

Tracking Trouble: Spatial and Temporal Distribution of Potentially Harmful Algae Species in Clayoquot Sound, BC

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Harmful algal species such as *Alexandrium* spp., *Pseudo-nitzschia* spp., and *Dinophysis* spp. are known to cause harmful algal blooms (HABs), where toxins accumulate in bivalves and can lead to paralytic, amnesic, and diarrhetic shellfish poisoning in humans. These blooms disrupt aquaculture industries and can cause significant economic losses. Additionally, harmful algae may damage marine animals, including causing fish kills and disrupting trophic interactions, threatening overall ecosystem stability. Increasing frequency and severity of blooms have been correlated with higher nutrient loads and may also be influenced by changing water properties, such as temperature. Since 2001, researchers at the University of Washington Tacoma have collected late summer/early fall water property data in Clayoquot Sound, with phytoplankton sampling added beginning in 2006. Phytoplankton samples from vertical net tows and discrete water samples collected at 5 m and 10 m were analyzed taxonomically to quantify species presence and concentrations. This study investigates the spatial and temporal distribution of select potentially harmful algal species in Clayoquot Sound to assess their prevalence and potential risks to human health, aquaculture, and local economies. We compiled and mapped distribution patterns of the three target species and evaluated changes over the past 17 years, comparing findings with historical data from Fisheries and Oceans Canada. We hypothesize that HABs will become increasingly prevalent as water temperatures rise, as warmer conditions can enhance algal growth rates and extend bloom seasons. The results will support future monitoring and management strategies to mitigate HAB impacts.