

# Nearshore species diversity and abundance in potential green crab traps in Hoonah, Alaska

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## Introduction

Green crabs have reached Metlakatla and are starting to be a concern in Hoonah. Green crabs live in rocky terrain (Nicholas et al. 2022) and because Hoonah has a rocky ecosystem the crab could establish here. Their impact is vast and can disturb a whole ecosystem, including negative impacts on shellfish and shellfish fisheries (Grosholz et al. 2011). For us to know where the most crab are caught can help us plan more of a response if or when green crabs reach Hoonah. We are also interested in the diversity of species caught with our research, to see what changes if the green crab arrives here. We looked at what trap opening size, what kind of bait, and which location works best for catching crabs. Though we do not have green crab in Hoonah so far, we will know general locations and what kind of bait they could potentially be interested in.

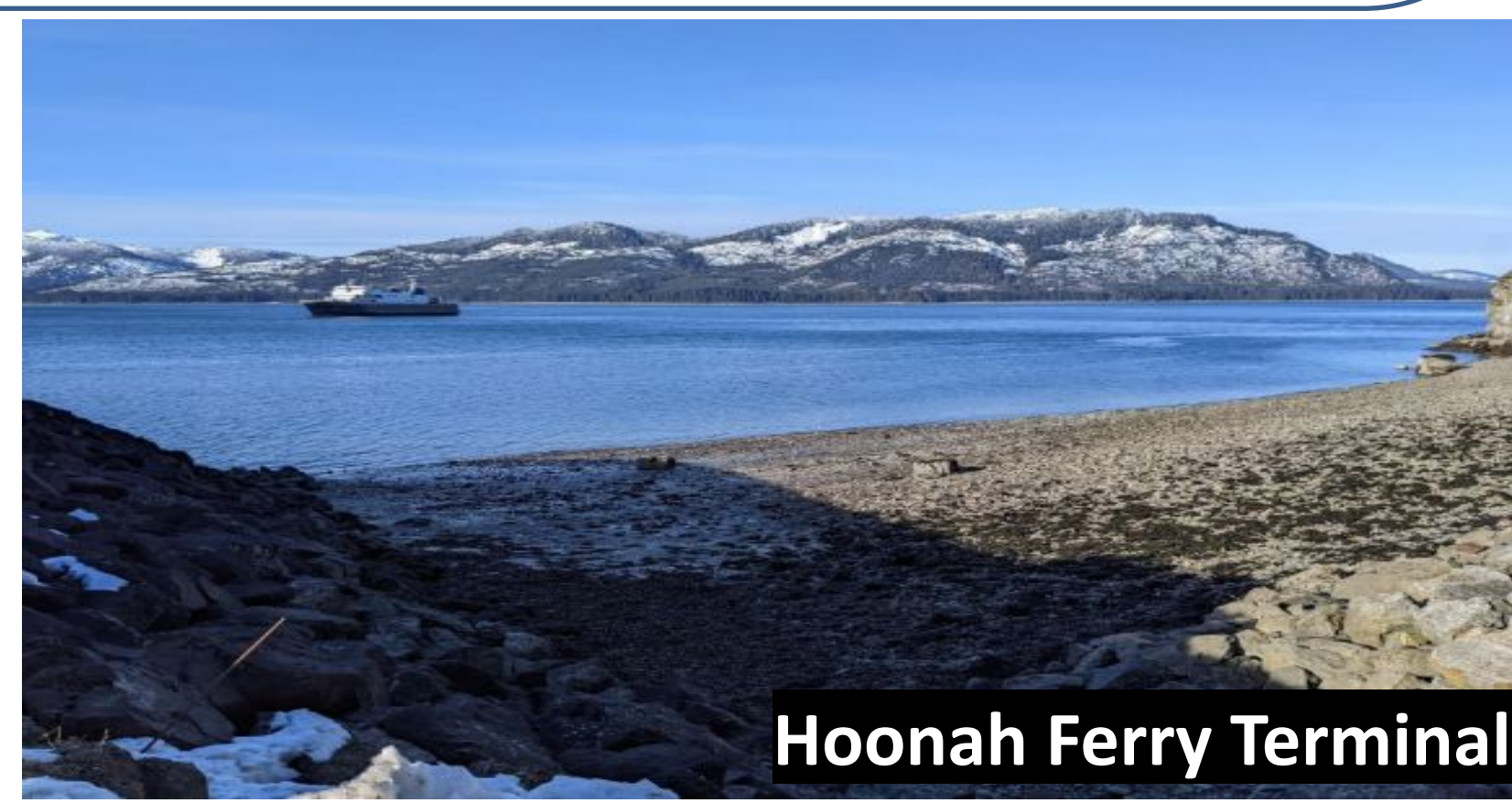
## Hypothesis

1. We predict that the traps **baited** with butter clams will catch more species and individual animals than any other bait. The reason we expect this is because we believe the crabs and other organisms will be more attracted to shellfish, and butter clams are larger.
2. For our **location** test, we believed that we would catch the most crabs at the beach at the ferry terminal. The reason we believed this is because there is more of a rocky area and the eel grass is more suitable for crabs.
3. Then our last hypothesis is that the trap with a two inch **entrance** hole will work the best for catching crabs as it is easier to get into.

## Methods



Crab trap



Hoonah Ferry Terminal

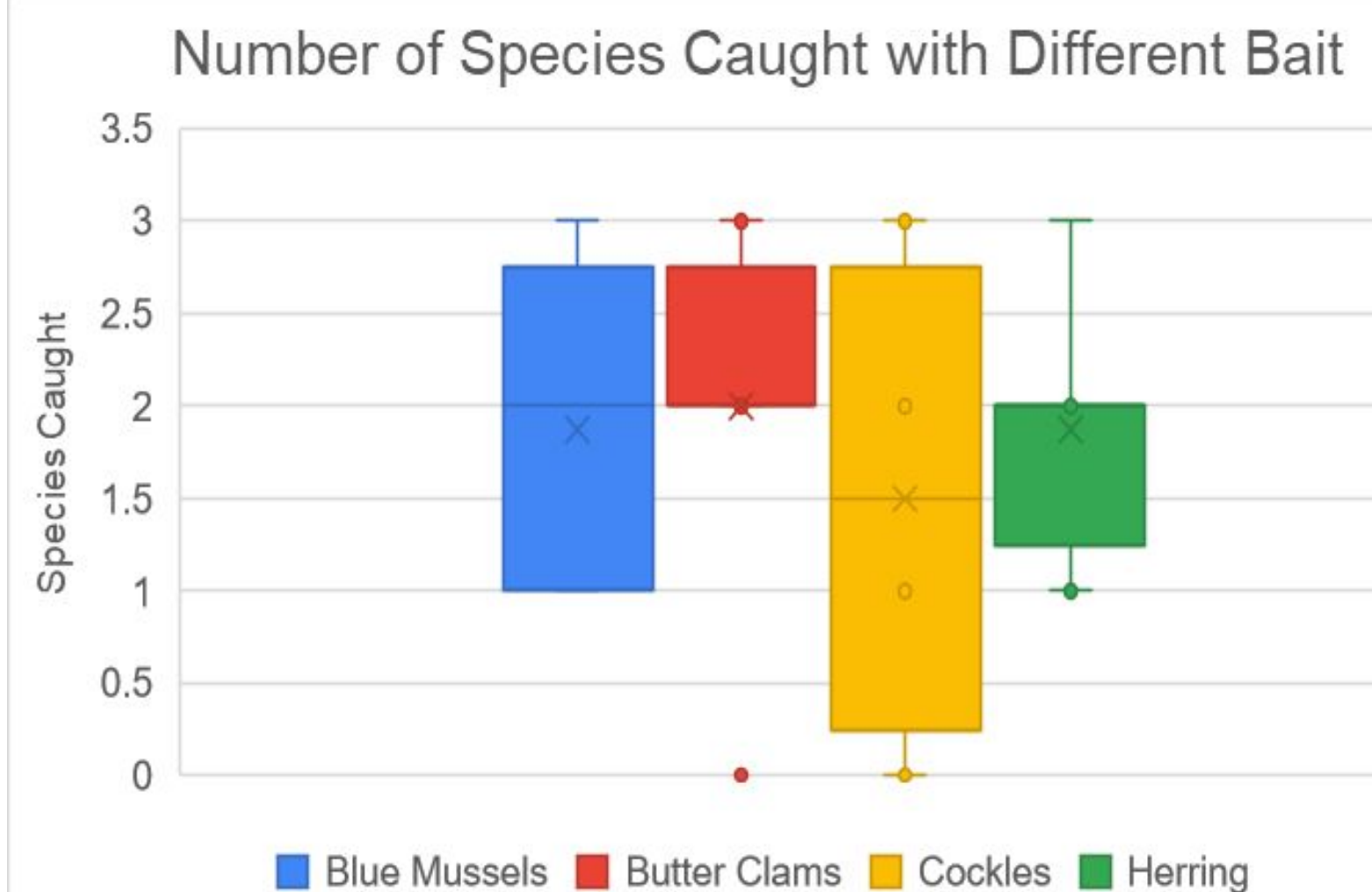
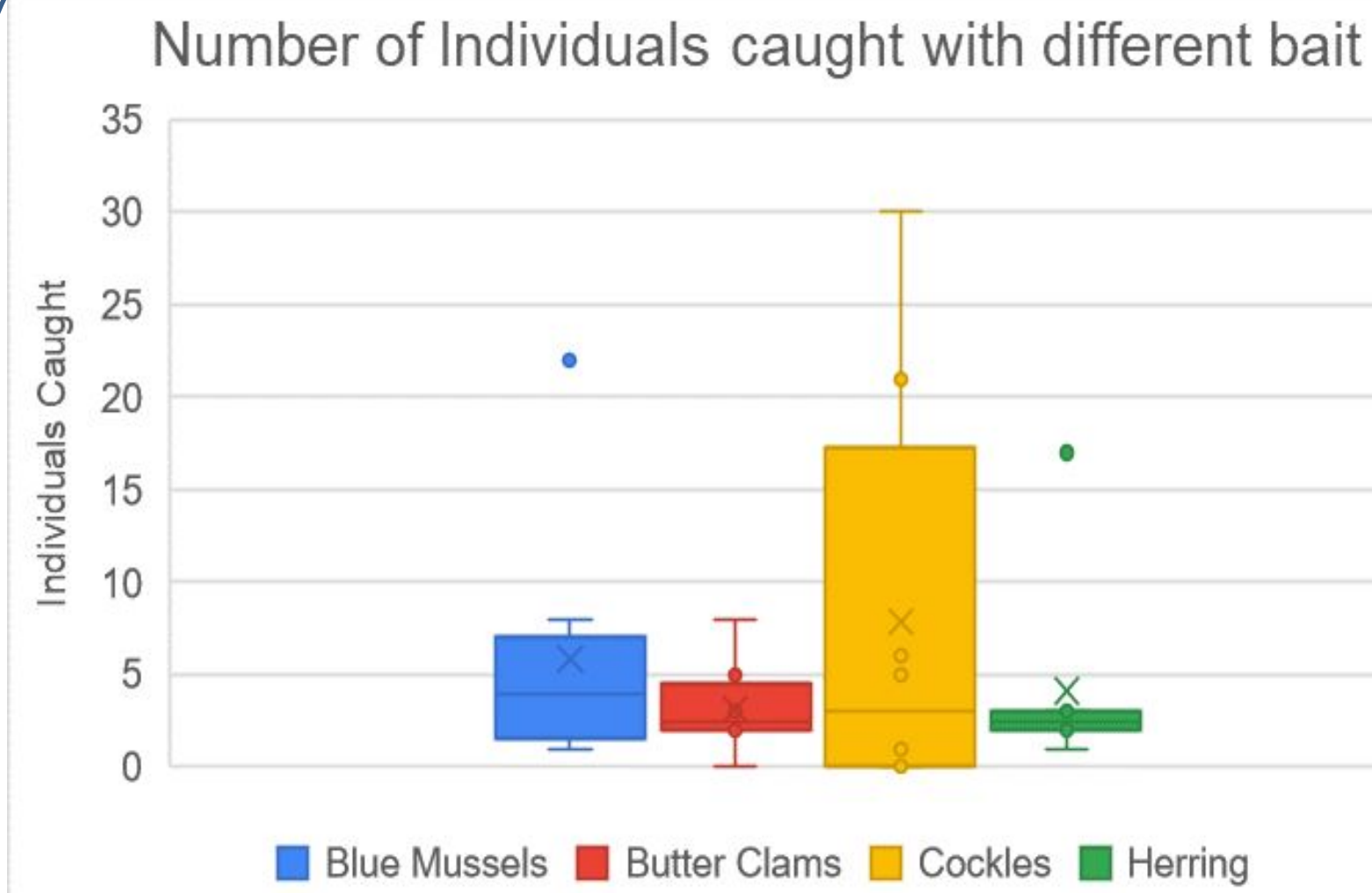
- With the baited test, all traps were deployed with a one inch trap hole size off the Hoonah harbor. They each got baited with either blue mussels, cockles, herring, or butter clams.
- For location testing, all the traps had a one inch entrance, were baited with blue mussels, and deployed off the Hoonah harbor, and ferry terminal, cold storage, and Hoonah trading.
- For the opening size, tests were done with a one inch entrance hole size as well as half, one and a half, and two inch opening size. The bait and the locations stayed the same with blue mussels and were done at Hoonah harbor.
- Species were identified, counted, and measured on site.

## References:

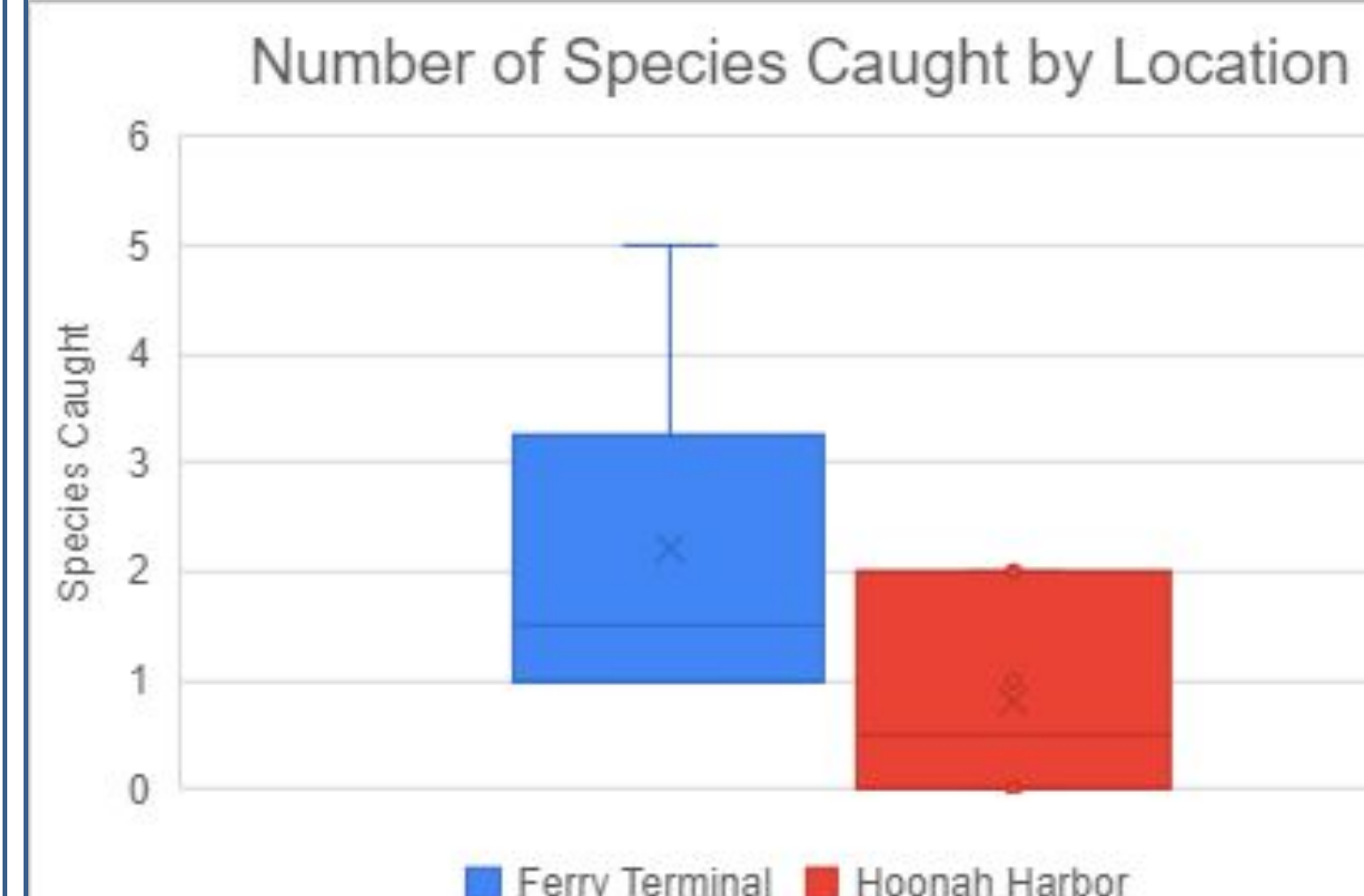
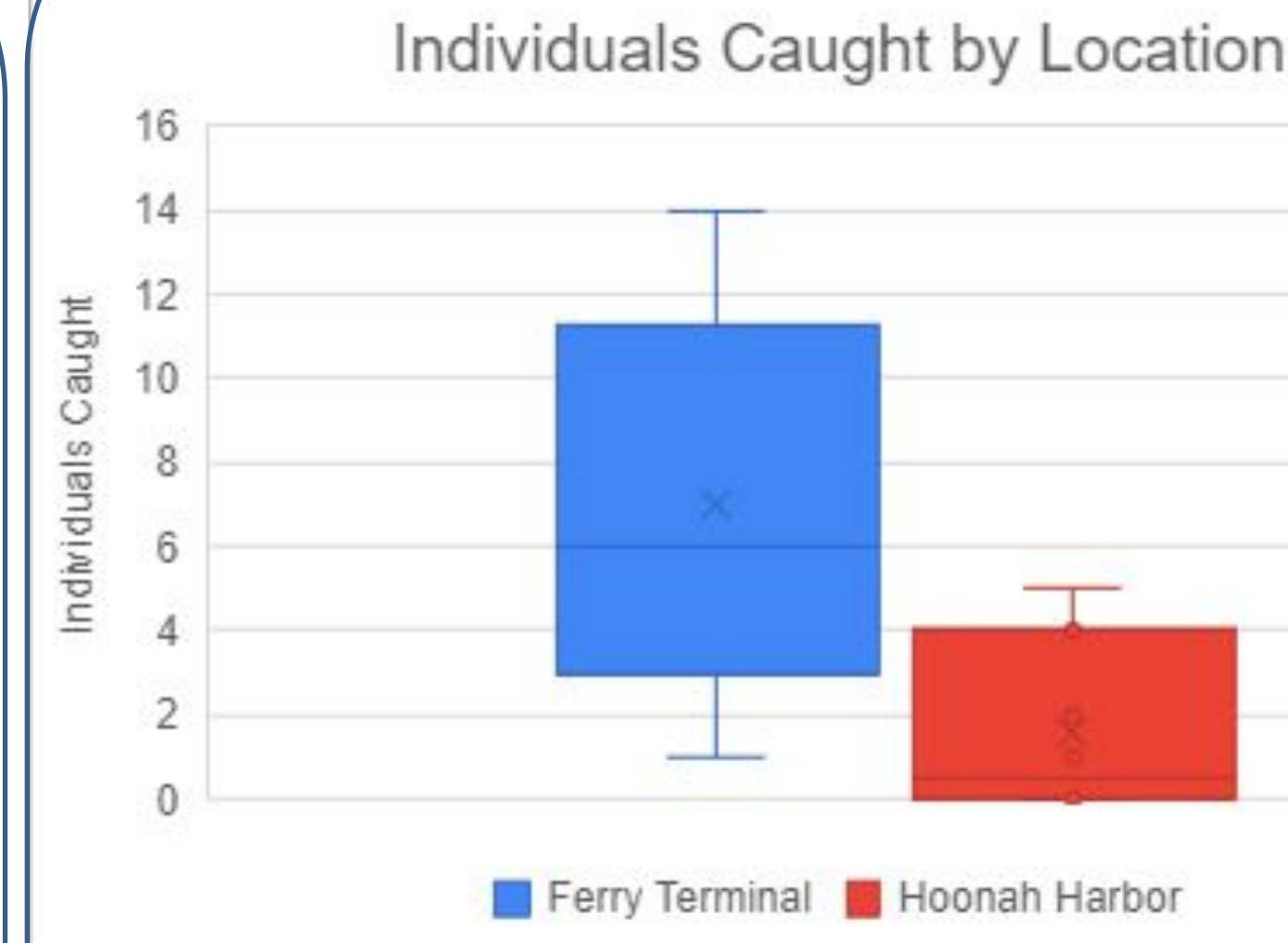
Grosholz, E., Lovell, S., Besedin, E. and Katz, M. (2011), Modeling the impacts of the European green crab on commercial shellfisheries. *Ecological Applications*, 21: 915-924. <https://doi.org/10.1890/09-1657.1>

Nicholas J. Ens, Bronwyn Harvey, Morgan M. Davies, Hanna M. Thomson, Keegan J. Meyers, Jennifer Yakimishyn, Lynn C. Lee, Meaghan E. McCord, and Travis G. Gerwing. 2022. The Green Wave: reviewing the environmental impacts of the invasive European green crab (*Carcinus maenas*) and potential management approaches. *Environmental Reviews*. 30(2): 306-322. <https://doi.org/10.1139/er-2021-0059>

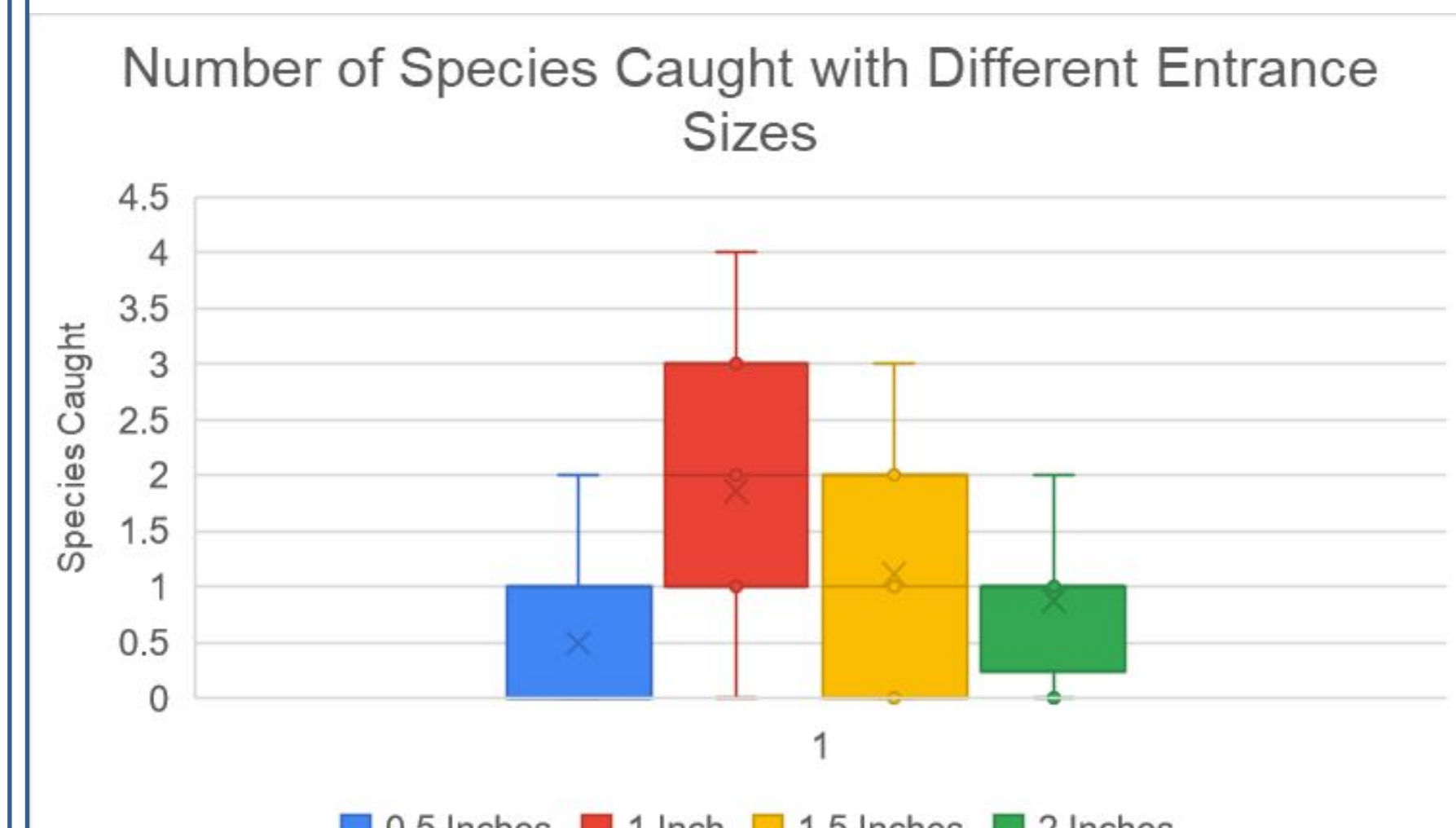
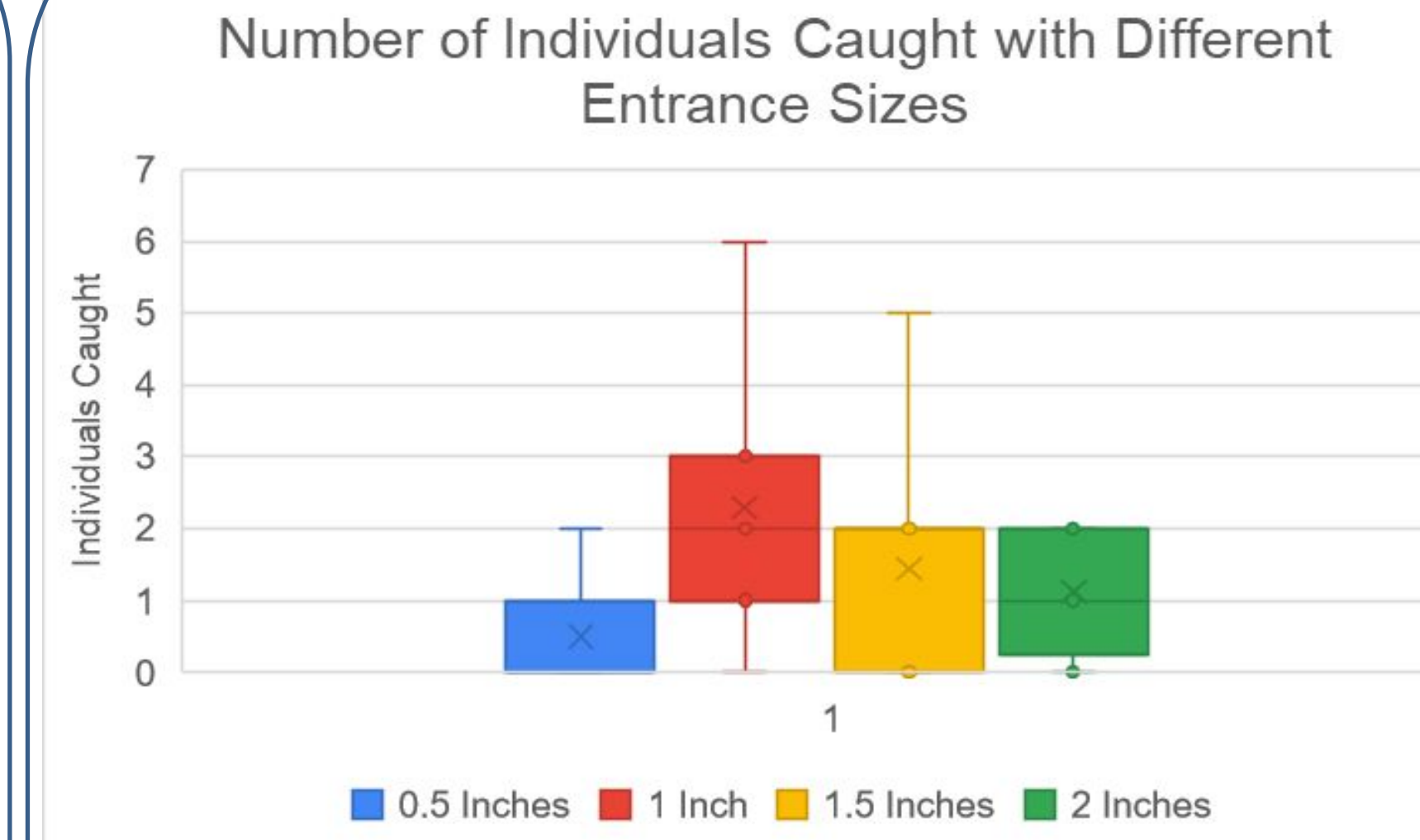
## Results



- Herring-baited pots caught on average fewer species and individuals than the shellfish-baited pots.
- Cockles on average were the specific of shellfish that caught the fewest species but the most individuals. They also had the largest range of species and individuals.
- Overall the most commonly caught species were: Pink krill, Spotted shrimp and Brown shrimp.



- Crabs (purple shore crabs and hermit crabs) were only caught consistently at the ferry terminal.
- More individuals and species were caught at the ferry terminal than at the harbor.
- We were unable to reliably check the traps at cold storage and Hoonah Trading.



- The 1 inch traps caught the most individuals and species.
- The 0.5 inch traps caught the fewest individuals and species.



## Discussion

Our first hypothesis was partially supported because butter clams caught more species than the other types of bait, however, fewer individuals were caught. We were correct in our hypothesis that more species and individuals would be caught at the ferry terminal, further away from the center of town. This was likely because there was better habitat (rocks and eelgrass), and less human disturbance than at the ferry. Our third hypothesis was not supported. Two inch traps did not catch as many species or number of individuals as the one inch trap. This could be because the larger hole size might have allowed more specimens to leave the trap. The smallest hole size (0.5 inch) may have been too small to successfully trap specimens. We hope that these tests will be run again next year or as often as wanted. Then we hope that the locations will broaden and more data will be collected. We feel that more beach carapace surveys should be done and probably broaden that as well.

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