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Ecological Effects of Rockweed (Ascophyllum nodosum) Harvesting

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Ascophyllum nodosum, the dominant intertidal macroalgal species from Maine to Canada, plays an important role in buffering intertidal stresses and supports a variety of organisms such as molluscs, crustaceans, fish and birds. *A. nodosum* is harvested commercially for use in fertilizers and food additives, and landings have been increasing in Maine in recent years. The ecological impact of removing the rockweed canopy was assessed in a comparative study between Kent Island in the Bay of Fundy, New Brunswick, Canada and Orr's Island in Harpswell, ME, USA. Paired 2x2m control and experimental plots were set up, harvested, and surveyed monthly during the summers of 2013 (15 plots on Kent Island) and 2014 (an additional 9 plots on Kent Island and 20 on Orr's Island) in a BACI design (Before, After, Control, Impact). One square meter surveys were conducted to determine algal species richness, algal percent secondary cover, and megafauna abundance and diversity. Surveys were designed to assess the overall diversity within plots and count/identify all present species.

Initial t-tests of Kent Island data show a short-term reduction in amphipods and isopods, *Carcinus maenas* (green crabs), and *Littorina obtusata* (smooth periwinkles) and a short-term increase in *Littorina littorea* (common periwinkles) ($p<0.05$), with a long-term reduction in anemones and continued trends towards generally lower numbers of mobile megafauna. However, macroinvertebrate biodiversity (H'), macroinvertebrate species richness, and algal species richness were not significantly affected by harvest. Although many of the same trends were observed at the study site in Maine, there were no significant changes following harvest. Initial results suggest that although the presence of mobile invertebrate species is not affected by harvest, removal of the canopy results in general reduction in abundance of most invertebrates that persists for at least a year in many cases. The harvested canopy was still significantly shorter than the control canopy one year following harvest (t-test, $p<0.0001$), although the algal percent secondary cover had returned to nearly normal levels (t-test, $p=0.8$).

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