

Kelp-Grazer Interactions in Kachemak Bay Alaska (F0407)

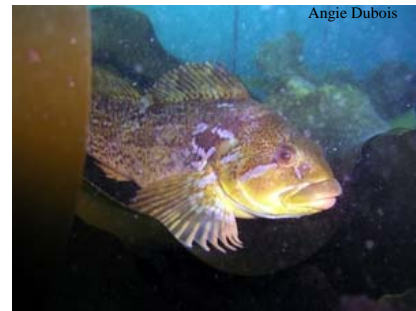
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The problem: *Historically, Kachemak Bay located in the Kenai National Wildlife Refuge in Alaska is abundant with kelp beds; however, some of the beds are now disappearing.*

Kelp provides a critical habitat in Alaska's coastal system. Many commercial and non-commercial fish species such as greenlings, ronquils, pricklebacks, rockfish and sculpins use kelp beds as feeding grounds, nursery areas, refuges and/or spawning grounds. Sea urchins, snails, and chitons rely on the kelp and algae found in the beds for nutrition, and sea otters hunt for clams and other invertebrates in these areas. The reasons for the disappearance of the kelp beds are largely unknown, but one theory is that the gastropods, like snails and chitons, are destroying them.

How kelp fights back: *What are phlorotannins?*

Many plants, produce chemicals, called phlorotannins. Phlorotannins are chemicals produced by kelp to defend against grazers like snails, sea urchins, and fish. Stored in the kelp tissues, phlorotannins are the most typical and widely distributed defense mechanism in kelp. When consumed by a grazer, the phlorotannins are released and challenge the ability of grazing animals to digest the kelp.



Kelp Greenling hiding in Bull Kelp

What are the researchers studying?

With funding from the North Pacific Research Board, biologists from the University of Fairbanks are studying the interactions between kelp and grazing gastropods like snails. Their goal is to determine if the kelp's natural chemical and physical defenses are strong enough to withstand an increase in grazing by greater numbers of gastropods.

The research focuses on four different species of kelp found in Kachemak bay. Biologists will evaluate each species to determine if:

- The kelp's chemical defenses are significant to defend against gastropod grazers.
- The kelp stores chemical defenses strategically to reduce the risk of attack by grazers.
- The kelp's chemical defenses change in concentration with increased numbers of grazers.
- There is a difference between the growth/chemical defense strategies of canopy forming-kelp species, and bed-forming kelp species.

The biologists recognize that the disappearance of kelp may be due to other factors than just grazing gastropods. The different ecosystems that compose Kachemak Bay experience drastic disturbances. Many unidentified causes such as differences in salinity and water temperature impact the kelp ecosystem. In addition, these environmental changes may influence interactions and the competitive strategies of the kelp itself. Researchers will take these factors into consideration when evaluating how the kelp stores its phlorotannins.