

Summary for Glacier Bay Area

- We documented a 59% decrease in whale numbers since 2013
- Calving and juvenile survival are in a sharp and continuing decline.
- Site fidelity interrupted in 68% of “regularly sighted” whales
- More whales appear to be in poor body condition.

**For Glacier Bay annual reports and details:
www.nps.gov/glba**

Question #1: Is the Problem Just in Glacier Bay?

And are there data to
address that question?

Answer: Yes, in some places



Gulf of Alaska Humpback Whale Data Sources

1968 – 2018: humpback whale photo-ID

Jurasz family photo collection starting in 1968

Glacier Bay National Park 1985-present

Chris Gabriele NPS, Janet Neilson NPS

SEAK long term shared database – 1986-present

NPS, Jan Straley UAS, Scott Baker OSU

SPLASH - Structure of Populations and Levels of Abundance and Status of Humpbacks –NP Basin wide study 2004-2006 *A cast of thousands*

SPLISH - Survey of Population Level Indices for Southeast Alaskan Humpbacks –NSEAK 2016, 2017 & 2018

John Moran NOAA, NPS, Andy Szabo AWF, Heidi Pearson & Jan Straley UAS

Gulf Watch Alaska - Prince William Sound 2007-2009, 2012-2015, 2017, 2018 John Moran NOAA, Jan Straley UAS



March 22, 2017 – Sitka Sound



July 17, 2017 – Glacier Bay

NOAA-Funded Surveys Throughout Southeast Alaska

2016-2018

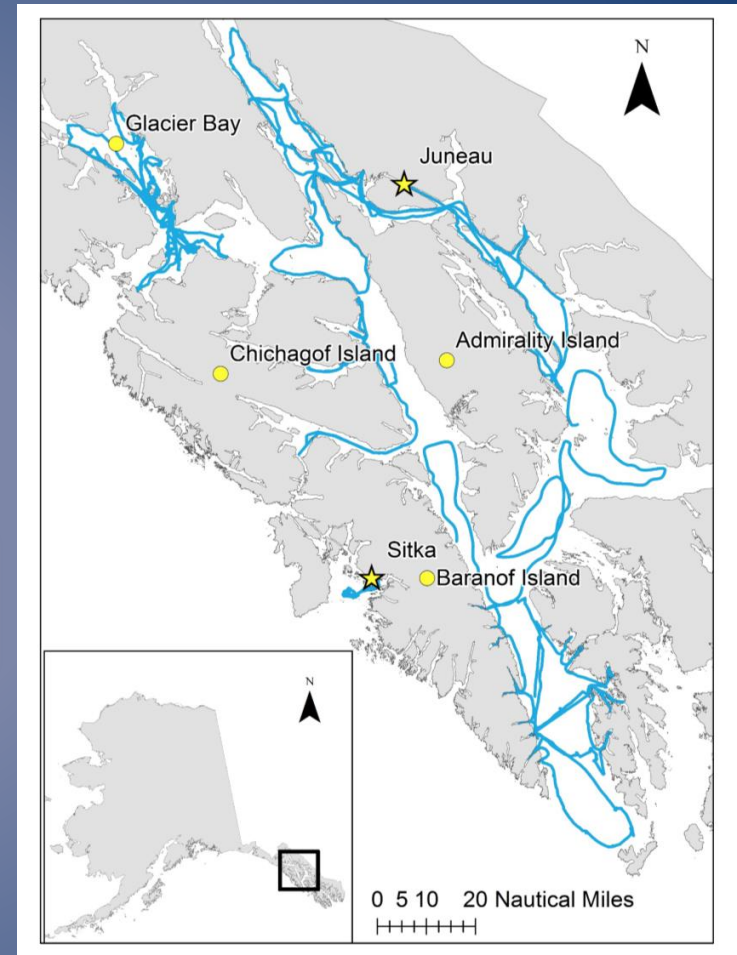
INTRODUCING

SPLISH

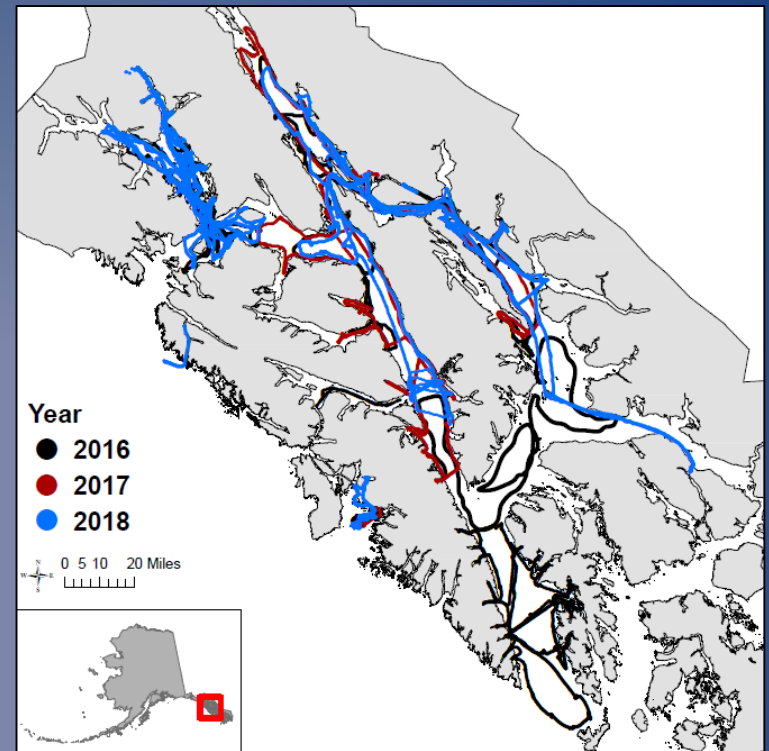
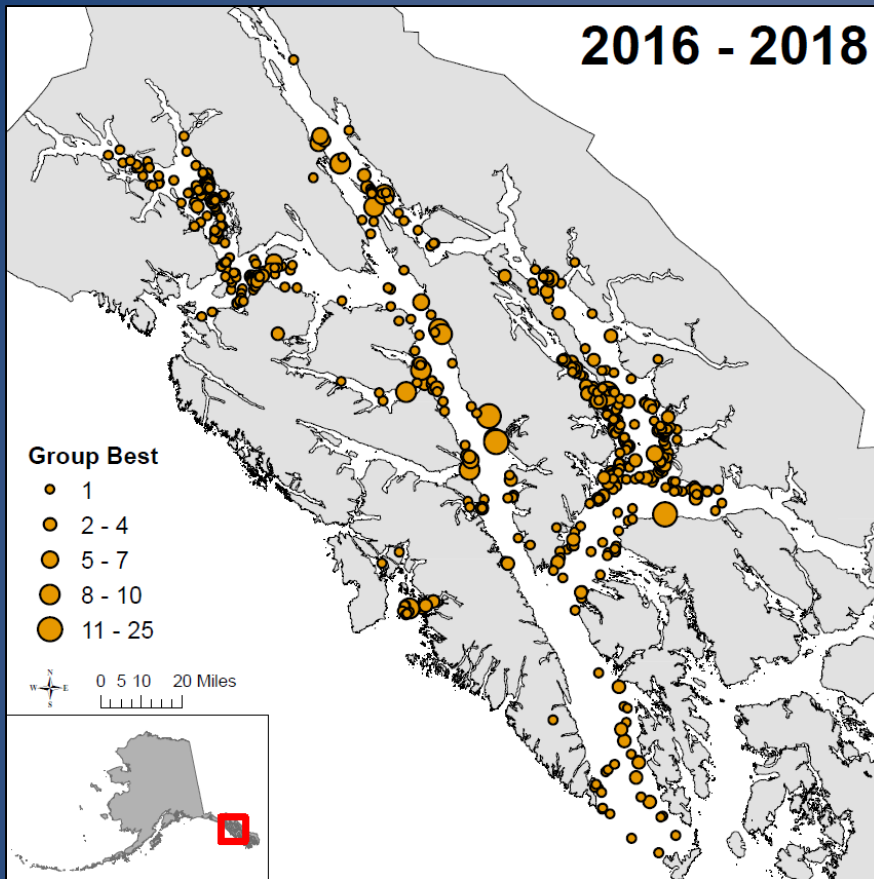
Survey
Population
Level
Indices for
Southeast Alaska
Humpbacks

Synchronous surveys by all research groups for two weeks in Aug 2016, 2017 & 2018

- Humpback whale ESA Post-Delisting Monitoring Plan calls for 10 years of monitoring “as funds are available”.
- NMFS Alaska Region (Aleria Jensen) proactively funded data collection for an annual snapshot of SE Alaska whales in 2016, 2017, and 2018.



Preliminary SPLISH Findings 2016-2018



Maps courtesy of John Moran

SPLISH Synchronous surveys by 5 research groups for two weeks in Aug 2016, 2017 & 2018

Year	Survey Distance (nm)	Effort Time (hr)
2016	1,609*	195
2017	1858*	224
2018	1318 *	173

Source: Moran, Cedarleaf, Gabriele, Lewis, Neilson, Pearson, Sharpe, Straley, Szabo (in prep). Report on Survey of Population Level Indices for Southeast Alaska Humpback Whales (SPLISH).



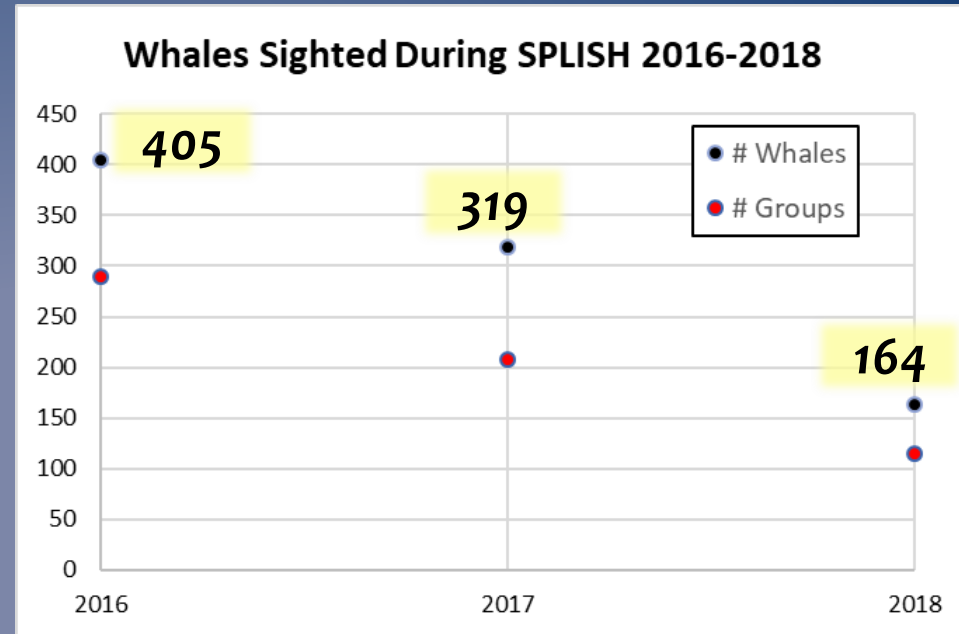
Preliminary SPLISH Findings 2016-2018

Year	Whales	Calves	Effort	Whales Per Hour	% Calves
2016	405	2	195	2.08	0.5%
2017	319	2	224	1.43	0.6%
2018	164	0	173	0.95	0.0%



SPLISH Synchronous surveys by 5 research groups for two weeks in Aug 2016, 2017 & 2018

Source: Moran, Cedarleaf, Gabriele, Lewis, Neilson, Pearson, Sharpe, Straley, Szabo (in prep). Report on Survey of Population Level Indices for Southeast Alaska Humpback Whales (SPLISH).



OVERALL RESULTS:

- Low whale counts
- Few calves
- Skinny whales
- 2 males and 1 female from GB-IS found in Chatham Strait in 2017



Skinny Whales-Northern Southeast Alaska

Sept 4 2016
Sitka Sound

D. Miller
photographer



March 22, 2018
Sitka Sound

J. Straley
photog.

Question #2: In Search of the “Missing” Whales: Did They Re-locate?



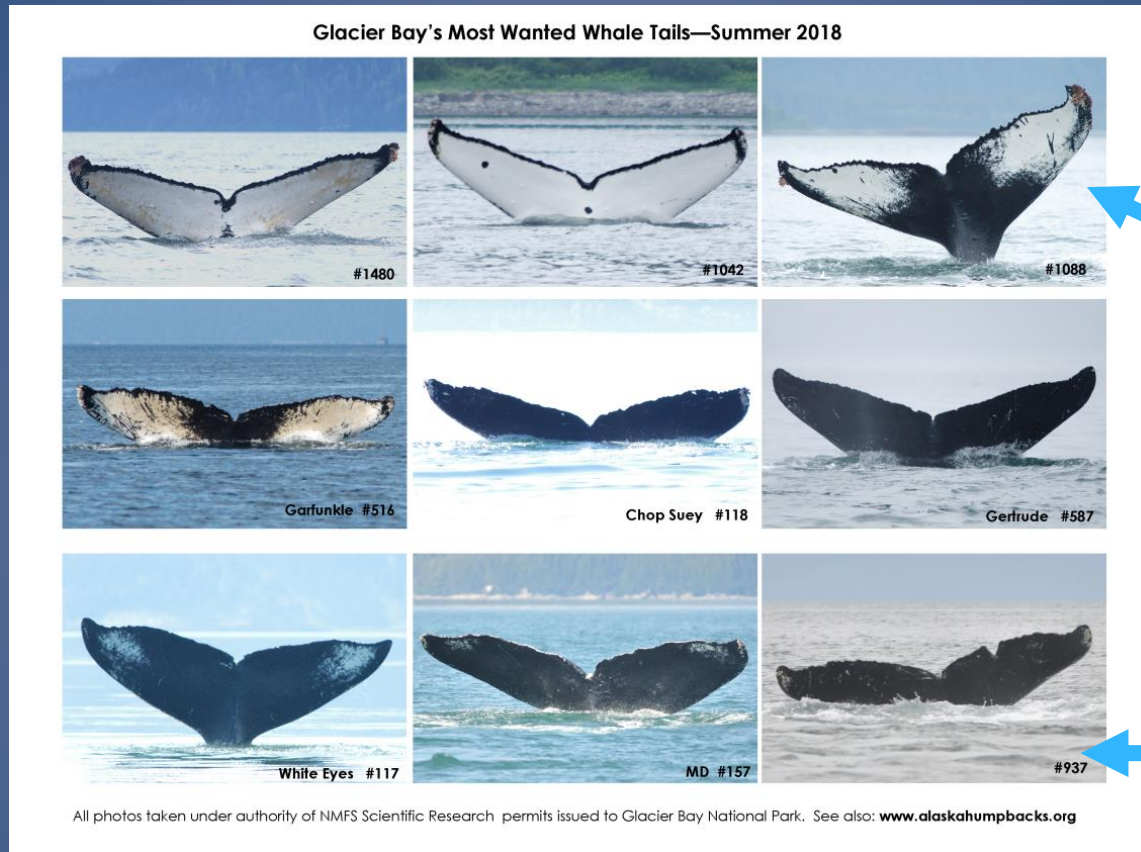
Whale #516,
a.k.a. “Garfunkle”

Glacier Bay National Park

Lost and Found “Missing” Whales

#616 Maui
Mar 2019
PWF

#465
Frederick
Sound 2017,
2018
Mexico
HappyWhale
Mar 2019
Glacier Bay
May 2019



#1088
Tenakee Inlet
(Steve Lewis
Oct 2018)

Maui (Pacific
Whale
Foundation
Dec 2018)

#937
Chatham
Strait 2017
& 2018
Back in
Glacier Bay
2019

**Circulated photo PDF to research groups, tour vessels
Gearing up to match catalogs with
British Columbia researchers
Sent over 9,000 fluke ID images to HappyWhale.com**

Question #3: Carrying Capacity: Did humpbacks eat themselves out of house and home?



Maybe... but at all levels of the marine food web, things are out of whack.

This points to larger ecological changes driving the declines.

What Exactly *IS* Carrying Capacity?

Seems clear that the ability of the ecosystem to sustain the existing whale population has diminished

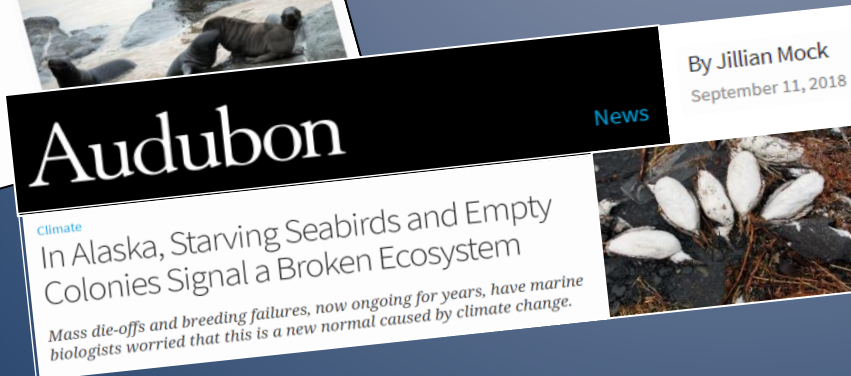
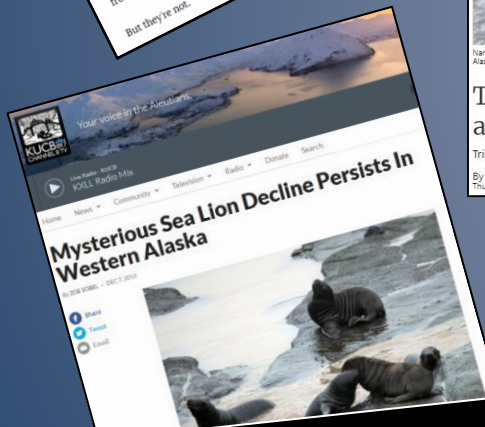
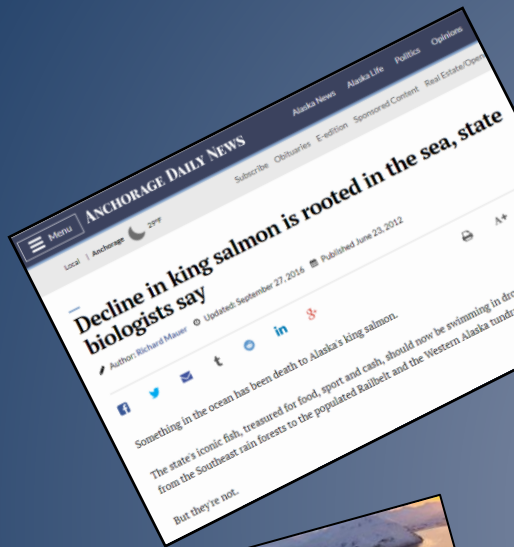
The effects we have seen correspond with the 2013-2016 marine heatwave and lasted beyond it.

We can infer that changing ocean conditions can change carrying capacity rapidly.



Alaska News Reel:

Lots of Marine Ecosystem Changes In Recent Years



SE Alaska Herring Fishery Recent History

Herring are a dominant humpback whale prey item.

Many SE Alaska gillnet fisheries out of business past several years.

Only one sac roe fishery exists in the Gulf of Alaska: **Sitka Sound**

2018: fishery closed early, 8,300 tons short of quota.

2019: No harvest; fish not of marketable size.

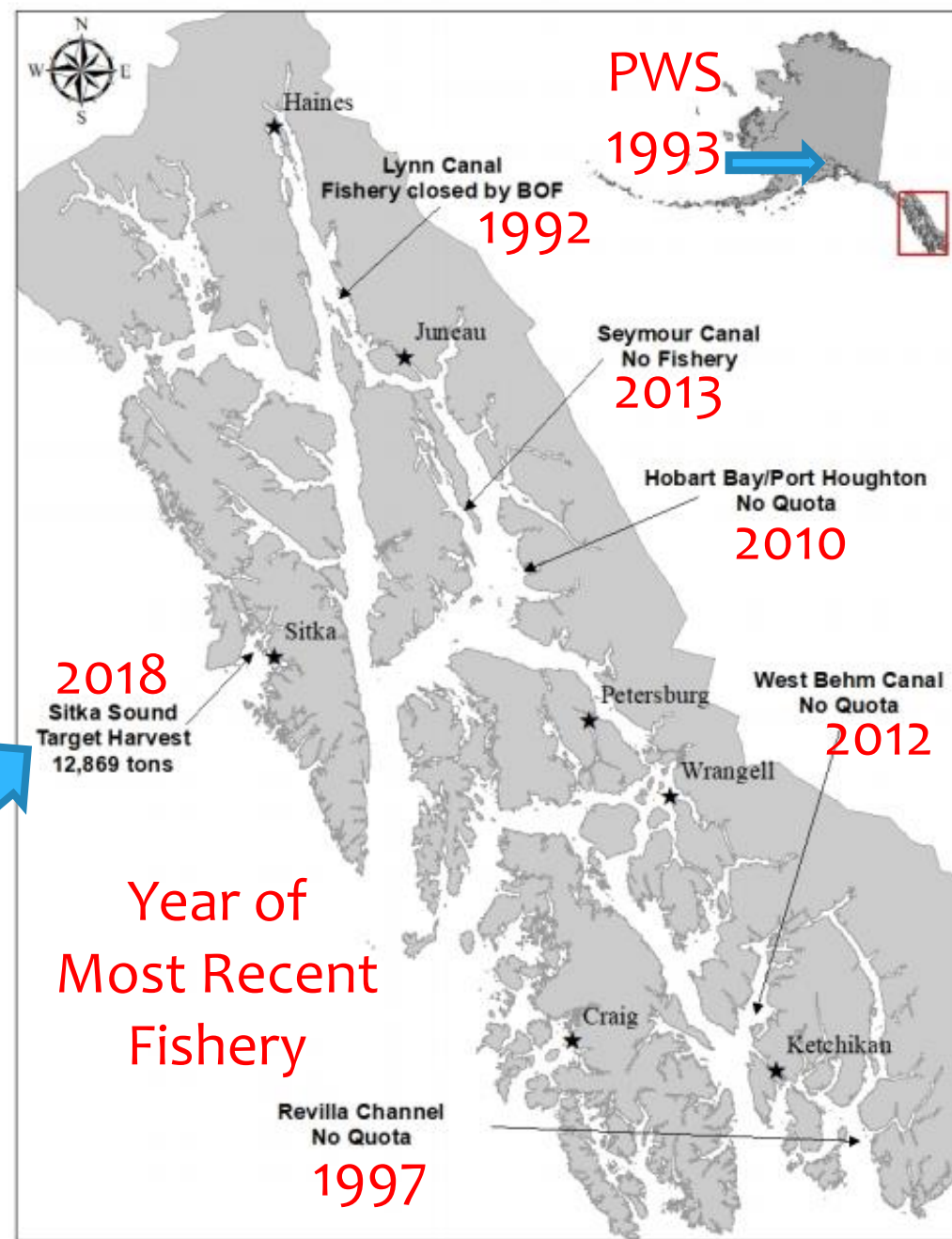
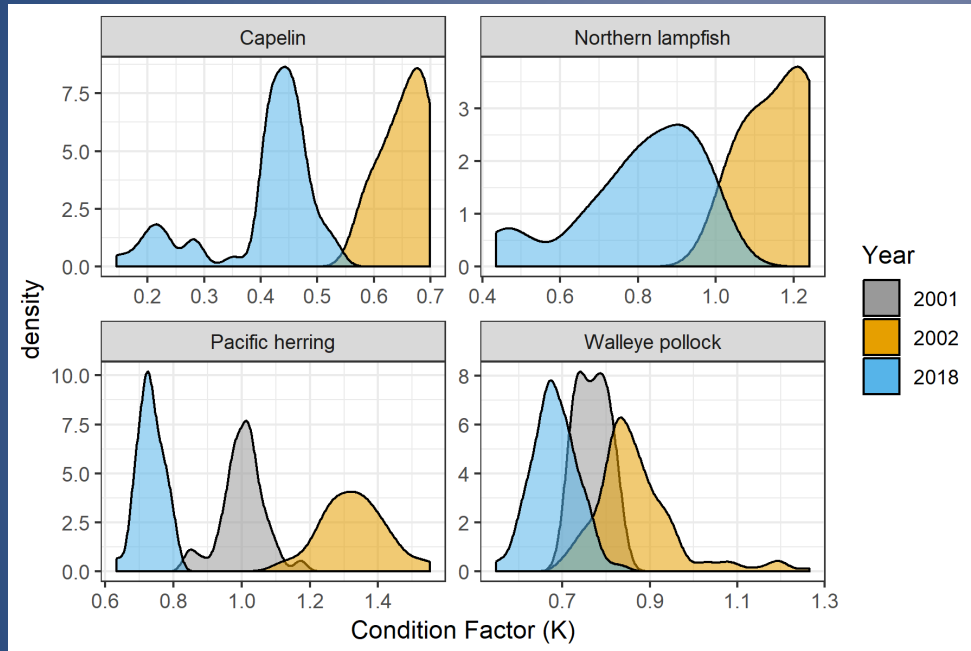


Figure 1.—Southeast Alaska sac roe herring areas and Guideline Harvest Levels for 2019.

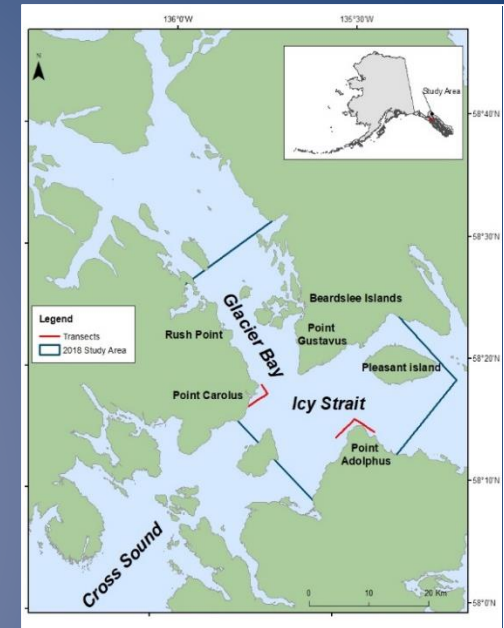
Body Condition of Forage Fish in Icy Strait and Glacier Bay

Focal follows with hydroacoustics & trawling



Fish we caught in 2018 had lower weight at length than those caught in 2001 and 2002.

Arimitsu et al. 2019 Evaluating changes in humpback whale prey in Glacier Bay National Park and Icy Strait, Alaska: 2018 Progress Report. 23 pp.



Reduced prey quality may help explain poor whale body condition and reproductive success.

Graphs courtesy of Yumi Arimitsu, USGS



EMA: Southeast Alaska Coastal Monitoring



“Skinny” zooplankton

Mean zooplankton lipid content was high in 2014 and decreased ~3-fold in 2015 (Fergusson et al. 2017)

Prey quality, not just quantity, is important!

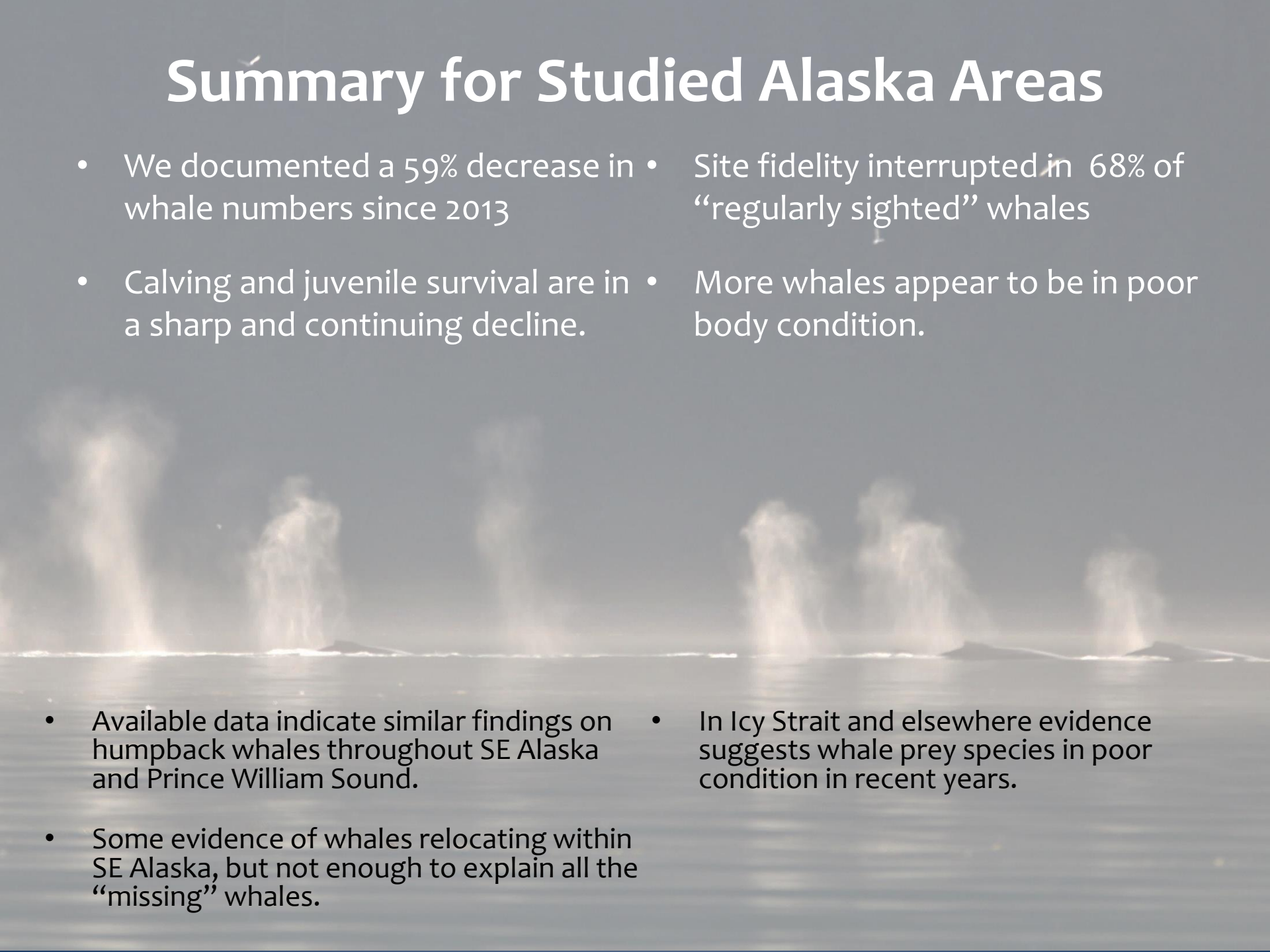
Images
from:

www.sfos.uaf.edu/directory/faculty/hopcroft/index.html

<http://www.dfo-mpo.gc.ca/species-especes/profiles-profil/euphausiids-krill-euphausiaces-eng.html>

Summary for Studied Alaska Areas

- We documented a 59% decrease in whale numbers since 2013
- Calving and juvenile survival are in a sharp and continuing decline.
- Site fidelity interrupted in 68% of “regularly sighted” whales
- More whales appear to be in poor body condition.

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- Available data indicate similar findings on humpback whales throughout SE Alaska and Prince William Sound.
 - Some evidence of whales relocating within SE Alaska, but not enough to explain all the “missing” whales.
 - In Icy Strait and elsewhere evidence suggests whale prey species in poor condition in recent years.



Closing Thoughts: Tools To Address The Issues

- Support long term population monitoring and integration of physical science data.
- Ensure that Post-Delisting Monitoring Plan is carried out for 10 years as promised.
- Look closely at “Response Triggers” in Post-Delisting Plan.
- Acknowledge that DPS’s mix on feeding grounds. Err on the side of caution in Critical Habitat designation for ESA-listed stocks.



10-Year Post-Delisting Monitoring Plan

If substantial information indicates that any delisted DPS is experiencing decreases in calf production, juvenile or adult abundance, population growth rate...

“NMFS will convene an ad hoc team of experts to decide whether

- monitoring should be extended
- intensive review or studies needed to examine mechanisms
- initiate a status review
- recommend an emergency listing”



We will never have have perfect knowledge, but do we have enough to make good decisions?

Acknowledgements

Our “regulars”:

Jan Straley, John Moran, Jen Cedarleaf,
Scott Baker, Mayumi Arimitsu

Charles Jurasz and family (Sea Search Ltd.)

Sally Mizroch (NMML)

Data collection & analysis: Alex Andrews,
Georgia Arnold, Kierstin Barlow, David
Cannamore, Ellen Chenoweth, Tracy Hart, Dena
Matkin, Laura Mentzer, Katja Mocnik, Melissa
Senac, Louise Taylor-Thomas, Phoebe
Vanselow, & Emily Warchol

*Humpback whale photos in this presentation were taken under
NOAA Fisheries research permits issued to the NPS.*

