ISOSTATIC REBOUND PLANT COMMUNITIES

Isostatic rebound occurs when glaciers retreat and the land, freshly unburdened by the weight of the ice, lifts up. The phenomenon is not unlike a memory foam mattress expanding upward when a person gets out of bed in the morning. Here in Homer and Seldovia, isostatic rebound and tectonic uplift are additive and the land rises faster than sea levels. This results in responses from natural ecosystems, such as coastal marshes.

Coastal marshes are sites where freshwater and saltwater mix from ocean tides and rivers. As sea level changes in relation to land elevation, the boundaries of fresh and saltwater interaction change. The changes in water composition over time can, in turn, be tracked by monitoring changes in coastal plant community composition.

Plants in coastal marshes have developed adaptations that allow them to compete as salt-tolerant or salt-intolerant organisms. The more salt tolerant a plant is, the better it can compete for space in places with higher concentrations of salt in the water. Plants that are less salt tolerant tend to outcompete salt-tolerant plants where freshwater is more abundant. Therefore, the boundaries of freshwater and saltwater in marshes can be tracked through time by where certain species grow. As the boundaries change with isostatic rebound and post-seismic adjustment, plant communities flux to reflect where the seawater inundates.

The paintings above reference photographs taken by researchers at the Kachemak Bay National Estuarine Research Reserve, which has been sampling slew vegetation composition for over a decade.