

Tableau Exploration Guide

If you're interested in checking out the Crab Team dataset but don't know where to start, we invite you to follow this guide to learn more about Crab Team's new data visualization dashboard. While you're exploring, please let us know if you find any errors or challenges while navigating the platform by either contacting us at Crab Team (crabteam@uw.edu) directly or using this <u>Google form</u>. If you plan to revisit <u>Tableau</u> in the future (and we hope you do!), we recommend bookmarking this site for easy navigation.

Part I: Scavenger Hunt

To kick off your exploration, we encourage you to dive into the data from your site, specifically. By clicking "Site Results" on the top right of the <u>Tableau landing page</u>, you will then be able to select your site and dive into the specific results from your molt, trap, and transect surveys over the years. The following questions will guide you through each of these survey data. If you like to track your progress through these questions, you can do so using this optional <u>Google Form</u>.



Scavenger Hunt Questions:

- 1. Site Number:
- 2. Habitat Type:
- 3. How many sampling dates have been recorded at your site?
- 4. Compared to 2020, did your site capture more or less HEOR in September 2021?
- 5. List all species that have only ever been seen once at your site.
- 6. What is the size and species of the biggest crab ever recorded at your site, when was it captured?
- 7. Which month has the highest average number of molts for your site?
- 8. Which wrack category dominates at your site?
- 9. Has live epifauna ever been reported at your site?
- 10. Synthesis: Are there any surprising or interesting observations or trends you noticed about your site?

Part II: Deep Investigation

Now that you have a handle on your site-specific data, it's time to dig into additional tools available to you. Both the "CAMA Counts" and "Research" tabs bring together data collected across all sites in the Crab Team network and allow you to make comparisons between sites and across years. When navigating through different scenarios in



these tabs, you can reset your changes using the button on the bottom right of your dashboard. While working your way through the following activities, note that questions are ordered from beginner to advanced within each activity. We know that some of these questions may be challenging, so we encourage you to reach out if you have questions.



Activity 1- Green crabs across the Crab Team network data

To explore green crabs captured across the Crab Team network data, you can start by navigating to the "CAMA Counts" tab (remember CAMA is the species code for green crab, *Carcinus maenas.* Through the following questions, you will use this Tableau tab, along with the "Research" and "Site Results" tabs.

- 1. What is the site with the most CAMA captured during monthly monitoring?
- 2. What is the total number captured at that site?
- 3. In 2021, which Crab Team site captured CAMA for the first time since monitoring began there?
- 4. What patterns, if any, do you notice about green crab numbers across the network, both in terms of space and time?
- 5. What months do Crab Team sites most commonly catch CAMA in? (Hint: For month information, navigate to the "Research" tab, select "Annual Comparison" and choose CAMA in the dropdown menu)
- 6. How has the sex ratio of CAMA changed at the site where they are most abundant?

Activity 2- Green crabs in the ecological community

To explore species trends across sites, the "Research" tab is the best place to start. Note that when you enter this tab, there are five additional buttons on the right hand side.

- 1. Which Crab Team site has observed the greatest diversity of organisms in traps?
- 2. Have green crabs been captured at this site during monthly monitoring?
- 3. What about the site with the lowest diversity?
- 4. What did trap catches look like at these sites?
- 5. On average, is diversity or abundance of total trap catch associated with whether or not green crabs have been found at a site.

Activity 3- Native species trends:

- 1. Some species may appear in traps at different times of the year. On average, when is HEOR most abundant?
- 2. Is this the same trend you have observed at your site?
- 3. Choose a less common species to answer the same questions.
- 4. What site has the most CAPR?
- 5. This year, were there species (or times of year) with more regional "synchrony" than others? Different from other years?
- 6. For the site with the most CAPR, how might that site impact the average for the network?

Answer key

Part I: Scavenger Hunt

Because each site is different, the answers to this section will change. In lieu of creating a key for each site, we've taken screenshots of the specific locations within Tableau that you can find this information, regardless of site selected. Screenshots are placed directly below the associated questions.

- 1. Site Number:
- 2. Habitat Type:
- 3. How many sampling dates have been recorded at your site?



- 4. Compared to 2020, did your site capture more or less HEOR in September 2021?
- 5. List all species that have only ever been seen once at your site.



6. What is the size and species of the biggest crab ever recorded at your site, when was it captured?

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	40		-0		
	20				Data Filters
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- Site Results Select Site 367: Drayton Harbor Molts Transect From the Molts tab, select Molt Graph button, and make sure all species are selected. Data View Molts Counted for None at 367: Drayton Harbor Molt Table 150 Molt Graph Molts 100 2017 Num 50 0 lect Species 150 AII) Molts 100 2018 Num 50 0 150 Molts Use scroll bar to compare years 100 2019 across monitoring months. БЛ 50 0 150 Molts Average lines for all 100 2020 collection dates for this Mum site and month, over 50 time. 0 150 Num Molts 100 2021 50 0 150 olts April Mav June July September August a 🔨 .
- 7. Which month has the highest average number of molts for your site?

- 8. Which wrack category dominates at your site?
- 9. Has live epifauna ever been reported at your site?



10. Synthesis: Are there any surprising or interesting observations or trends you noticed about your site?

Part II: Deep Investigation

Activity 1: Green crab over space and time.

- 1. The site with the most CAMA captured in monthly monitoring is
 - 384, (DNWR) Graveyard Spit Channel (West), with a total of 12 CAMA.
 - To find: Summary > CAMA Counts
- 2. In 2021, which Crab Team site captured CAMA for the first time since monitoring began?
 - 527 Swinomish Casino
 - **To find:** Summary > CAMA Counts
- 3. What patterns, if any, do you notice about green crab numbers across the network, both in terms of space and time?
 - There isn't too much of a wrong answer here, but data are sparse, so we can't draw super strong conclusions.
 - It's rare for a site to encounter a green crab more than once!
 - Green crab at Crab Team sites follows a similar geographic pattern to what is observed by trapping efforts across all partners (North Olympic peninsula and more northern portions of Salish Sea in WA).
 - No evidence of exponential increase in range or numbers
- 4. What months do Crab Team sites most commonly catch CAMA in?
 - Depends on the year, but on average, April, May, June.
 - **To find:** Research > Annual Comparison by selecting CAMA from dropdown
- 5. How has the sex ratio of CAMA changed at the site where they are most abundant?
 - Answer: Increasing male biased sex ratio (~50:50). Started out more females than males, in 2021, more males than females; this trend of female to male bias at Dungeness Spit (in couple hundred removed since 2017), we see the same trend
 - To find: First have to remember that site with most green crab was 384 from CAMA Counts (Graveyard west), then go to Site Results → Trapping → Measurements

Activity 2: Green crab in the community

- 1. Which Crab Team site has observed the greatest diversity of organisms in traps?
 - Answer: Depends on how you quantify "diversity."
 - Species Richness: Site 581 (Raabs on Vashon with 22 species),
 - Shannon Diversity: 380/Fidalgo Trestle (make sure year is checked for "all")
 - **To find:** Summary > Research > Shannon Diversity or Species Richness. Mouseover tallest bar to find site number.
- 2. Have green crabs been captured at this site during monthly monitoring?
 - Answer: No, regardless of how you quantify diversity
 - **To find:** Tallest bar is teal/green = No green crabs found
- 3. What about the site with the lowest diversity?
 - Answer: Depends on how you quantify "diversity."

- Species Richness: Site 503 (Crockett Lake, Whidbey former site),
- Shannon Diversity: 371 (Double Cove, Orcas)
- **To find:** Summary > Research > Shannon Diversity or Species Richness. Mouseover shortest bar to find site number.
- 4. What did trap catches look like at these sites?
 - Most Diverse:
 - Species Richness: Site 581 (Raabs on Vashon with 22 species), a number of unique or oddball species in low numbers (unicorns) but still a large number of common species like HEOR and LEAR
 - Shannon Diversity: 380/Fidalgo Trestle relatively even numbers of species.
 - Least Diverse:
 - Species Richness: Site 503 (Crockett Lake, Whidbey former site), Two species ever. Look at how long this site was monitored we ended after one season because it wasn't good habitat for green crabs. Probably didn't capture much species richness because we didn't sample for very long, but also note that some sites which were sampled less (e.g. Port Susan Bay (299)) had more species richness in one month (3 species)!
 - Shannon Diversity: 371 (Double Cove, Orcas) this site (also former) was vastly dominated by HEOR, so even though the total number of species found at this site ever wasn't the lowest (5), the dominance of HEOR causes Shannon Diversity to be low.
 - **To find:** Site Results > Traps for respective sites, may need to refer to main site results page to know sample dates
- 5. On average, is diversity or abundance of total trap catch associated with whether or not green crabs have been found at a site.
 - **CAUTION** These are trends and this visualization does not enable us to test whether these results are statistically significant i.e. the signal rises above the noise.
 - Shannon Diversity = No/Doesn't look like it
 - Abundance = Probably not, slightly more at Non-CAMA sites
 - Species Richness = Depends on Year view.
 - All: CAMA > Non-CAMA
 - 2021: Avg not much different
 - 2020: Avg not much different
 - 2019: Avg not much different
 - 2018: Avg not much different
 - 2017: CAMA > Non-CAMA
 - Looks like the all year is really driven by 2017, so we'd want to take a close look at the data since most years don't support this difference.

Activity 3: Native Species Trends

- 1. Some species may appear in traps at different times of the year. On average, when is HEOR most abundant?
 - HEOR are most abundant in August or September, depending on the year.

- **To find:** Summary > Research > Annual Comparison > Select HEOR from Drop down.
- 2. Is this the same trend you have observed at your site?
 - Depends on site and year
 - **To find:** Summary > Research > Seasonal Comparison > Select HEOR from Drop down, and make sure the site is selected. May have to toggle through years.
- 3. Choose a less common species to answer the same questions.
 - Recommended: LEAR, GAAC, TECH, MEMA, CAPR
 - **To find:** Summary > Research > Seasonal Comparison > Select HEOR from drop down, and make sure the site is selected.
- 4. What site has the most CAPR?
 - 553/Blakely, Bainbridge
 - **To find:** Summary > Research > Seasonal Comparison > Select CAPR, scroll through years, hover over highest line.
- 5. How might that site impact the average for the network?
 - Seasonal trend at that site drives annual trend for network average is biased toward site with most CAPR. (Compare Seasonal Comparison for CAPR to Annual Comparison for that several years)
 - Numbers of CAPR at Blakely jumped dramatically following a site revision in 2017 (*To find:* look at table in Site Results > Traps), this bumped up average catch for all sites starting that year.
- 6. This year, were there species (or times of year) with more regional "synchrony" than others?
 - GAAC has more synchrony late in the year, Some outlier sites (540)
 - **To find:** Summary > Research > Seasonal Comparison Select 2021 in year, and toggle through species. The "spread" of lines will be one way to look at whether all sites are following the same trend in terms of relative abundance