File guide (there's so much to sift through, I am sorry)

Ignore the folder called archive. These are my first attempts. They are overly complicated, narrower than final functions, or not functions at all.

Sea Star table clean-up

Original data frames: In the "Table Clean-Up" folder. CSVs named ShortenedSiteOriginal.
Function: Cleanup_function.R in the "Table Clean-Up" folder.
Function ouputs: In the "Cleaned Dataframes" folder. CSVs named SiteFullName.

All 12 sea star data tables combined into one file: All_Sites.R, AllSites.csv

Prey species clean-up

Original data frames: In the "Prey Fix" folder. CSVs named SiteNickname_Species_method. RQ indicates data from random quadrat sampling. VT indicated data from vertical transect sampling.
Function: Prey_cleanup_function.R in the "Prey Fix" folder. I added in parameters for species, though for this project species 1 was always acorn barnacles and species 2 was always mussels.
Function outputs: In the "Cleaned Dataframes" folder. CSVs named SiteFullName_method.

All 12 prey species data table combined into one file: end of Prey_cleanup_function.R, AllSites_Prey.csv

Combining sea star and prey data tables

Original data frames: In the "Cleaned Dataframes" folder.
Function: All_Species.R in the "Cleaned Dataframes" folder.
Function outputs: In the "Combined Dataframes" folder. CSVs named SiteFullName_all_species.

All 12 combined data tables combined into one file: end of All_Species.R, AllSpecies_AllSites.csv

Plots

ggplot_fun.R and several plots in the "Graphs" folder.

- A comment with the name/partial name of a png file indicate what code was used to make each figure in the folder.

A few notes/explanations of the science behind the project

SSWD onset and the non-standard year-binning: (All_Species.R) September is used as the start of each year instead of January because:

1. Most of the data is from the Winter months - it makes the most sense to group observations from December 2012 with observations from January 2013, not with observations from January 2012. September specifically is one of the least sampled months.
2. Most of the sampling was done by schools, so a "year" lines up with the school year.
3. SSWD is estimated to have hit central California between August and October 2013.

Note: While September first, 2013 is used as the cutoff between Pre- and Post-SSWD (Cleanup_function.R), the End-2013 data point from Coal Oil Point has been manually set to Pre-SSWD because SSWD reached SoCal later than the rest of the state, in the Winter of 2013-2014 (Hewson et al., 2014, All_sites.R).

Relative population: Method adapted from Miner et al (2018) - each density observation was divided by the site's pre-SSWD mean density for that color.
Notes - Density here refers to count per $10m^2$.
"k": (in the cleanup function and mortality rate comparison) is the pre-SSWD mean.

Mortality rates: These were ripped directly from my research last year, not recalculated. Mortality rates were calculated using the difference between the "2012" average count (or "2011" where no "2012" data existed - i.e. Carmel and Pigeon Point) and the "2013" average count.

Coal Oil Point data from November 2013 was included in the 2012 mean instead of the 2013 mean due to the later SSWD onset in SoCal.

"Period": There is no "during SSWD" category becayse the epidemic never technically ended. It has declined, but wasting still flares up from time to time and there is no conclusive date for this "decline in wasting". Looking at the data is impossible to tell whether low population numbers past the initial end-2013 decline are due to continued/remerging wasting or the lasting impacts of population/ecosystem collapse.

References

Hewson, I., Button, J. B., Gudenkauf, B. M., Miner, B., Newton, A. L., Gaydos, J. K., Wynne, J., Groves, C. L., Hendler, G., Murray, M., Fradkin, S., Breitbart, M., Fahsbender, E., Lafferty, K. D., Kilpatrick, A. M., Miner, C. M., Raimondi, P., Lahner, L., Friedman, C. S., … Harvell, C. D. (2014). Densovirus associated with sea-star wasting disease and mass mortality. *Proceedings of the National Academy of Sciences of the United States of America*, *111*(48), 17278–17283.

LiMPETS Rocky Intertidal Monitoring Total Count Data. (2018-2024). [dataset]. National Ocean and Atmospheric Administration, National Marine Sanctuaries, Greater Farallones Association, Pacific Grove Museum of Natural History. https://rockyintertidal.limpets.org/app/data/tc

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