8.5.1 **Project proposal**

Hypothesis and Predictions:

1.Pods with lower maternal relatedness will have less pod cohesion over time. Killer Whales tend to follow the matriarch, with no maternal bond they may not stick together

2.Pods will be less likely to remain cohesive if their common maternal ancestor dies. Pods are matrilineal, so losing the singular matriarchal ancestor could cause pod dispersal since the leadership connecting all lineages is lost.

3. A living common maternal ancestor is alive, there will be higher counts of lactating females in a pod. The stress of losing the maternal ancestor could impact the amount of pod fecundity.

4. Bigger pods will form in years of greater Chinook Salmon ocean abundance. With more food available it is likely that pods will stay together as there is no pressure to break up.

5. More related pods with lactating females likely have higher cohesion. The organisms are more related and so want to encourage passing on of at least some of their genetics, so they will remain together to care for closely related young.

6. The closer a sub-matriarch and her family is related to the entire pod would lead to lower survivorship due to inbreeding.

Data Source:

We are using data from Oceans and Fisheries Canada. The data set is titled “Northern Resident Killer Whale Group Cohesion (1980-2010)”. It records a variety of observations over 30 years of multiple Killer Whale pods and their changes in group members and matriarchal leaders, and eventual ‘fission’ of the group. The data was collected from censuses in Pacific Canadian waters conducted by the ‘Department of Ocean’s and Fisheries Canada’ (DFO) Cetacean Research Program. Killerwhales were identified by markings on their body and dorsal fins collected via photographs on a boat. Genes collected by another study were used to validate matrilineal relationships that were inferred from observations.

We plan to use the following columns:

Year

Group ID
Sub Matriarch ID
FLG (number of lactating females in a pod proportionate to pod size)
HWI (half weight index value (Estimate of pod cohesion in given year)
LM (maternal ancestor common to all pod members alive or dead)
NG (number of individuals in the pod)
CK.oa (Chinook salmon ocean abundance)
RG (average pairwise maternal relatedness in the pod, corrected for pod size)
Rxm (average pairwise maternal relatedness between sub matriarch and her descendents (the subunit), relative to that between her and the rest of her pod

- In other words how related the submatriarch and her lineage is related to the rest of the pod

*Unit: Female and all her descendents
*Subunit: The largest matriarchal lineage in the pod
*Sub-Matriarch: Matriarch of the largest subunit

Works Cited

Secretariat, T. B. of C., & Secretariat, T. B. of C. (n.d.). *Northern Resident Killer Whale Group Cohesion (1980-2010)—Open Government Portal*. Retrieved September 29, 2023, from https://open.canada.ca/data/en/dataset/8c773994-1031-411b-a1ad-933928daa4ac