Kelp-grazer interactions in Kachemak Bay, Alaska: Grazing activity, chemical defenses and resource allocation in selected kelp species.

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Kelp beds are a critical habitat in Alaska's coastal system because of their high productivity and the diversity of associated communities of invertebrates and fishes. In the recent past, several large kelp beds in Kachemak Bay have temporarily or permanently disappeared, or showed significant fluctuations in density and spatial coverage. The reasons for this are largely unknown, but herbivory by mesograzers could be one explanation. One objective of this study is to understand kelp-mesograzer interactions in Kachemak Bay as an element that may be particularly important for kelp bed survival. Consequences of herbivory not only depend on spatial and temporal distribution patterns of grazer densities, but also on algal growth and competitive strategies. Chemical defenses against mesograzers, in particular phlorotannins, are being investigated on spatial scales from different kelp tissue types up to regions, and on temporal scales from seasons to inter-annual variability. Grazing impact and phlorotannins are also being related to algal growth as well as to temperature, salinity, light and nutrient availability in various regions of Kachemak Bay. This will provide baseline data for future monitoring efforts for large-scale changes in coastal habitats in the Kachemak Bay National Research Reserve.