

Mapping Oyster Distributions along the West Coast

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Executive Summary

Mapping Oyster Distributions along the West Coast was an extensive crowdsourcing project dedicated to documenting current and historical sites of native oysters, *Ostrea lurida*, and non-native oysters, *Crassostrea gigas* along the Pacific northwest coastline. This project incorporates abundance data from academic literature, iNaturalist records, and expert observations. The data collected was put into ArcGIS as an interactive map to display the areas that have current and historic sites with detailed descriptions.

Project Objectives

The project *Mapping Oyster Distributions along the West Coast* focused on the crowdsourcing data of oysters from British Columbia to Baja California. The species of oysters that we focused on was *Ostrea lurida*, who are native to the West Coast, and *Crassostrea gigas*, who are native to Japan but were introduced to the Pacific northwest to replace native oyster aquaculture once they were depleted in the 1900's. The data was compiled from different sources such as experts' sites, scientific publications, iNaturalist, and museum entries. The overall project outcome was to create an interactive map that contains sites where *O. lurida* and *C. gigas* are currently and/or were historically present. As we progressed into the project, the group determined that we could gather important information about *O. lurida* and *C. gigas* populations from the abundance data, such as spatial and temporal patterns, that could inform future conservation and restoration efforts and decided to write a paper.

To contribute to the project goal, I dedicated my time to searching for oyster abundance information from historic literature, participated in weekly meetings, decision-making to ensure

quality assurance and quality control of the database. I contributed 246 hours and 43 papers to constructing the oyster map.

Project Approach

Literature Reading

For the project, my main task was reading historic literature and inputting the data I found. The literature consisted of scientific publications, theses, and reports that were mostly published before 2000. I would read over reports focusing on key terms such as *O. lurida* and *C. gigas*. With the information provided from the papers, I would enter the coordinates, abundances, observer name, year of observation, and details about the site if applicable. Some of the papers contained information about individual sites of scientific study while others briefly mentioned oyster beds that were spotted in the bays or estuaries. Some of the coordinates and abundances would have to be estimated because the author gave vague information about the location and the amount of oysters, those entries were flagged to remain a general location for oysters. To solve issues concerning the latitude and longitude, I would leave the coordinates in the middle of the estuary and make a note that “no exact location was given”. These data points will be displayed on the final map as a different color to signal that these points are vague. To estimate abundances, we decided to go with the metric which abundance is based on how many oysters in a 20 meter strip. I would mark the abundance “common” if there were more than 100 oysters per 20 meter strip, “rare” if there was less than 100 per 20 meter strip, and “absent” if no oysters were recorded at the site. If no abundance is given, I would mark it “present but unknown abundance.” I carefully read over the data to ensure that the oysters were naturally occurring or feral, not oysters planted and cultivated for aquaculture.

Writing

For the process of writing the paper, my supervisor Kerstin wrote up an outline about topics to discuss in the paper along with assignments for each person to complete. From there, I created a more detailed outline and wrote out the paragraph I was assigned. My task was to write about where the data and sources were from along with how it was entered and methodological contributions.

Project Outcomes

The result of this project was the very first large scale crowdsourcing of oyster populations. We were able to successfully gather data from all of our sources to put it into an interactive map. The sites range from British Columbia to Baja California. The analysis of the results have not been done yet at this current time of the project.

The internship taught me many lessons in academia as well as how to do remote work effectively. I have now learned how to thoroughly read academic literature, keep open communication with supervisors about questions, and practice writing scientific papers. With the current pandemic, many people have been forced to work remotely which presents initial challenges. During my time interning remotely, I have learned how to better manage time and communicate more effectively through emails and zoom.

Conclusions

This project gave me experience in other forms of research than being in a lab or doing fieldwork. Even with COVID, this project shows that large projects like this can still be done remotely and effectively. For future research, other crowdsourcing projects could be done on other marine animals that are endangered to help restoration efforts.

Appendix

A



C. gigas and *O. lurida* oyster bed

Kellogg Beach Site, San Diego CA (Source: Zacherl lab in the field)

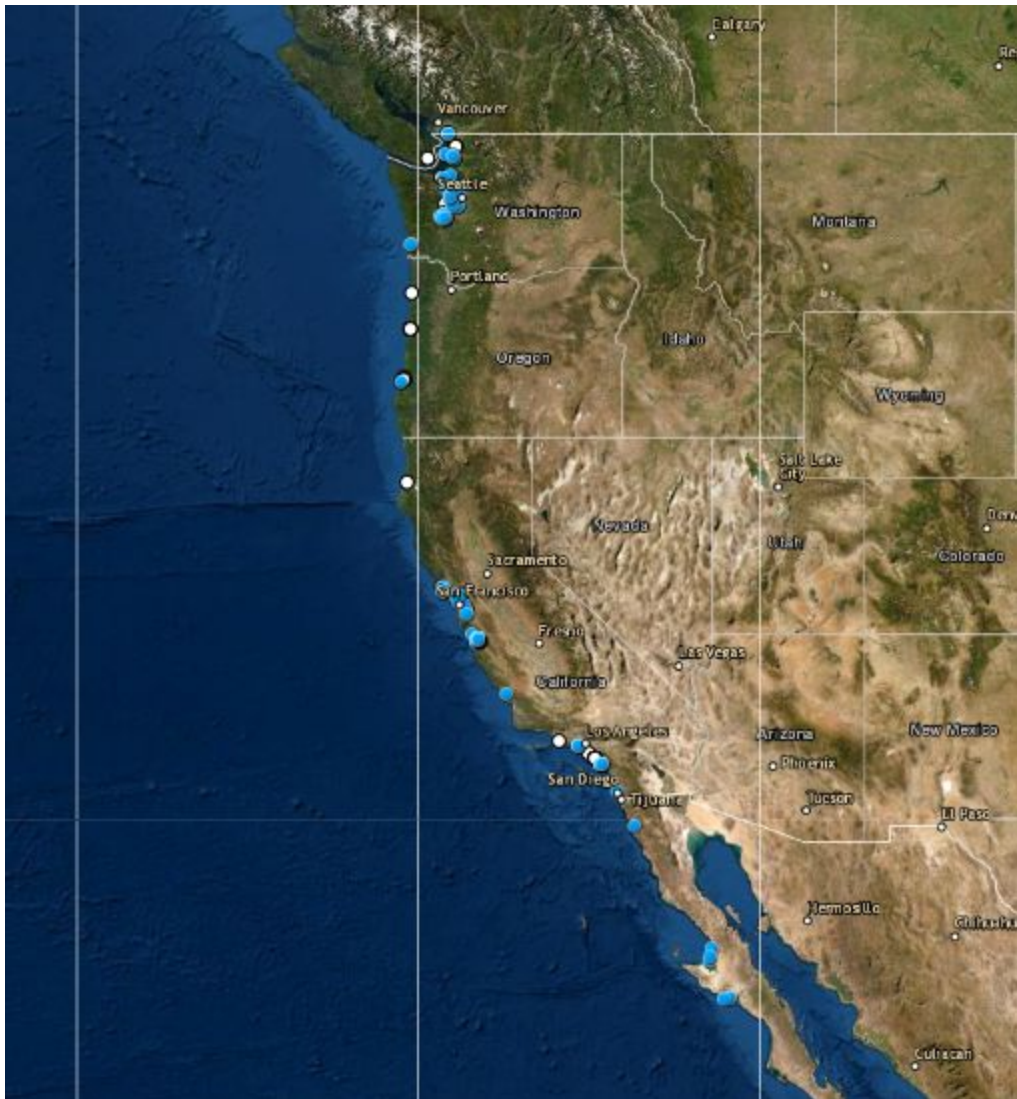
B



The larger oyster is *C. gigas* and the three smaller oysters are *O. lurida*

Kellogg Beach Site, San Diego CA (Source: Zacherl lab in the field)

C



A screenshot of the interactive map with the points being oyster locations