



# Investigation of Seasonal Settlement and Clam Harvest Pressure in the Sechelt Inlet System, British Columbia, Canada, Through Sclerochronology and Stable Oxygen Isotope Analyses

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## ABSTRACT

The Sechelt inlet system (SIS), situated on the inner Sunshine Coast of British Columbia, lies within the territory of the shíshálh Nation. This study focuses on ~1000 years of shíshálh shellfish harvesting from 930–0 cal. BP. Specifically, we investigated the seasonal timing of shellfish collection, relative shellfish harvesting pressure and paleo-temperature reconstruction at four archaeological sites. Thirty archaeological butter clam shells (*Saxidomus gigantea*) from the SIS underwent high-resolution shell oxygen isotope ( $\delta^{18}\text{O}$ ) analysis and 662 individual archaeological shell fragments were analysed for growth stage determination. The  $\delta^{18}\text{O}$  results showed a pattern of year-round collection with an emphasis on spring collection at village sites. Results from shell growth stage analysis suggest an intensive pattern of shellfish harvesting in the region, regardless of the site type. Archaeological shells show a larger  $\delta^{18}\text{O}_{\text{shell}}$  range, possibly reflecting a greater sea surface temperature amplitude than modern shells (i.e. a difference of ~6.5°C; modern range: ~3.7–20.4°C; archaeological range: ~–0.8–22.4°C). We contextualise our results with previous studies of seasonal timing and intensity of shellfish harvesting from the Pacific Northwest Coast, while interpreting these new data in the context of shíshálh occupation and landscape use.

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## Key Points

- Seasonality and intensity of shellfish harvest were investigated at four archaeological sites on shíshálh lands on the Sunshine Coast of British Columbia
- All seasons were represented, though a higher frequency of spring-collected shells were analysed
- Growth stage analysis revealed that shellfish remains in younger stages of growth were harvested at higher frequency than shells in a senile growth stage, suggesting that shellfish were intensely harvested

## Introduction

Similar to dendrochronology, which is the study of growth rings in trees, sclerochronology is the study of physical and chemical variations in accretionary hard tissues such as those found in bivalve shells (Prendergast, Versteegh, and Schöne 2017). These archives provide proxied information on past physical environmental properties such as seasonal temperature amplitudes, but also the season and intensity of shellfish

harvesting. Recently, sclerochronological studies of archaeological shell midden sites employed daily and annual shell growth pattern analysis, high-resolution stable oxygen isotope data, shell size measurements and ontogenetic age estimates to provide new insights into past shellfish harvesting practices in coastal British Columbia (Hallmann et al. 2011; Burchell et al. 2013a, 2013b, 2013c; Toniello et al. 2019). For the Sechelt inlet system (SIS) in southern British Columbia, previous settlement and subsistence patterns studies developed seasonal occupation estimates based on indicators such as presence/absence of salmon and herring remains (Coupland et al. 2012; Letham 2014), as taxa spawn seasonally in British Columbian rivers, allowing for zooarchaeological remains to be used to estimate site seasonality. However, the presence of fish remains is an imprecise indicator for seasonal occupation due to the documented storage economy, where fish obtained during the spring or fall were stored, transported and eaten during a later season (Barnett 1955), in addition to the long-term spawning variability and year-round fish availability along the coast (Groot and Margolis 1991; Hay and McCarter 2006). Further, these earlier

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