

# Environmental conditions in invasive European green crab habitat on Annette Island

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## Introduction

European Green Crab (*Carcinus maenas*) are an invasive species on Annette Island first discovered here in 2022. Since then, Metlakatla Indian Community Dept. of Fish and Wildlife have been making efforts to reduce the number of these destructive crab (Winter et al., 2025). These crabs not only eat our native species, but they also burrow and destroy eelgrass beds, of which a lot of our native wildlife need to survive (Fisher et al., 2024). This research is important because it can and will help improve the lives of the people living here, it will allow our native species to thrive as they should, and will assist in preventing further damage to the ecosystem by these invasive crab. Although plenty of research has been done, the threshold for ecological damage or accurate population density estimates about European Green Crab (EGC) are still unknown (Ens et al., 2022). This project aims to establish and confirm a correlation between salinity and dissolved oxygen levels in the water and the appearance of European Green Crab.

## Hypothesis

We predict that locations will have a higher concentration of adult EGC will have lower salinity because they seem to thrive in places with both fresh and saltwater.

## Methods



Figure 1

### Colby Creek

- Located in Tamgas Bay.
- Colby Creek is the area where the second highest number of adult European Green Crab were trapped in 2022-2024
- Close to freshwater input

### Coast Guard Beach

- Located in Tamgas Bay.
- Coast Guard beach is the area where the most adult European Green Crab were trapped from 2022-2024.
- Beach area with a peninsula that goes out

### Salt Chuck

- In 2024 there were very high number (883) of juvenile green crab found and removed from this area.
- Closer inland, more secluded and protected from wave action and people.
- Furthest site from town.
- Shallower than other sites.



- To test our hypothesis, a YSI was used to measure the dissolved oxygen, salinity, and temperature of the water.
- The study sites were Salt Chuck, Coast Guard beach, and Colby Creek (Fig. 1)
- The study took place over 2/12/25 to 3/18/25.

## Results

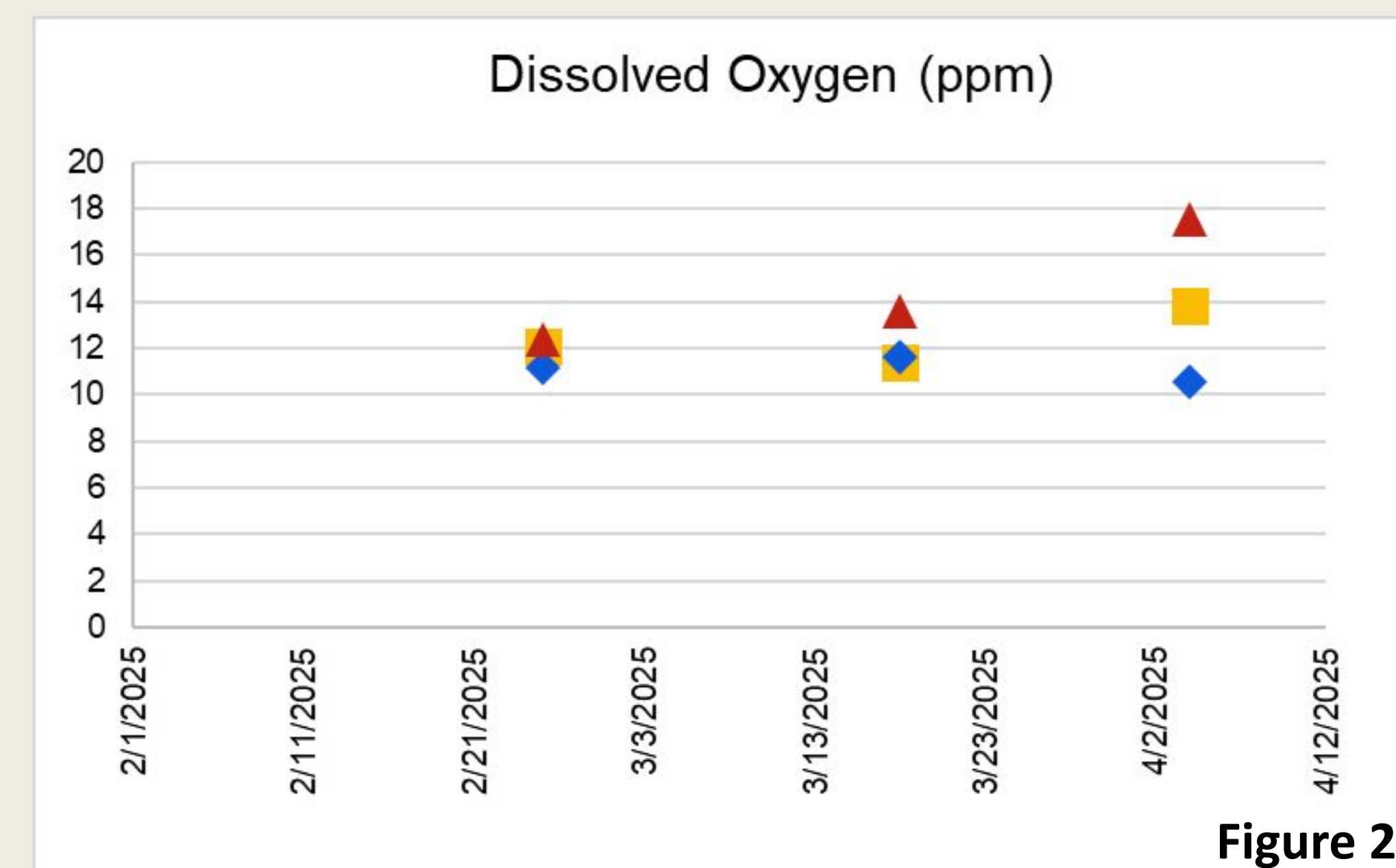


Figure 2

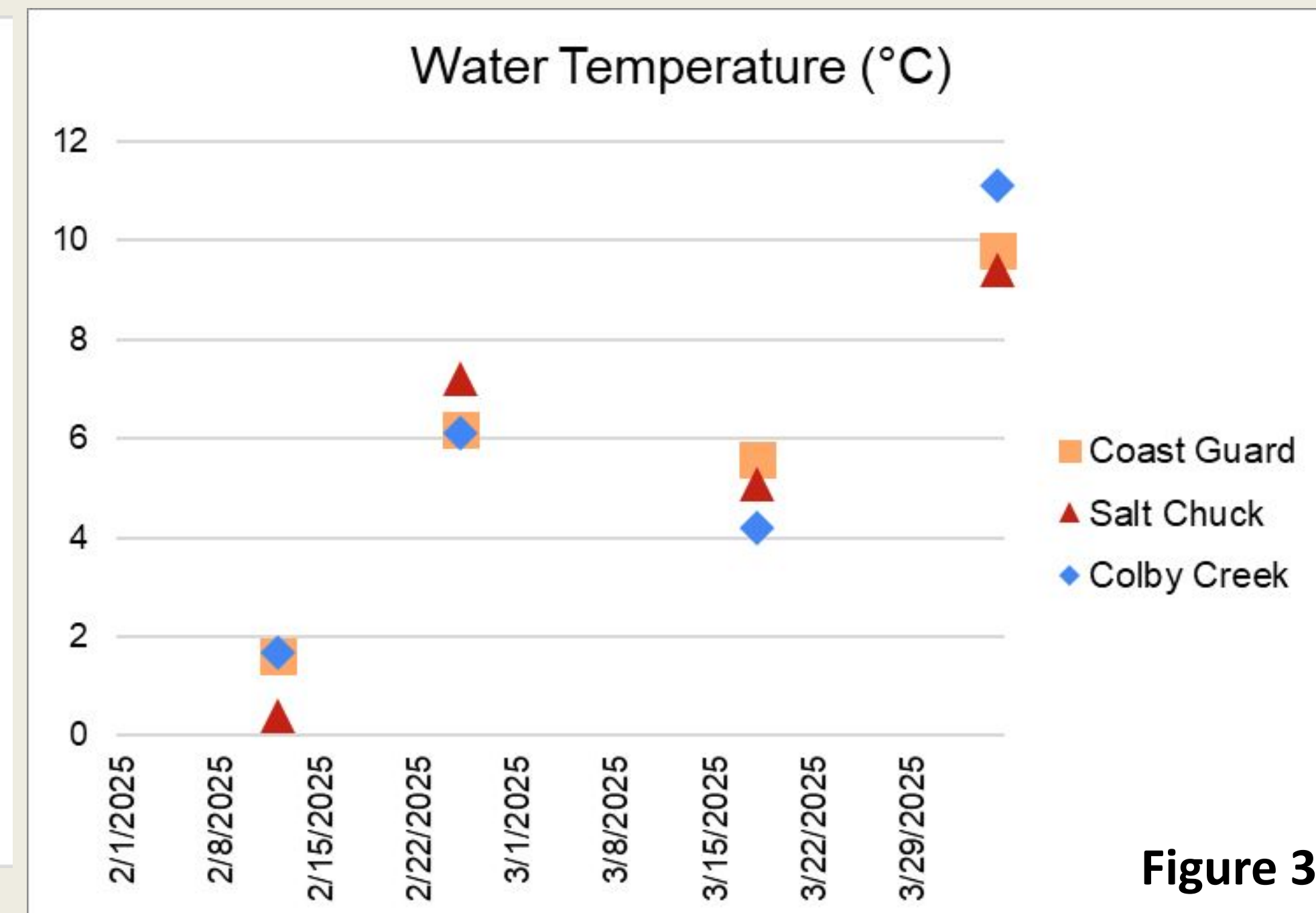


Figure 3

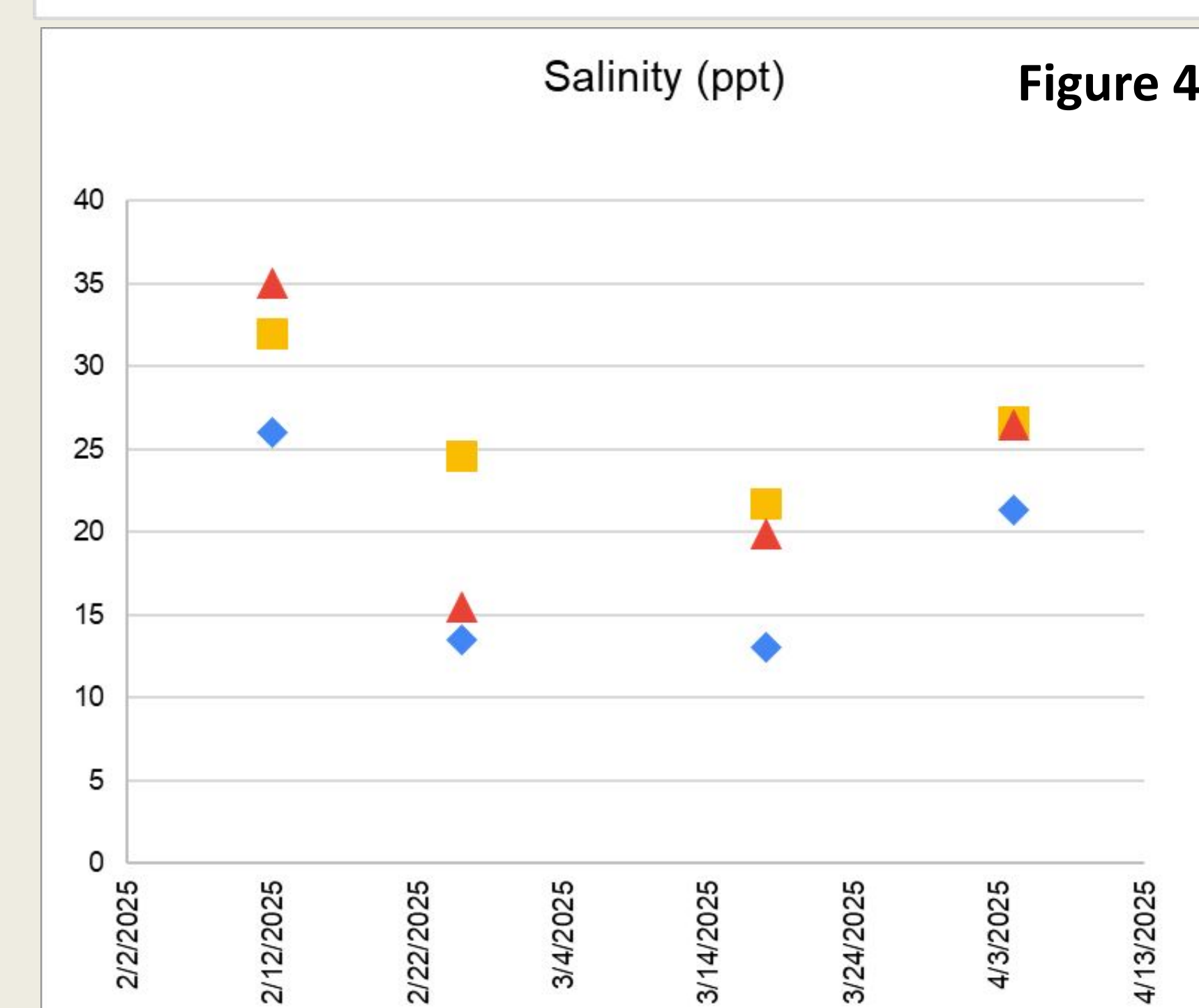


Figure 4

- Salt Chuck had the highest amount of dissolved oxygen (Figure 2).
- Salt Chuck had the most temperature variability (Figure 3).
- Salt Chuck has the most salinity variability. (Figure 4)
- In dissolved oxygen and temperature both Colby Creek and Coast Guard are similar, but Colby Creek has a lower salinity.

## Discussion

My hypothesis was not supported. Coast Guard, which has the highest rate of adult EGC found in 2022-2023 also has the highest average salinity out of the 3 testing sites. Salt Chuck has the highest average dissolved oxygen, as well as the most temperature variability. It is also the site where a large amount of juvenile green crab were found in 2024 (Winter et al., 2025). This shows that juvenile EGC can survive in these difficult conditions, and that if they are left unchecked in an area with less competing wildlife, they may swiftly grow their population. Sites like Salt Chuck that have enough temperature variability to where they will have no native crab to compete against need to be monitored more, because if we do not root them out from those areas we will not be able to fully eradicate them from the island. One next step would be looking into new sites similar to Salt Chuck on Annette Island in search of green crab. Another step could be to compare data from molt walks in both the summer and winter in order to find when they are most active. One limitation was that we could only collect data on 4 different days, so it would be valuable to collect data more frequently and over a larger period of time. These invasive green crab are a big issue on the island because they not only outcompete our native crab, but they also burrow, damaging and eroding the land itself, which in turn damages plant life.

### References:

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