Changes in Marine Predator and Prey Populations in the Northern Gulf of Alaska: Gulf Watch Alaska Pelagic update 2019

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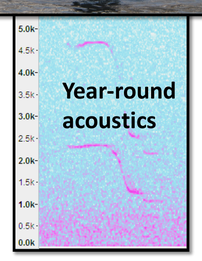
Gulf Watch Alaska is a long-term marine ecosystem monitoring program in the Northern Gulf of Alaska. Over-arching questions that guide monitoring efforts by several coordinated projects within the pelagic component include:

1) What are the population trends of key upper-trophic-level pelagic taxa?

2) How do predator-prey interactions, including interannual changes in prey availability, contribute to changes in the populations of predators in this region?

Continued monitoring of the pelagic ecosystem by the GWA program will provide data required to evaluate the response of key predators and their prey to changes in the marine environment.

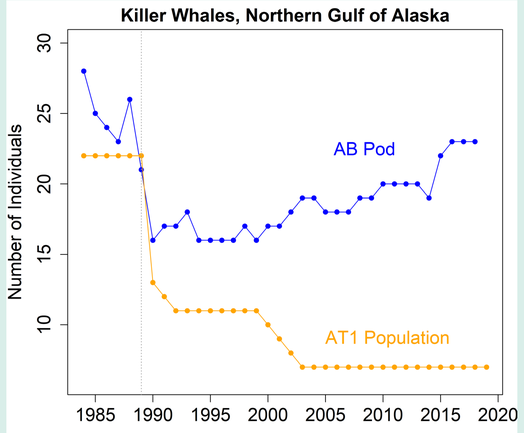
Killer Whales



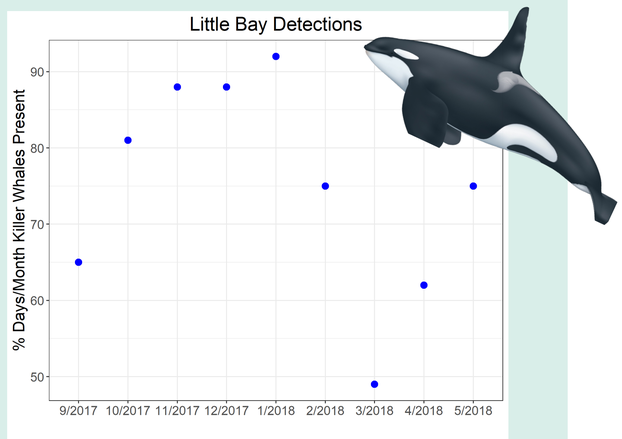
- Effort: 55-66 days/yr
- Photoidentification
- Feeding Ecology
- Acoustic Monitoring

2019 Surveys

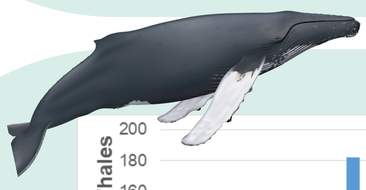
- 46 encounters on 65 surveys
- AB pod (resident) only partly encountered in recent years, possible new mortalities, analysis is incomplete
- AT1 (transients) are detected regularly on remote hydrophones, no change in population
- Little Bay detections between Sept 2017 and May 2018 peaked in January. Auto-detection methods are being developed for year-round acoustic data (see Meyers et al. poster)

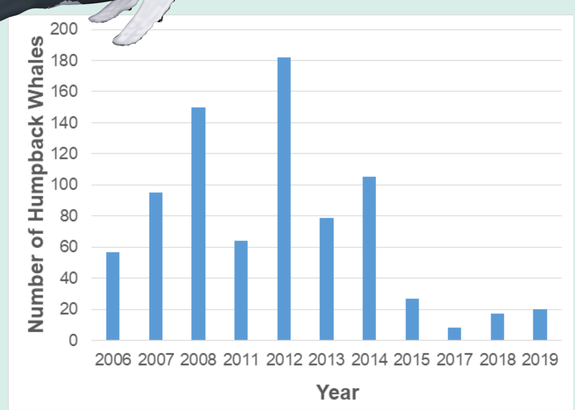


Note: AB Pod only partly encountered, results are preliminary



Humpback Whales





April 2019

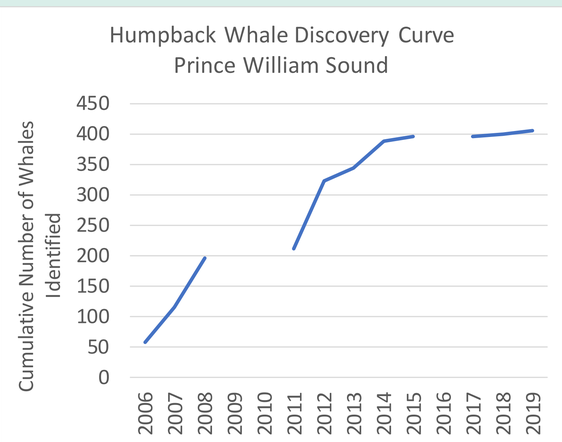
- low whale numbers continue, individuals were scattered across Prince William Sound and not as strongly associated with herring shoals as in past years

September 2019

- whale numbers remained low but body condition seems to be better than 2017 -2018
- whales were feeding primarily on juvenile herring and euphausiids. The prey field improved compared to 2017-2019
- Fin and Minke whales were seen in the Sound, similar to what we saw in 2014 during the marine heatwave

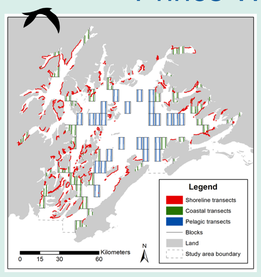
Overall

- Discovery of new whales in Prince William Sound has flattened since 2014 as a result of fewer whales using the Sound and lower calf production (see Moran et al. poster)

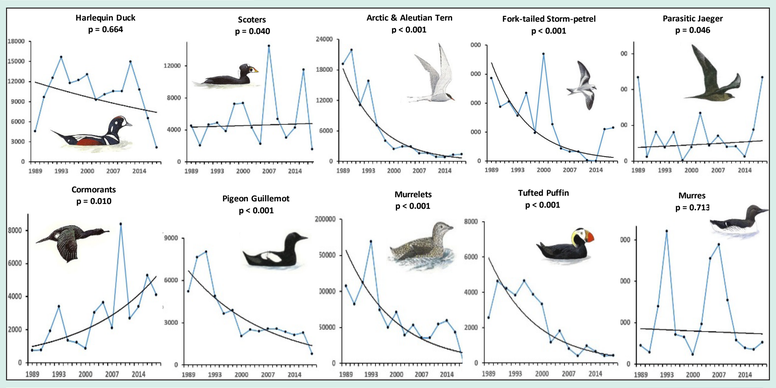


Marine Birds

Summer Marine Bird Status and Trends
Prince William Sound



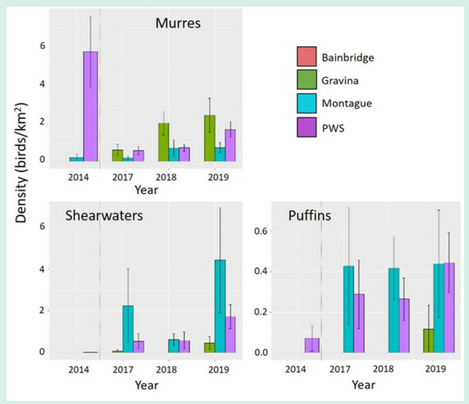
- 1989-2018 marine bird trends overall trended downward (1989-2018) with the exception of increases in abundance of some pelagic species (e.g., storm-petrels, jaegars, and murres).



Nearshore — Offshore

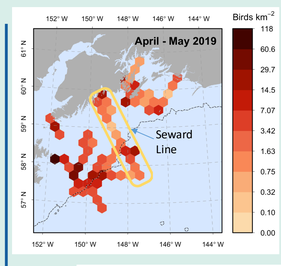
Drawings: The Sibley Guide to Birds, National Geographic Birds of North America

Fall/Winter Marine Bird Surveys
Prince William Sound

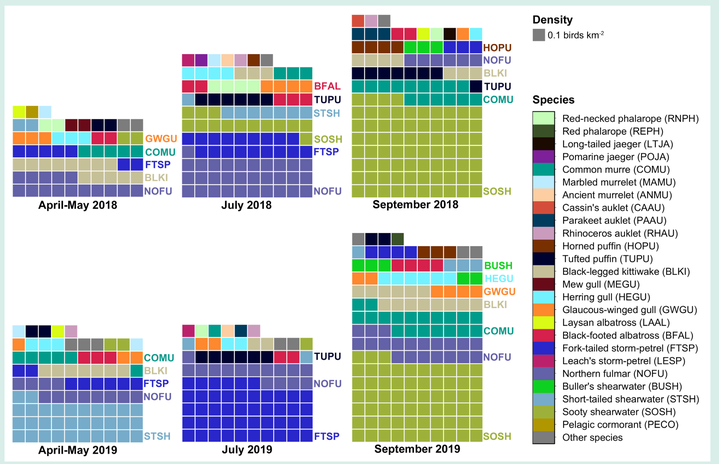


- increased Common Murre densities during September 2019 surveys
- shifts in distribution by shearwaters and puffins from the interface of Prince William Sound and the Gulf of Alaska to more inside waters of Prince William Sound, potentially in response to the warm water mass that developed in the Gulf of Alaska in 2019

Spring/Summer/Fall Marine Bird Surveys
Seward Line/ Northern Gulf of Alaska LTER

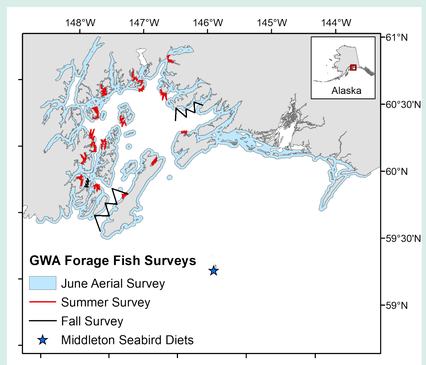


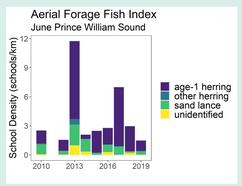
- Abundance of seabirds increased seasonally and was highest in fall, when sooty shearwaters predominated. In July, northern fulmar and fork-tailed storm-petrel were predominant
- In spring 2019, seabird abundance was lower than previous years (2007-2018) along the Seward Line, but high densities occurred east of Kodiak Island

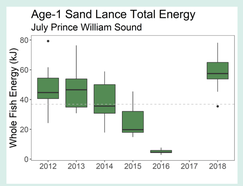


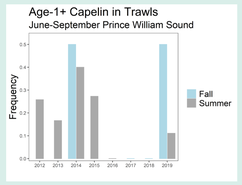
Forage Fish

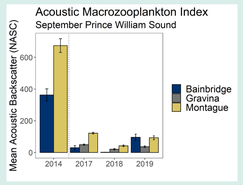
Summer/Fall Forage Fish Surveys
Prince William Sound





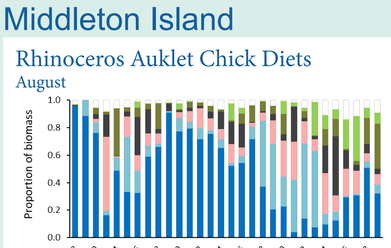


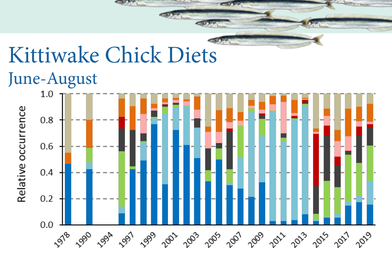




- aerial forage fish index was below average in 2019
- after several years of zero catches, age-1+ capelin frequency in trawls increased in Prince William Sound during 2019
- age-1 sand lance whole fish energy content returned to normal levels by 2018
- macrozooplankton index (primarily composed of krill) was higher in 2019 compared to 2018, but was still much lower than 2014

Spring/Summer Seabird Diets
Middleton Island





- Rhinoceros Auklet and Kittiwake diets diverged in recent years when sand lance and capelin were less available. In 2019 Auklets fed more greenling and kittiwakes fed more herring to their chicks, a trade-off related to changes in foraging locations. Capelin indices increased for both species in 2019.

THE LONG-TERM MONITORING PROGRAM OF THE EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL

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