Marine Animal Distribution in the California Current Ecosystem

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https://github.com/anhar421/Portfolio

Which Domain?

Domains for this data include marine biology and ocean ecology.

Information about the California Current Ecosystem:
https://cce.lternet.edu/about

NOAA information about California Current Ecosystem and its fisheries:
https://www.fisheries.noaa.gov/west-coast/ecosystems/california-current-regional-ecosystem

Research foci regarding the California Current Ecosystem:
https://www.research.gov/research-portal/appmanager/base/desktop;jsessionid=vJq5Tz1LmynWVdYcrzWvRF4ryS4TsTqdrdMtJ2Q0XF6bhkkJ2M7y!260043017!-979602518?_nfpb=true&_windowLabel=researchAssets_1_1&_urlType=action&wlpresearchAssets_1_1_id=%2FresearchGov%2FResearchAsset%2FPublicAffairs%2FCaliforniaCurrentEcosystemLongTermEcologicalResearchSite.html&wlpresearchAssets_1_1_action=selectAssetDetail

NOAA information on salmon in the California Current Ecosystem:
https://www.integratedecosystemassessment.noaa.gov/regions/california-current/cc-salmon

NOAA fisheries information about ecosystem health indicators regarding salmon:
https://www.fisheries.noaa.gov/west-coast/science-data/ocean-ecosystem-indicators-pacific-salmon-marine-survival-northern

California conservation information for coho salmon:
https://wildlife.ca.gov/Conservation/Fishes/Coho-Salmon

Study on ecosystem indicators and salmon survival:
https://kbifrm.psmfc.org/wp-content/uploads/2017/06/Peterson-et-al_2013_0280_Ocean-ecosystem-indicators-of-salmon-marine-survival-in-northern-California-Current.pdf

Species at risk in the California Current Ecosystem:
https://usa.oceana.org/california-current-species-risk

Article about birds in the California Current Ecosystem:
http://www.prbo.org/OBSERVER/Observer112/Ecosystem.html

Audubon Society information on birds and the California Current Ecosystem:
https://ca.audubon.org/conservation/seabirds-and-marine

Which Data?

The dataset comes from the NOAA Fisheries website and can be found here, along with a codebook: https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/bird_density_by_station_in_the_california_current_ecosystem

This is an ecosystem survey conducted as part of a larger project studying the survival of juvenile salmonids. This survey tracks the density of birds and other animals near various stations between 2003-2012.

Research Questions? Benefits? Why analyze these data?

I would like to analyze this data on two fronts. I would like to visually display the data to show density of different animal groups in different locations to see if there are any patterns of distribution. I would also like to create a predictive model to predict specific animal appearances at specific stations.

The benefits of understanding the distribution of different animal groups could help understand the ecosystem as a whole and indicate if there may be environmental factors affecting the distribution of different animals.

What Method?

I will use EDA methods to isolate and visualize the animal data as a map.

For the predictive model, a clustering model may be appropriate where each cluster is the station location. A time series model may also work if I look at the data in terms of which animals show up at a station by date.

Potential Issues?

Predictive modeling is an incredible challenge for me. I do not entirely know where to start or how to figure out which model will work the best. It is likely that most of my issues will stem from this. The other issue could be not having enough data for a specific group of animals to accurately predict information about them.

Concluding Remarks

The California Current Ecosystem plays an important role in the overall health of the eastern Pacific and holds many important fisheries. Every type of plant and animal within the ecosystem plays a role in maintaining its overall balance. Understanding what animals are present within the ecosystem and where they are primarily located can help guide key decisions, such as creating protected areas and tracking endangered populations. By studying specific types or species of animals within an ecosystem, it is possible to determine behavioral trends that in turn offer insight into environmental factors that may play a role in the distribution of species.

The purpose of this study is to examine the distribution of different animal groups observed during ecosystem surveys observing salmonid health. 45 different animals were recorded at various stations. The animals recorded are primarily different bird species along with various broad categories of animals such as sharks and seals. Historical information about the locations of these animal are available on a daily basis between 2003 and 2012, providing foundational information to predict the appearance of animals at specific stations in the future. Accurate predictions of animal appearances at specific

stations could allow for preemptive efforts to maintain environmental factors and resources in the areas to allow for those animals to flourish. This is particularly important to consider for salmonids and other fisheries in the area.