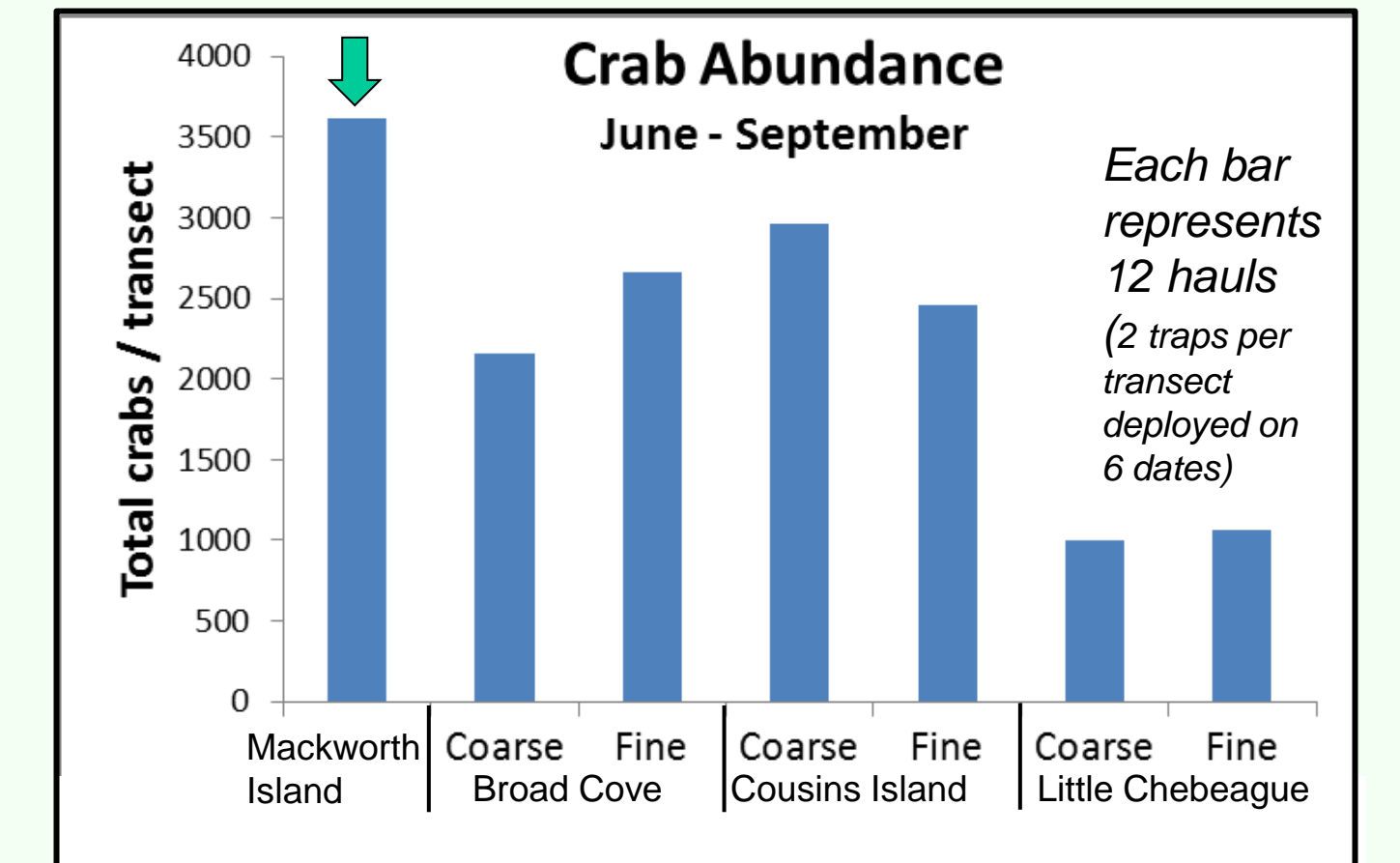
Little Chebeague Island



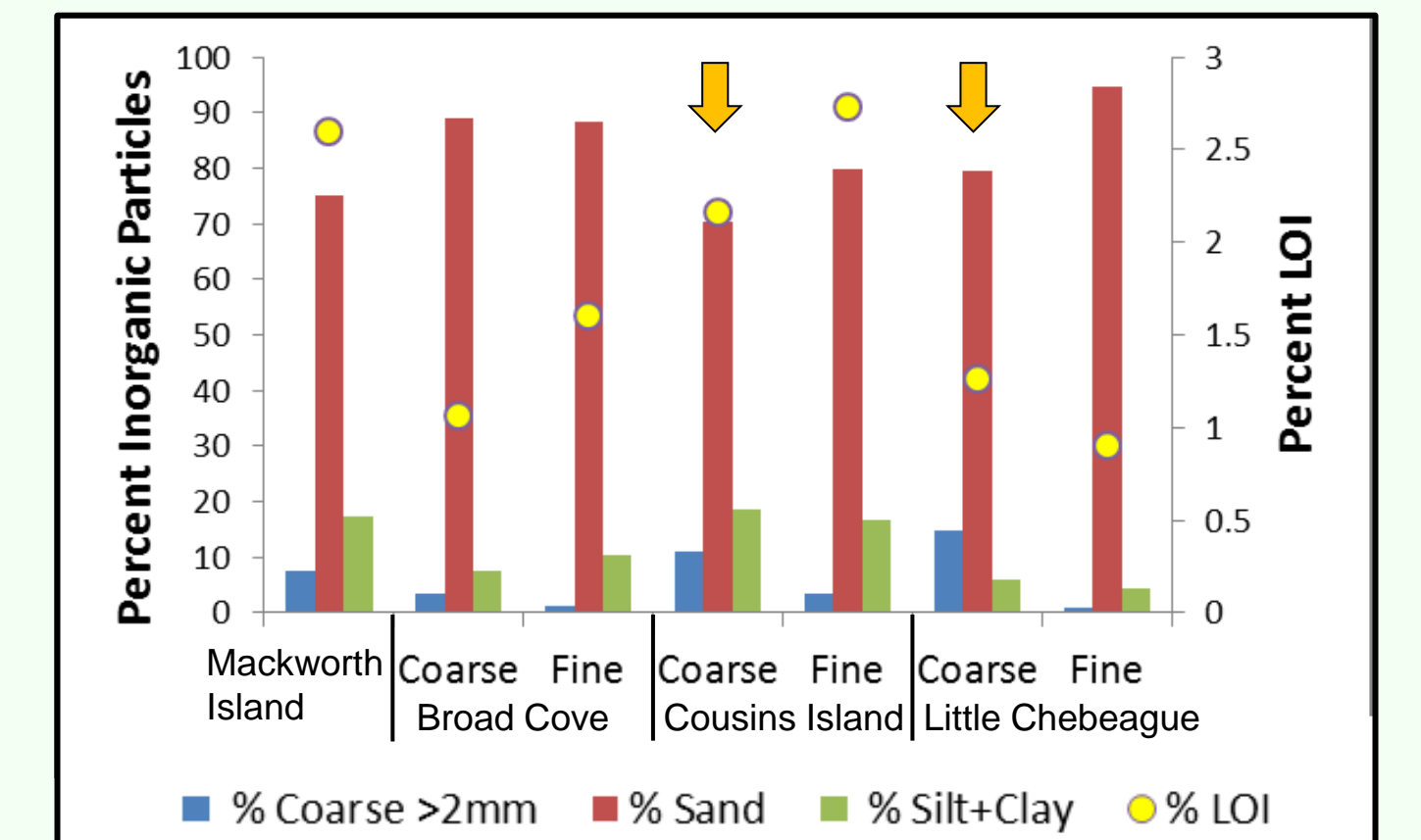
Mackworth Island



Environmental Variables: June – September, 2014



- Highest number of green crabs occurred at Mackworth Isl. transect
- Sediment texture > 10% coarse particles at two sites (Cousins Isl.-Coarse and Little Cheb.-Coarse)
- Seasonal mean attenuation of photosynthetically available radiation (K_d) among sites was 0.46 m^{-1} to 0.59 m^{-1} , resulting in a minimum of about 24% surface irradiance at the canopy depth at mid-tide

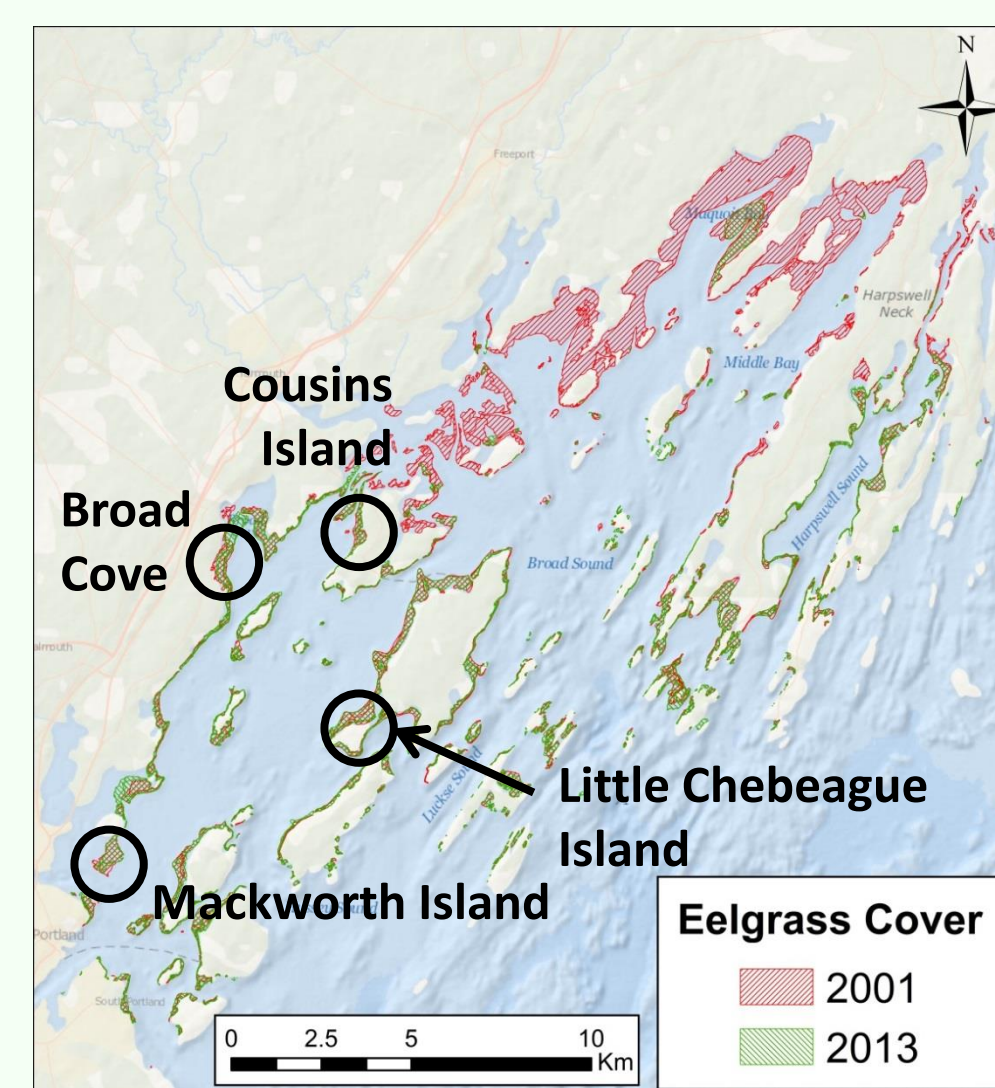


Questions

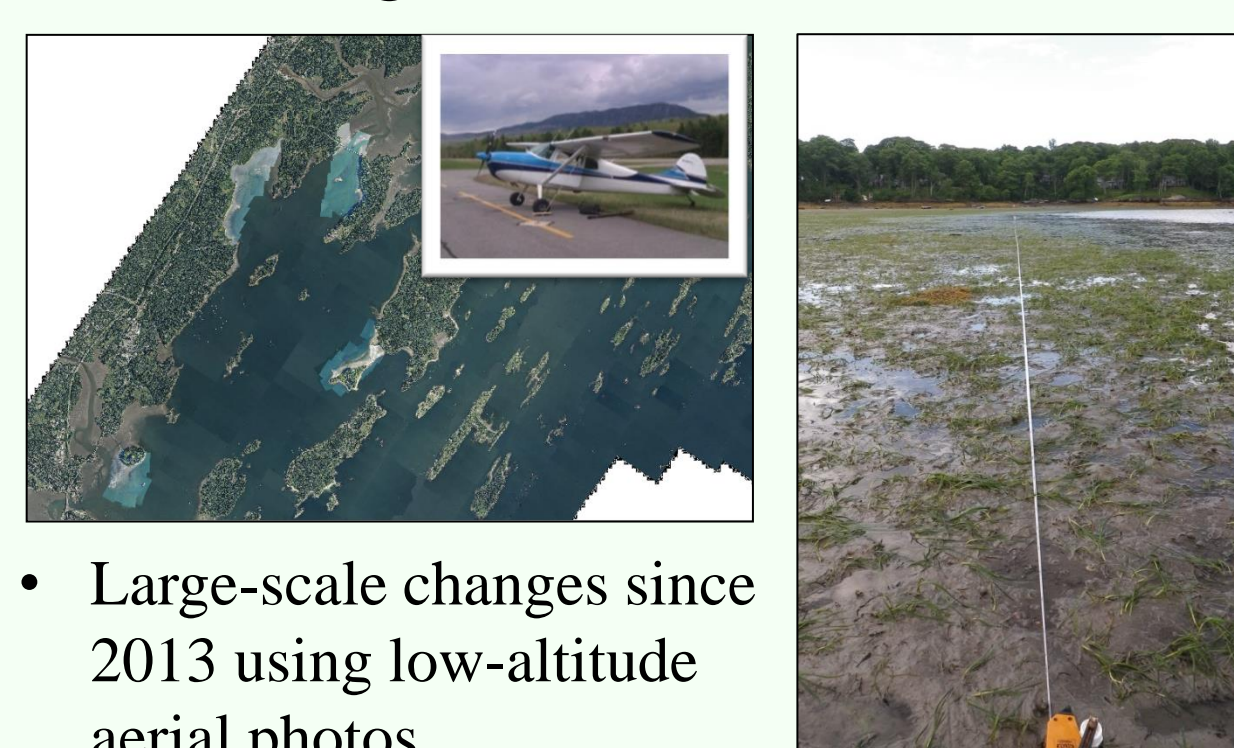
- Are green crabs continuing to destroy eelgrass in Casco Bay?
- Are effects of green crabs influenced by other environmental factors?

Multi-Scale Approach at Targeted Locations

Study Sites



Eelgrass Measurements



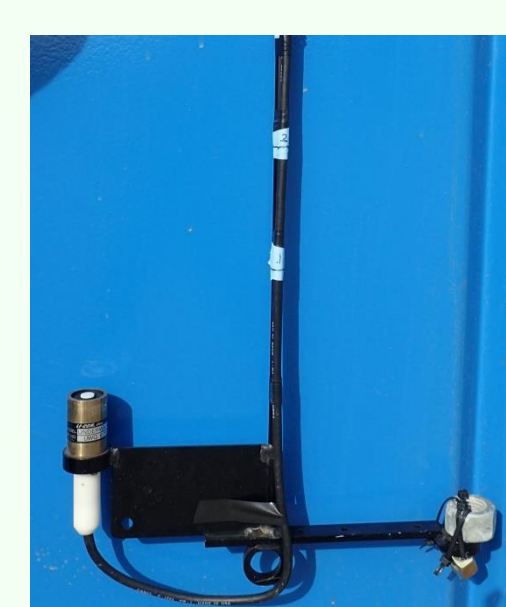
- Large-scale changes since 2013 using low-altitude aerial photos
- High-resolution changes in cover during the peak growth season along fixed transects (1-2 per site) parallel to shore in low intertidal/shallow subtidal
- Permanent quadrats (12) along transects [methods follow SeagrassNet.org]

Green Crab Abundance



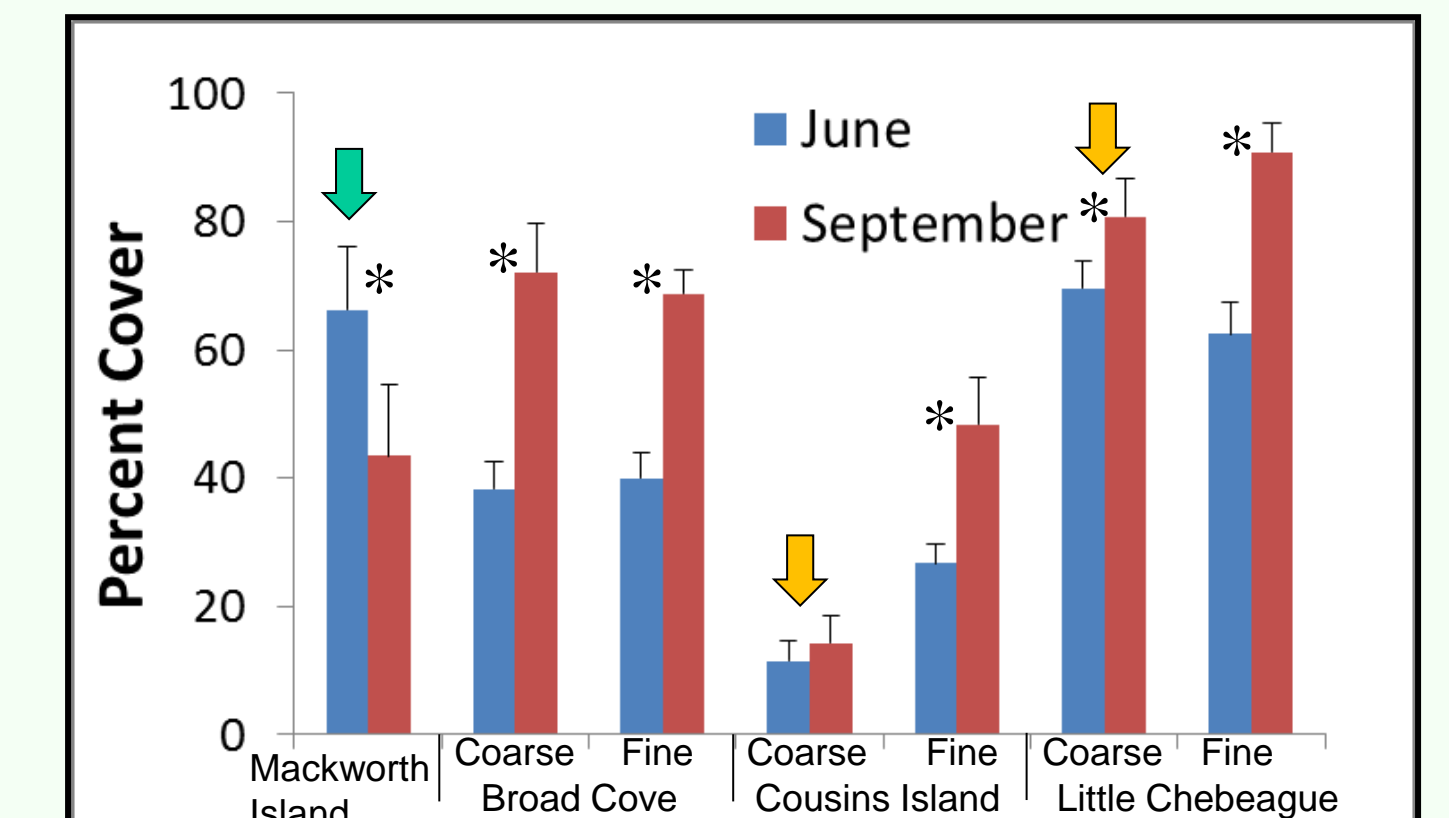
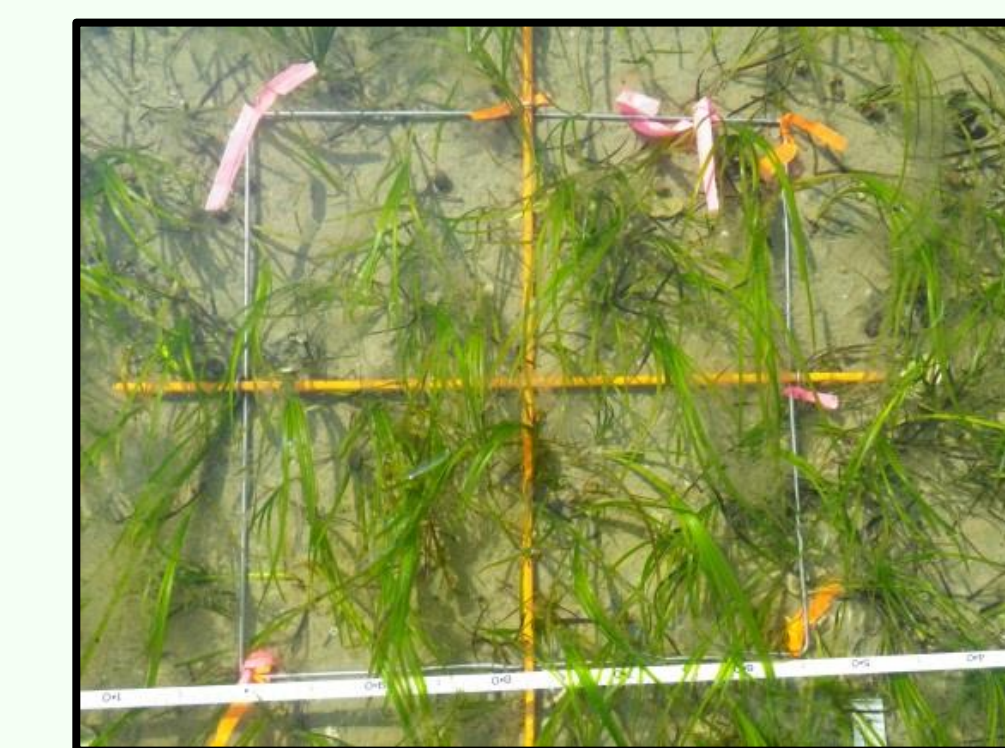
- Two traps per transect deployed 24 h every 2 weeks
- Baited with standard quantity of frozen alewives

Environmental Variables



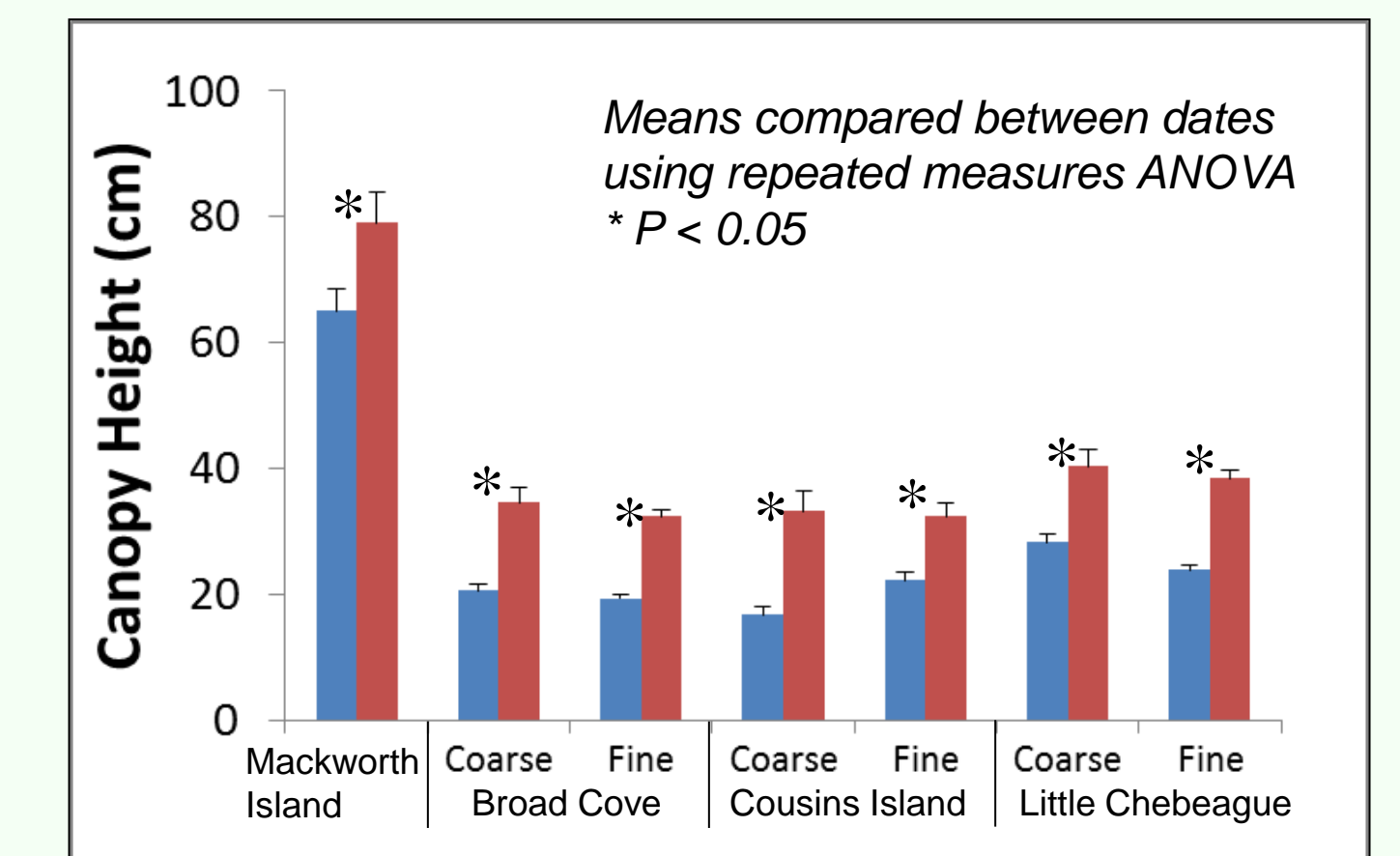
- Light attenuation adjacent to each transect measured from duplicate profiles every 2 weeks
- Triplicate sediment samples collected from each transect for texture and organic analyses

High-Resolution Eelgrass Change: June – September, 2014



From June to September:

- At the transect with the greatest total number of crabs, eelgrass % cover decreased despite increase in canopy height, signifying decrease in shoot density (Mackworth Isl.)
- The smallest seasonal increases in % cover occurred at the two transects with highest fraction of coarse sediments (Cousins Island-coarse, Little Chebeague-coarse)



Conclusions

- Eelgrass loss continued from 2013 to 2014
- Decreases in bed size, patch cover, and shoot density were apparent in different locations
- Changes in shoot % cover corresponded negatively to both crab abundance and the proportion of coarse particles in the sediment
- At measured values, water clarity would not appear to limit shallow eelgrass production
- Results suggest independent or interactive effects of green crabs and sediment texture on eelgrass cover in Casco Bay



Acknowledgments

Crab sampling: Joe Glowa
 Groundtruthing: Jim Stahlnecker
 Eelgrass sampling:
 Wendy Garland, Bob Houston,
 Michael Langlois, Leslie Latt, Jim
 Stahlnecker, Alex Sturtevant,
 Emily Zimmermann
 Target site maps: Becky Schaffner