The population and spatial distribution of the Purple Orange sea star (Asterias amuerensis) in the Bering Sea may be changing due to bottom warming temperatures. This affects bivalve populations as the Purple Orange sea star preys on them. The aim of this study is to determine the cause for the changes in abundance and spatial distribution of the Purple Orange sea star. During my internship with NOAA Fisheries, I used R programming to pull Bering Sea bottom trawl survey data and check the data for outliers. I then built a time series of sea star and bivalve abundance and spatial distribution from the years 1982 to 2019. I then compared the sea star and bivalve time series with each other and with trends in bottom sea floor temperatures. In the results, I found that sea star distribution shifts more southern as years progress. In addition, the correlation coefficient, which is the measurement of how strong a relationship is, between sea stars and bivalves population size is 0.4, which is significant, but is to be expected because of the predator/prey relationship. The correlation coefficients between temperature and sea stars and temperature and bivalves are low, meaning there is not a strong correlation between temperature and sea star and bivalve populations. Although sea star abundance and temperature aren’t correlated, the sea star’s spatial distribution shifts from the north to the south, which shows that their spatial distribution may be affected by temperature. This provides a look into how a changing climate affects marine species and ecosystems.