Name(s)

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Project Number

J1202

Project Title

Warming Seas, Warmer Seals: How Different Seal Species Thermoregulate

Abstract

Objectives

In order for the seal population to endure global warming, these animals are likely to need to adapt to warmer water temperatures. As the water temperatures increase, these seals may have to increase their capacity to cool off so they will not overheat. I wanted to see which of the three species I observed (Hawaiian Monk Seal (Tropical), Bearded Seal (Arctic), and Ringed Seal (Arctic) would be able to do this the best based on thermal imagery.

Methods

In December of 2018, I went to Dr. Terrie Williams office at Long Marine Laboratory at The University of California, and used an infrared camera to take pictures of three different seal species, a Ringed Seal, a Bearded Seal, and a Hawaiian Monk Seal. The infrared camera captures the surface temperature of the object you point it at and by using this device, I was able to identify major areas of each seal that lose or retain the most heat. Using two apps called Flir One and Flir Tools, I took pictures of the seals and then analyzed them.

Results

There is a correlation between the size of the seal and the amount of heat loss. The Monk Seal is the largest seal, weighing 192.5kg with an average maximum temperature of 25.62 (C). In contrast the smallest seal, the Ringed Seal, weighs 29.9kg and has an average maximum temperature of 18.08 degrees (C).
The difference between the maximum and minimum average temperatures within an individual seal decreases as the seal gets smaller, The Ringed Seal is smallest, showing about 5 degree difference; the Hawaiian Monk Seal is largest and has around a 7 degree difference.

Conclusions

The Hawaiian Monk Seal displays many of the highest temperature data points, including the highest and third-highest, and the data shows very little range between temperatures. This suggests that the Hawaiian Monk Seal would be able to adapt the most easily, based on my hypothesis that seals with the ability to release more heat will find adaptation to climate change easier.

Summary Statement

I used thermal imagery to compare temperatures in various body parts of three species of seal in an effort to understand the species relative ability to adapt to warming ocean temperatures.

Help Received

I developed this project independently but received advice and access to the three seals from my mentor, Dr. Terrie Williams of the UCSC Long Marine Laboratory.