European Green Crab Trapping with Pitfall Traps and Shellfish Bags

Abstract

The importance of trapping European green crab have been the subject to observation for over the past two decades here in Washington. The introduction of pitfall traps and shellfish



Green crab and Dungeness crab in our shrimp

traps were placed at two sites: Tsoo-Yess River and Neah Bay. The average amount of catch of the pitfall trap was greater than the shellfish trap (p<0.0001). The sites were compared, and although the habitats differed they had no effect over the catch per unit effort (p=0.2). Overall, we can conclude that the introduction of pitfall and shellfish traps have potential with trapping young of the year European green crab.

Introduction

First spotted in 2017 on the Makah reservation, European green crab (*Carcinus maenas*) can cause stress to the native crab, shellfish, and kelp and eel grass beds¹. The past three years we have caught more than 3200 green crabs and 850 of those just in 2020. We currently use Fukui, minnow, shrimp and Russell

traps in our bimonthly green crab trapping efforts. Shellfish and pitfall traps were successfully used in Willapa Bay and in areas on the Oregon coast to catch foraging young-of-year crabs and gravid females before. The goal of testing these new traps are to catch more females and smaller crabs than are caught in our regular trap efforts.



European green crab caught near the Tsoo-Yess River

Angelina Woods

Methods

Location Traps set:

- Neah Bay
- Tsoo-Yess River

Observations:

- Identify species
- Count species
- Collect green crab and bring to the lab for further analysis:
- Sex
- Size
- Underside color
- Damaged, missing, or regrown limbs
- Check traps everyday for 4 to 5 days

Data Analysis:

T-test

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- **One-way ANOVA**
- Two-way ANOVA

Traps Compared: Oyster mesh shellfish traps

- Pitfall traps
- Minnow traps



Results

We caught a total of 12 species. Only two green crab were caught in pitfall traps. The most common species caught was Hemigrapsus oregonensis, otherwise known as the hairy shore crab. The pitfall trap averaged a higher catch of the shore crabs (Avg. 2.39 crabs per trap) than the shellfish (Avg. 0.83 crabs) traps, but when comparing to the minnow trap it overall averaged the highest out of the three (Avg. 15.69 crabs). Differences between the amount of catch in the shellfish and pitfall traps were significant (p=0.0003) with their catch of hairy shore crabs. However, there was no significant difference in catch between the two locations, Neah Bay and Tsoo-Yess River (p=0.24). The minnow traps averaged more than the pitfall or shellfish traps (p<0.001).

Table 1. List of species caught

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Common Name	Scientific Name	Tsoo-Yess	Neah Bay
hairy shore crab	Hemigrapsus oregonensis	х	Х
staghorn sculpin	Leptocottus armatus	х	Х
fluffly sculpin	Oligocottus snyderi		Х
hermit crab	Pagurus spp.		Х
dungenous crab	Metacarcinus magister	х	Х
green crab	Carcinus maenas	х	
bay pipe fish	Syngnathus leptorhynchus		Х
starry flounder	Platichtys stellatus		Х
tidepool sculpin	Oligocottus maculosus		Х
checkered periwinkle	Littorina scutulata		Х
penpoint gunnel	Apodichthys flavidus		Х
sadleback gunnel	Pholis ornata		Х





Pitfall traps being set near the Tsoo-Yess River

Green crab caught in a pitfall trap

Shellfish trap



Figure 1: Map of the Tsoo-Yess river and Neah Bay where we placed our traps. Orange circles show pitfall traps and grey circles show shellfish traps.



Figure 2: Map of the Tsoo-Yess river and the Neah Bay showing catch of *Hemigrapsus oregonensis* (hairy shore crabs) and green crab. Dots are larger where more crabs were caught.

green crab because of their potential impact to important habitat, such as eelgrass², and shellfish, such as clams¹ and Dungeness crabs³, which may affect the Makah Tribe's fisheries. Over 5 weeks of trapping, we only caught two green crabs and only in pitfall traps. We found a difference between the pitfall and shellfish catch for shore crabs. Many factors could have affected our results, such as the openings to the shellfish traps, surrounding vegetation, position of traps, weather, One of the sites we set traps at in the and microclimate⁴. Neah Bay. In future studies to try to catch more green crab we could use larger shellfish traps and could utilize more of the surrounding shells in our traps¹. On the pitfall traps we might add a funnel so the crabs can still enter, but it will also decrease the amount of debris or escape routes for the crabs⁵. Adding bait might be a potential addition to the



lemigrapsus spp." Marine Ecology Press, vol. 225: 251-262, 2002, pp. 251-62, Inter-Research, 2002, print.

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Discussion

Past studies have shown the importance of trapping



traps, as other studies and trapping efforts primarily use baited traps to catch green crabs⁶. In the future we hope to find a way to utilize these traps to catch foraging young of the year or gravid females.

Counting and identifying species in a shellfis

Citations

Klassen, Greg. and A. Locke. 2007. "A biological synopsis of the European green crab, Carcinus Maenas". Can. Manuscr. Rep. Fish. Aquat. Sci. no. 2818:vii+75pp McDonald, P., Jensen, G., and Armstrong, D. "The Competitive and Predatory Impacts of the Nonindigenous Crab Carcinus Maenas (L.) On Early Benthic Phase Oungeness Crab Cancer Magister Dana." Journal of Experimental Marine Biology and Ecology, pp.39-54, Elsevier, 2001, print. holz, S., and Hannig, K. "Do covers influence the capture efficiency of pitfall traps?" pp.667-71., 2009, print Woodcock, B. "Pitfall Traping in Ecological Studies." Insect Sampling in Forest Ecosystems, pp.37-57, Blackwell publishing, 2015, print. Jensen, G., McDonald, P., Armstrong, D. "East Meets West: Competitive Interactions Between Green Crab Carcinus Maenas, and Native and introduced Shore crab

Acknowledgements



Location

- Tsoo-Yess river & Neah Bay
- **Compared Traps:**
- Pitfall
- Shellfish
- Minnow

Observations

- ID species
- Count species
- Collect green crab:
 - Underside color • Size

 - Sex

Methods

• Check traps everyday for 4-5 days

• Damage, missing, or regrowth limbs

Analysis

- T-test
- One-way ANOVA
- Two-way ANOVA









Map of location of traps



Mainly caught Harry shore crab 2 green crab Significance: Bycatch between pitfall and shellfish traps (P<0.0003) Bycatch between minnow, pitfall, and shellfish traps (p<0.000000000) No significance: between the Tsoo-Yess river site and the Neah Bay site (p=0.24)



Results

Common Name	Scientific Name	Tsoo-Yess	Neah Bay
hairy shore crab	Hemigrapsus oregonensis	Х	Х
staghorn sculpin	Leptocottus armatus	Х	Х
fluffly sculpin	Oligocottus snyderi		Х
hermit crab	Pagurus spp.		Х
dungenous crab	Metacarcinus magister	Х	Х
green crab	Carcinus maenas	Х	
bay pipe fish	Syngnathus leptorhynchus		Х
starry flounder	Platichtys stellatus		Х
tidepool sculpin	Oligocottus maculosus		Х
checkered periwinkle	Littorina scutulata		Х
penpoint gunnel	Apodichthys flavidus		Х
sadleback gunnel	Pholis ornata		Х

Map of Amount of Catch per Site

