Determining the Impact of Sea Surface Temperature Change During Pregnancy of the Steller Sea Lions Pup Weight

Yun Seo*, Program on the Environment, University of Washington
Site Supervisor: Molly McCormley, NOAA
Faculty Advisor: Randie Bundy, School of Oceanography, University of Washington

@yseo_uw

INTRODUCTION/BACKGROUND

- Steller sea lions residing on the Aleutian Islands are listed as endangered
- Various reasons are being researched, such as overfishing, disease, contaminants
- Climate change and sea temperature rise may also be contributing to their already stressed conditions
- Determining how pups are affected are important, as increase in pup mortality can lead to a further population decline

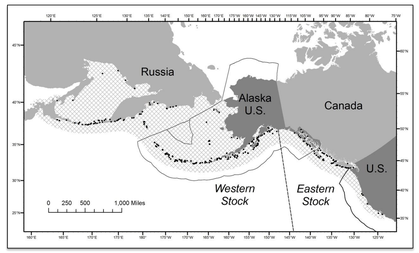


Fig 1. General distribution of two stocks of the Steller sea lion. Source: NOAA

RESEARCH QUESTION

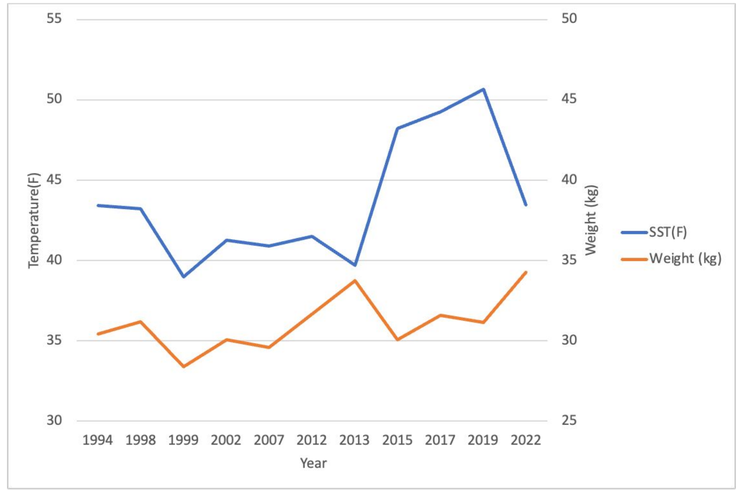
How does the sea surface temperature around Aleutian Island, Alaska during the time of adult female pregnancy and early lactation correlate to the weight of the Steller sea lion pups?

INTERNSHIP/METHODS

- Interned at NOAA Marine Mammal Lab
- Processed and analyzed a year's worth of rookery photos
- Data obtained from the internship, site supervisor and NOAA database.
- Correlation data obtained by using R

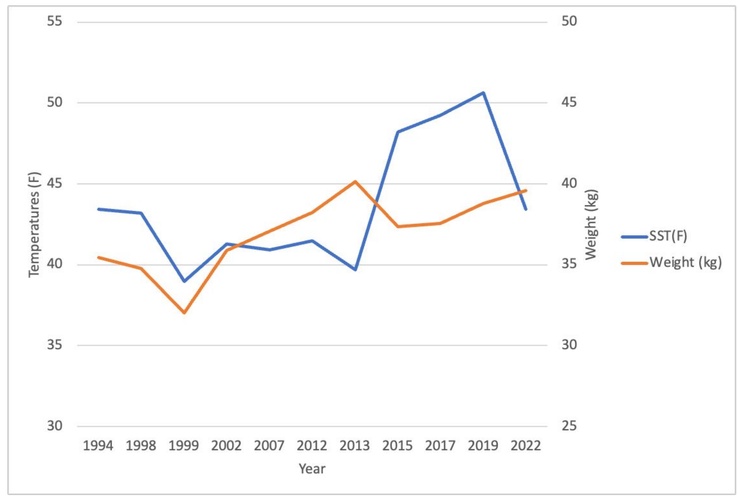
Fig. 2 Steller sea lion marked as part of NOAA's branding program. Photo Credit: NOAA

RESULTS



r^2(all years)=0.006, r^2(2013-2022)= 0.673

Fig. 3 Sea surface temperature (SST) during the time mother sea lion was pregnant with pup (Oct.-Jun), and the weight of the female pup born June of that year, ordered by year recorded at Ulak, Alaska. Data obtained from NOAA



r^2(all years)=0.096, r^2(2013-2022)= 0.624

Fig. 4 Sea surface temperature (SST) during the time mother sea lion was pregnant with pup (Oct.-Jun), and the weight of the male pup born June of that year, ordered by year recorded at Ulak, Alaska. Data obtained from NOAA

TAKEAWAYS

- Overall correlation is low, but we do see higher levels of correlation between years 2013-2022 for both sexes, which may mean recent temperature abnormalities may have some impact on pup weight
- The r^2 value for 2013-2022 is lower for males than females, which may imply that male pups seem to not be as affected by temperature changes while in utero and during early lactation
- Sea surface temperature may be a catalyst for another factors, or some other factors coincided with the SST

IMPLICATION AND NEXT STEP

- Determine externalities of sea surface temperature to Steller sea lions.
  - Ocean acidification, Sea level rise
- Further research is needed to determine other factors that may impact Steller sea lion pup weight in Alaska from 2013-2022.
  - Harmful algal blooms, prey availability

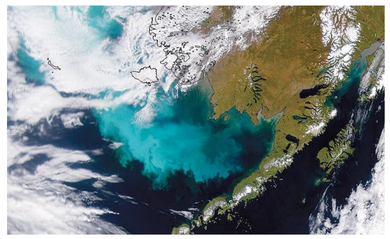


Fig. 5 Area of toxic algal blooms in the Bering Sea Photo credit: SeaWiFS Project, NASA/Goddard Space Flight Center, and ORBIMAGE.

Fig. 6 Fishermen hauling in fishes in the Pacific Ocean. Photo credit: NOAA

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