Significance of Whale Predation on Natural Mortality Rate of Pacific Herring

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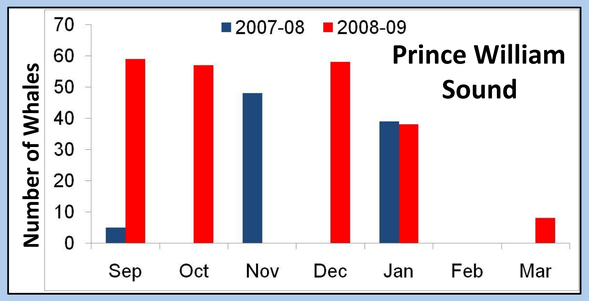
What is the impact of humpback whales on herring populations?

It varied between regions; alternative prey, whale abundance, and herring abundance are key factors.

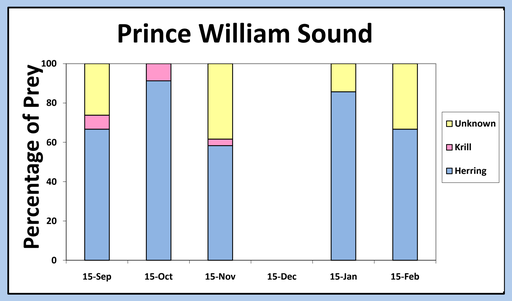
Region	Prince William Sound	Lynn Canal	Sitka Sound
Status of herring:	Depressed (last fishery >15 years ago).	Depressed (last fishery > 20 years ago).	Healthy (record harvest forecast for 2012).
Impact of whales	Higher	Either High or Low*	Low
Why	No alternative prey available. Reduced herring biomass.	Alternative prey available. Herring population structure uncertain (winter biomass >10X spawning biomass).	Alternative prey available. Huge herring biomass.

How did we determine this?

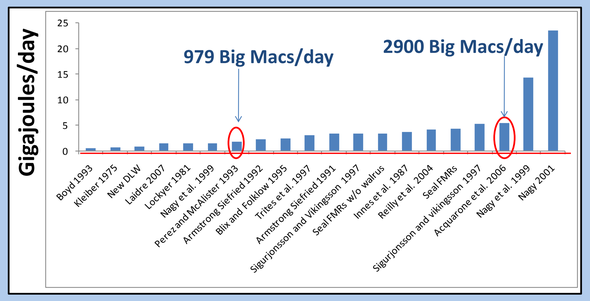
By modeling how many herring whales eat (Prince William Sound example).



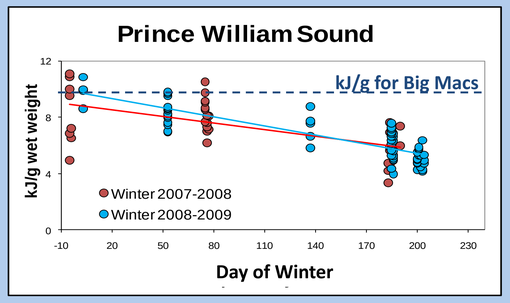
Whale abundance and trends



Whale Diet



Whale Energy Requirements



Energy in Herring

Location & Winter	∑ Tonnes Consumed
PWS 07-08	2639 (27%)
PWS 08-09	4388 (21%)
Sitka 07-08	1018 (1%)
Sitka 08-09	788 (<1%)
Lynn Canal 07-08	732 (67%)*
Lynn Canal 08-09	501 (100%)*

Total Herring consumed (% of Biomass)

*Lynn Canal estimates of herring removal are based on the spawning biomass. It is likely that whales are also feeding on a larger overwintering biomass

Take home message:

The effects of humpback whales on herring are localized. As marine mammal populations recover, they play a greater role in the marine ecosystem. Interactions between whales, forage fish and commercial fisheries need to be considered by managers at the fishery level.

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