The Effects of Covid-19 on Shellfish Ages at Starrigavan Beach in Sitka, AK

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Background

Shellfish harvesting for subsistence has been practiced along the Northwest Coast for thousands of years, and archeological sites have been found along Southeast Alaska as well (Moss 1993). Harvesting can impact the density and age distribution of organisms being harvested (Barber et al. 2012). In Washington there was a study that examines growth and ages of clams, but a study has not been done in Alaskan waters (Bradbury et al. 2005). Being able to monitor the age of clams helps to determine how healthy their environment is and how external factors, such a human harvesting, are affecting their population. With a pandemic in 2020, we wanted to study if there was an increase in the age of butter clams on Starrigavan Beach in Sitka between 2019 and 2021. Due to the fact that shellfish harvesting has historically been done as a community project, we wanted to test if this would change when losing the ability to gather in large crowds.

Hypothesis

We predict that butter clams from Starrigavan beach in Sitka in 2021 will be older than butter clams from Starrigavan beach in Sitka in 2019 because less Sitka residents harvested due to the COVID-19 pandemic reducing frequency of group activities.

Methods

- Thirty butter clam samples were collected randomly from Starrigavan Beach in Sitka in 2019 and 2021, without age or size bias.
- The shells were cleaned and labeled. Both shells of the same clam were kept together and numbered the same to compare results if weathering or breakage occurred.
- Starting at the end of the umbo line (Figure 2), concentric rings were identified (rings that wrap radially around the shell, and do not stop or blend into other lines or rings, Figure 2).
- Having used the measurement of distance between the umbo and first ring as a gauge, the rest of the rings were counted, excluding the most recent growth ring.
- Annuli were counted by three observers, then confidence in count is recorded, and the average of the three ages was taken.
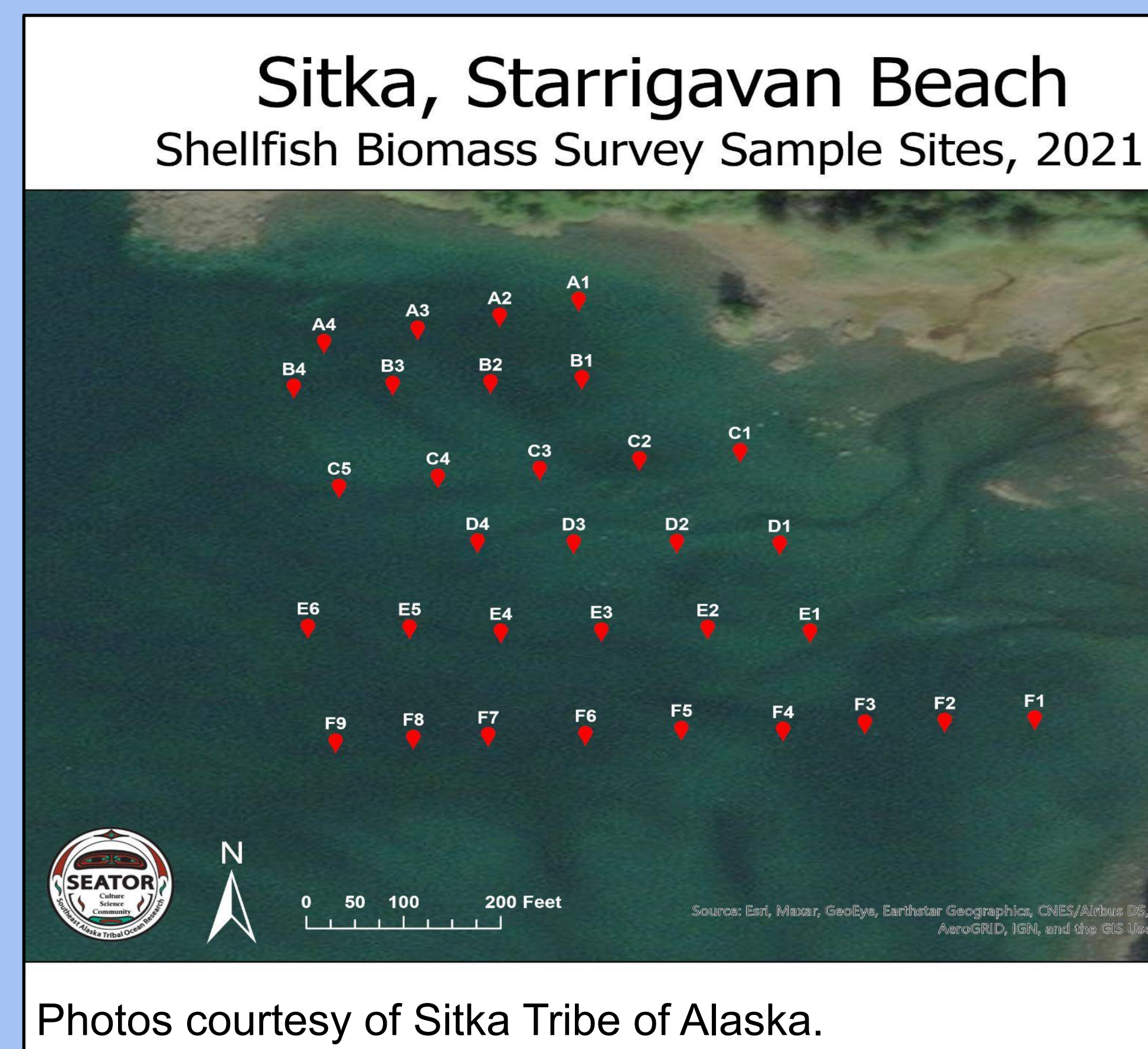
References:
Moss, M. L. (1993). *Shellfish, Gender, and Status on the Northwest Coast: Reconciling Archeological Ethnographic, and Ethnohistorical Records of the Tlingit.* American Anthropologist Vol. 95, No. 3, pp.631-652

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Bradbury, A., Blake, B., Speck, C., & Rogers, D. (2005, December). *Length-Weight Models for Intertidal Clams in Puget Sound (Bivalve Regions 1, 5, 6, 7, and 8).* Washington Department of Fish and Wildlife. Retrieved from https://wdfw.wa.gov/publications/00223

Sitka, Starrigavan Beach
Shellfish Biomass Survey Sample Sites, 2021

Photos courtesy of Sitka Tribe of Alaska.

Figure 2: Butter clam with annuli marked, each mark representing one year of age. Line A marks the umbo line.

Results
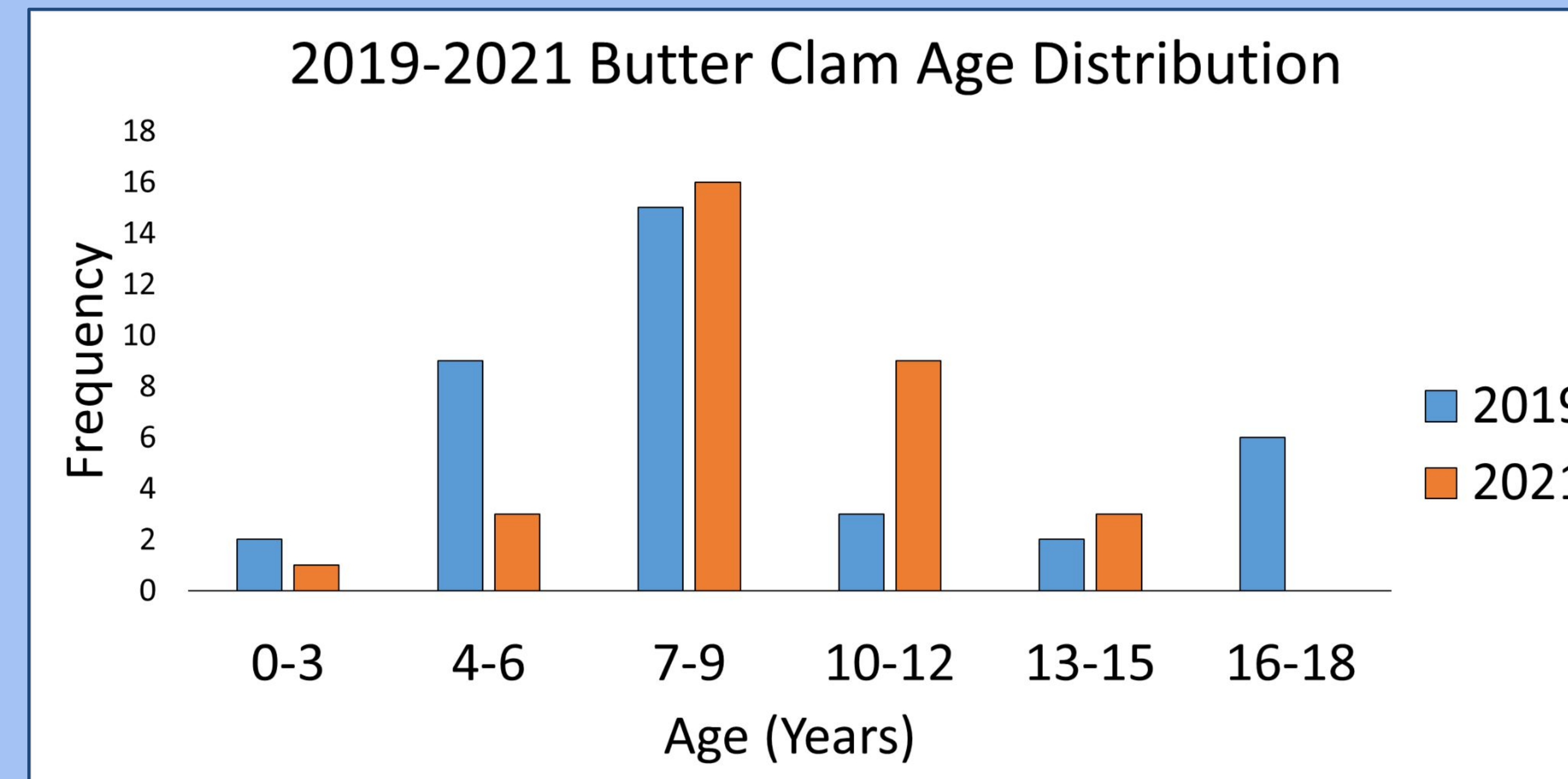

2019-2021 Butter Clam Age Distribution

Figure 3. A higher number of 2021 clams were aged than 2019 clams in the age groups of 7-15. For the age groups of 1-6 and 16-18, more 2019 clams were aged than 2021 clams, with no 2021 clams between the ages of 16-18.

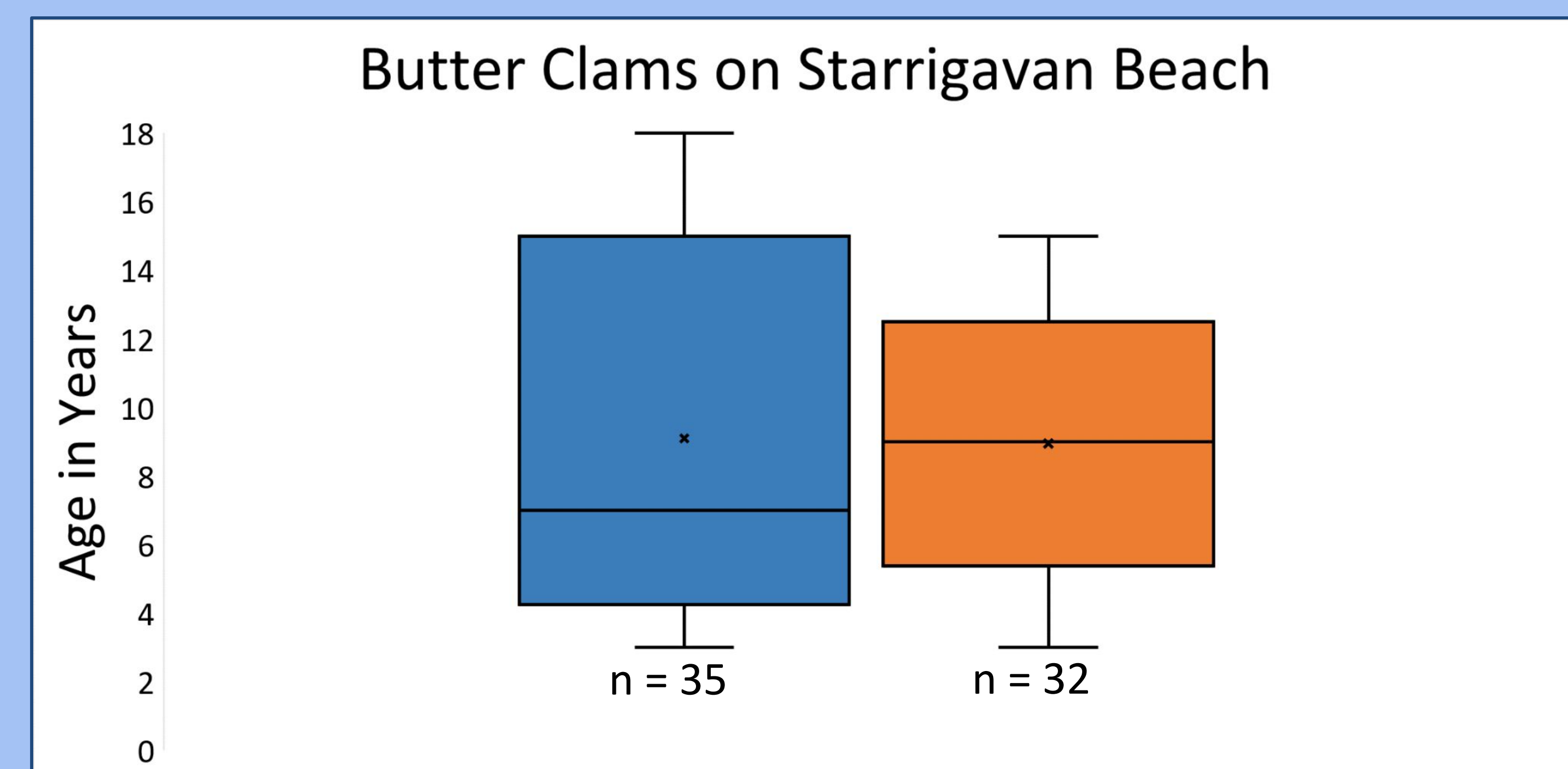Butter Clams on Starrigavan Beach

Figure 4. Middle line of the two boxes represents the median age. Median age of 2019 is 7. Median age of 2021 is 9. The X in the two boxes represents the mean age. Mean age of 2019 is 8.7. Mean age of 2021 is 9.09.

- After ages were determined, it was apparent that the average age of clams was not statistically significant between years. We conducted a two-sample t-test assuming unequal variance to determine if ages of butter clams on Starrigavan Beach were significantly different from 2019 to 2021.
- The p-value of 0.81 was not small enough to indicate a significant difference.

Discussion

Our hypothesis was not supported because there was not a significant difference between 2019 clams and 2021 clams. A possible explanation is that the Covid-19 pandemic had little effect on people's harvest habits on Starrigavan Beach. COVID's effect on harvest pressure and subsequent age composition require longer-term monitoring to fully identify patterns and evaluate potential changes to the clam bed. Future research studies on Starrigavan beach could include how sea otter predation effects clam population and age on Starrigavan beach, or comparing the clams on Starrigavan beach to clams from other areas like Washington State to see how the different climates affect clam growth rates.