East Side or West Side: Comparing the Timing of Phytoplankton Blooms Across Prince of Wales Island

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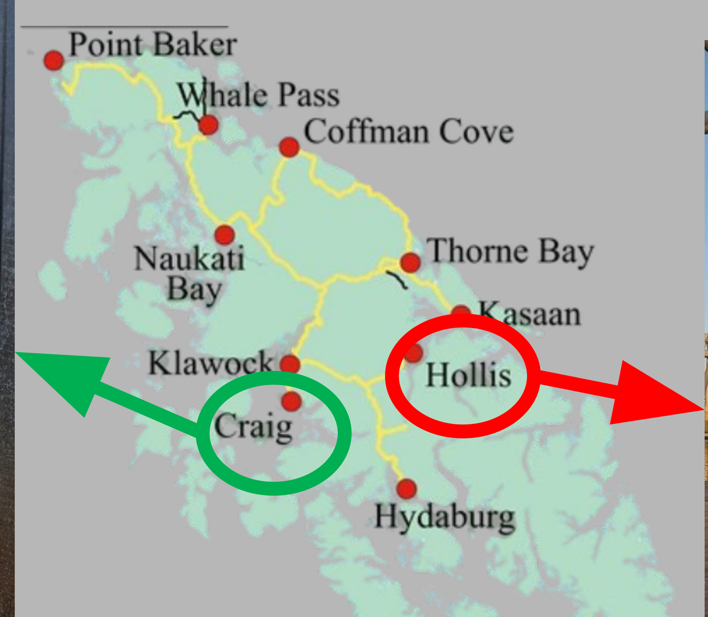
Introduction

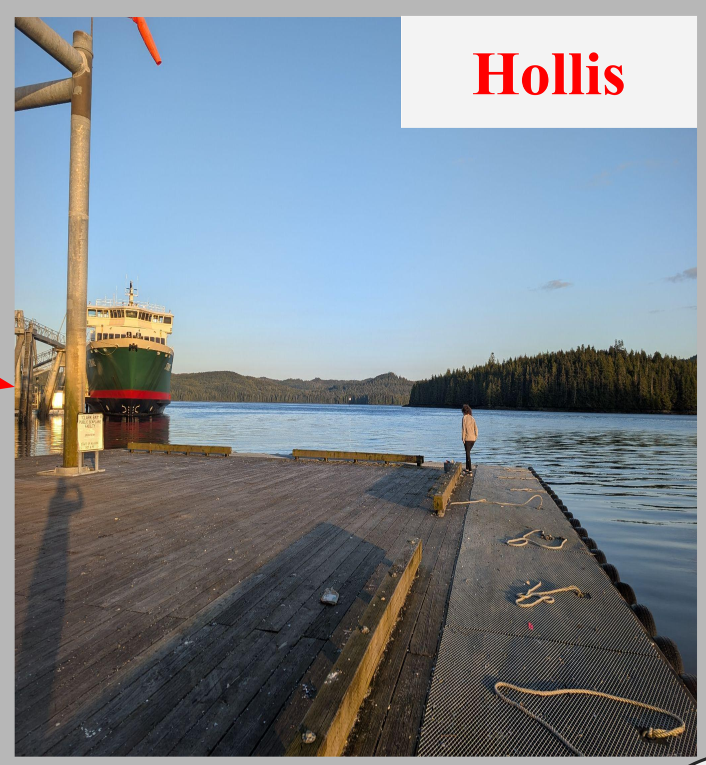
The study of plankton blooms is scientifically significant due to its impact on the subsistence lifestyles of individuals relying on marine resources such as shellfish, fish, and other marine organisms (Moss, 1993), especially king salmon, halibut, dungeness crab, and butter clams. Plankton is a foundational component of the marine food web, and variations in its populations can affect the availability and health of marine species (Fenchel, 1988). While extensive research has been conducted on the Craig side of Prince of Wales Island, plankton at the Hollis site has not been as explored, presenting a gap in our understanding. Differences in water temperature, salinity, nutrient availability, and light penetration between Hollis and Craig can affect plankton bloom timing. Monitoring bloom timing is crucial with climate change because it impacts ecosystem health, fisheries, and the carbon cycle. This research aims to fill this knowledge gap and provide valuable data for the local community, contributing to the management and conservation of marine resources on Prince of Wales Island. Monitoring plankton for PSP is essential to prevent health risks from toxic shellfish, especially as climate change alters bloom patterns and toxicity on Prince of Wales Island. Rising sea temperatures and ocean acidification can lead to more frequent and unpredictable harmful algal blooms.

Hypothesis

The Hollis side will experience plankton blooms earlier than the Craig side due to its earlier warming, which creates favorable conditions for plankton growth.

Methods





Samples were collected at two locations: the Hollis seaplane dock and the False Island Dock in Craig, 27 miles apart. The collection process involved performing plankton tows at each site. The plankton tows were conducted using a standard plankton net. Sample processing was conducted at the researcher's residence. The collected samples were prepared by creating microscope slides. Each slide was examined under a compound microscope on 40x and 400x to identify, with the assistance of the Southeast Alaska Tribal Toxins Informal Guide to Plankton ID packet (Kennedy nd), and quantify the plankton present. Randomly selected grid cells on the slides were reviewed to estimate the number of plankton in each sample.

References:

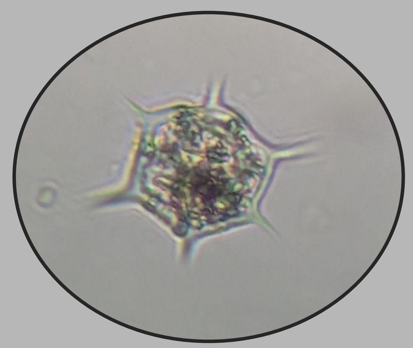
Moss. (1993) Shellfish, Gender, and Status on the Northwest Coast: Reconciling Archeological, Ethnographic, and Ethnohistorical Records of the Tlingit Madonna L. Moss American Anthropologist, Vol. 95, No. 3. pp. 631-652.

Fenchel, T. (1988). Marine Plankton Food Chains. *Annual Review of Ecology and Systematics*, *19*, 19–38. http://www.jstor.org/stable/2097146

Kennedy, E (n.d.) Southeast Alaska Tribal Toxins Informal Guide to Plankton ID. Southeast Alaska Tribal Ocean Research Network

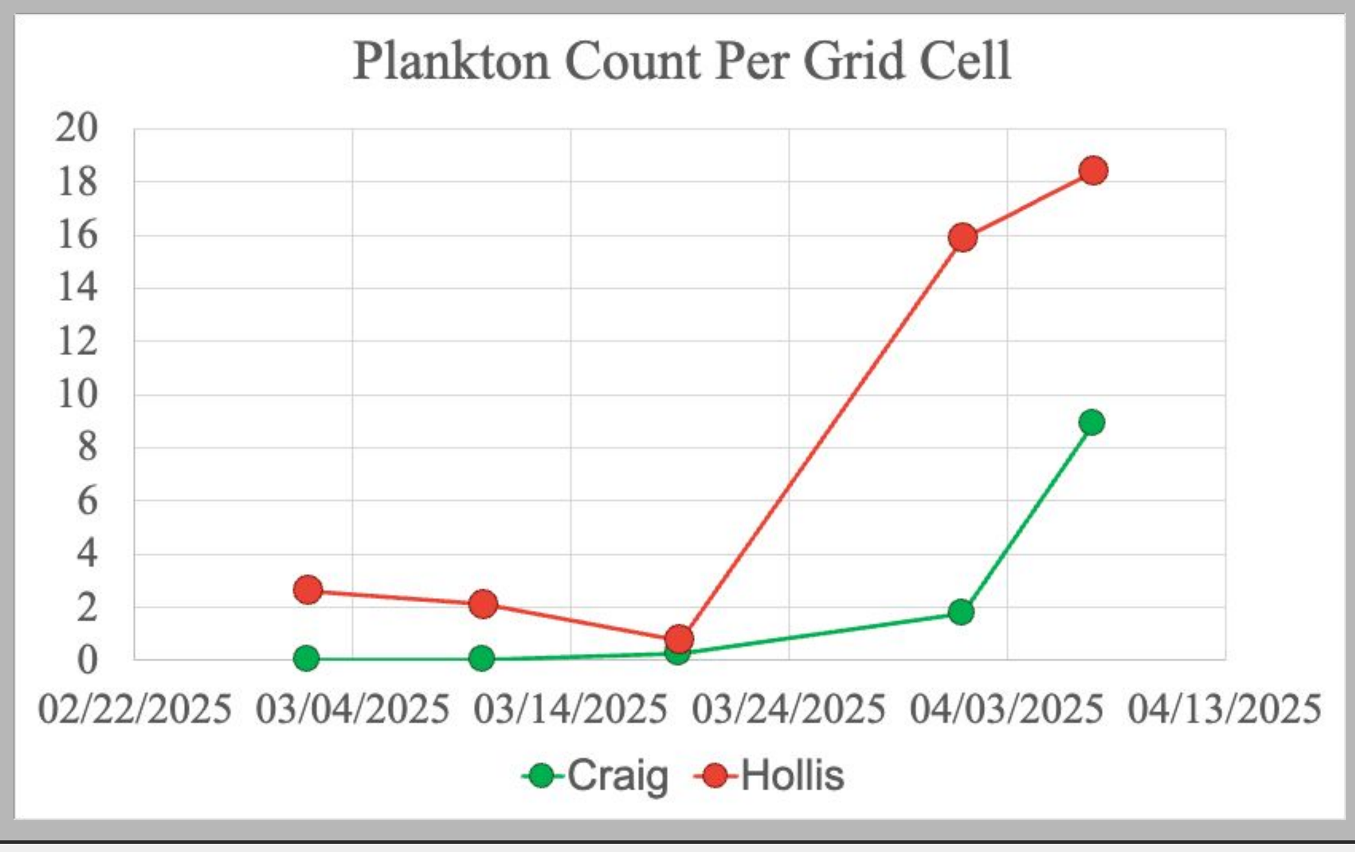
Results

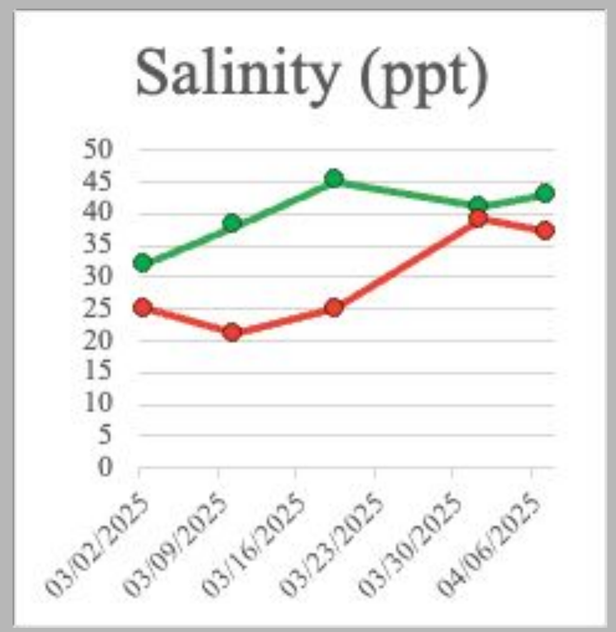

Navicula Morphotype

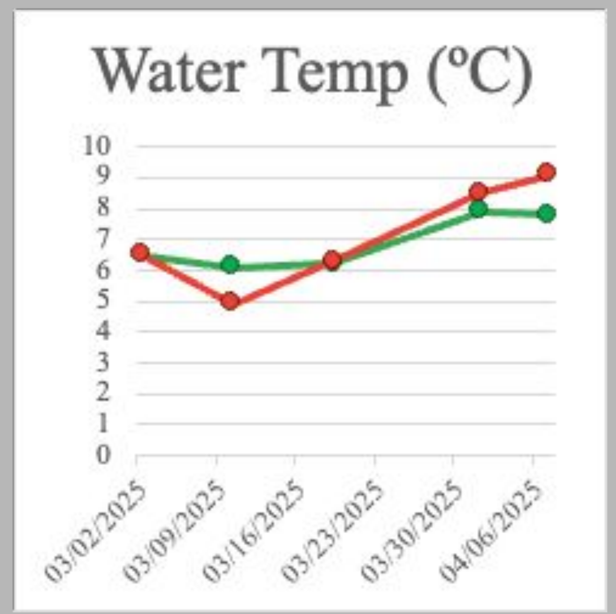

Dictyocha


Pseudo-nitzschia


Chaetoceros







- The major increase in the number of plankton present at Hollis occurred on 04/01/2025.
- Craig did not have a large increase in plankton and increased more slowly.
- Hollis water temperature was cooler early on in sampling, and increased in temperature later on compared to Craig, which held a more steady temperature.
- Hollis had lower salinity than Craig.
- In Hollis the main plankton species documented were Skeletonema, Chaetoceros, Melosira, Phaeocistis Globosa, Actinoptychus, and Pseudo-nitzschia.
- In Craig the main plankton seen were Melosira, Skelotenema, Chaetoceros, Coscinodiscus, and Navicula Morphotype.

Discussion

My hypothesis was supported with the findings that the Hollis plankton bloom happened before Craig. The reason behind this is most likely because the Hollis side is more protected by surrounding islands, and has more variable conditions, creating an environment that warms quicker, so the plankton bloom earlier. In contrast, Craig's proximity to the open ocean means it experiences less variable conditions and rougher waters, which can create and environment less ideal for earlier plankton blooms. One main question raised by this research is would Hydaburg produce the same results as Hollis if tested, since it is more protected, or would it have the same results as Craig, since it is also on the West side. Another question that is raised by this research is what would the results look like after testing for a whole year? Some important caveats from this research are small sample size, both of location and time, and that it does not represent the results of the whole East side and West side, but just these two test sites. The phytoplankton bloom timing could vary , even within these towns but between different sites. Paralytic shellfish toxin testing is crucial for coastal Alaska communities, including the Craig Tribe, to prevent paralytic shellfish poisoning from harmful algal blooms. This ensures the safe consumption of shellfish and protects public health.

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