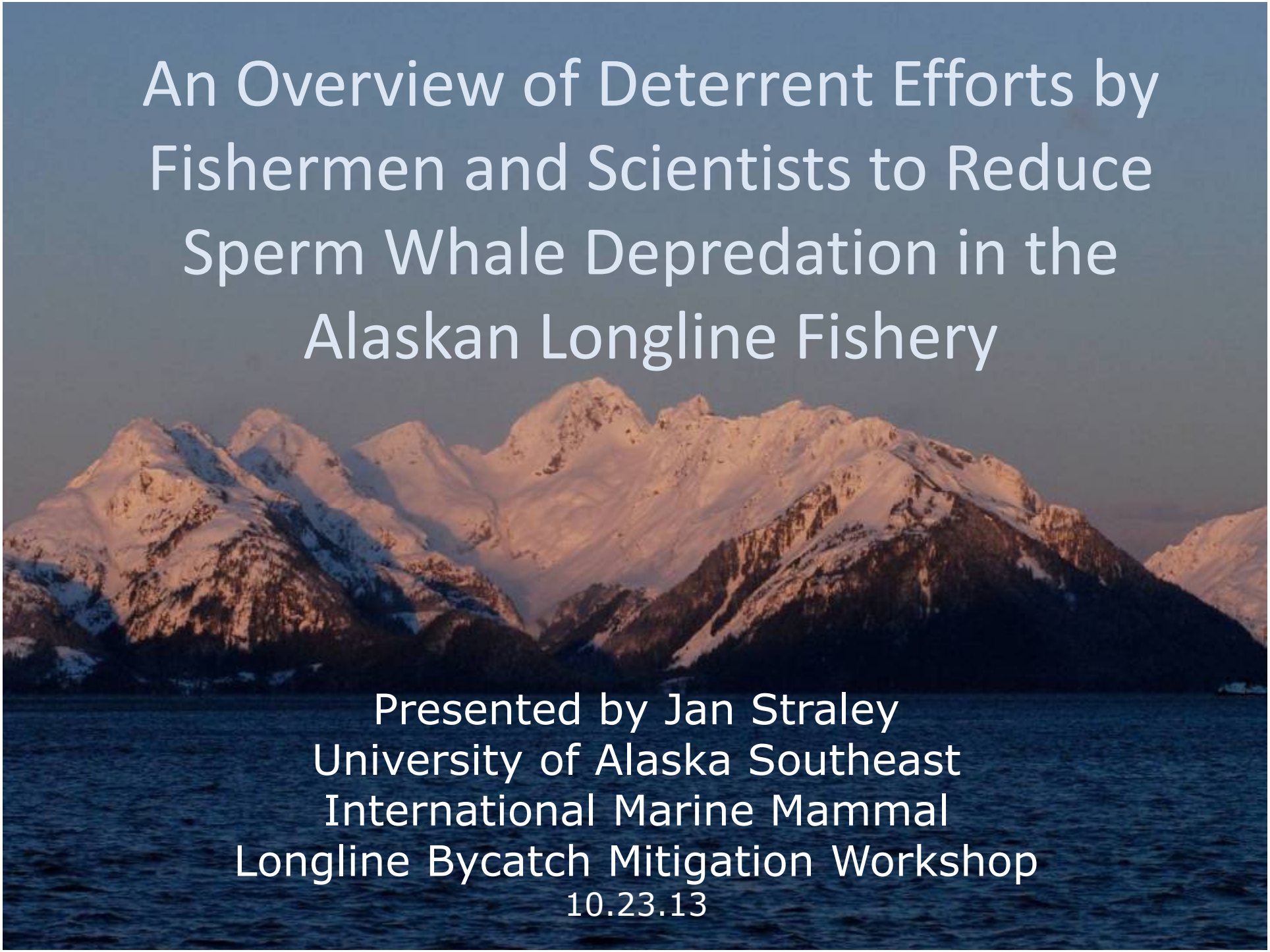
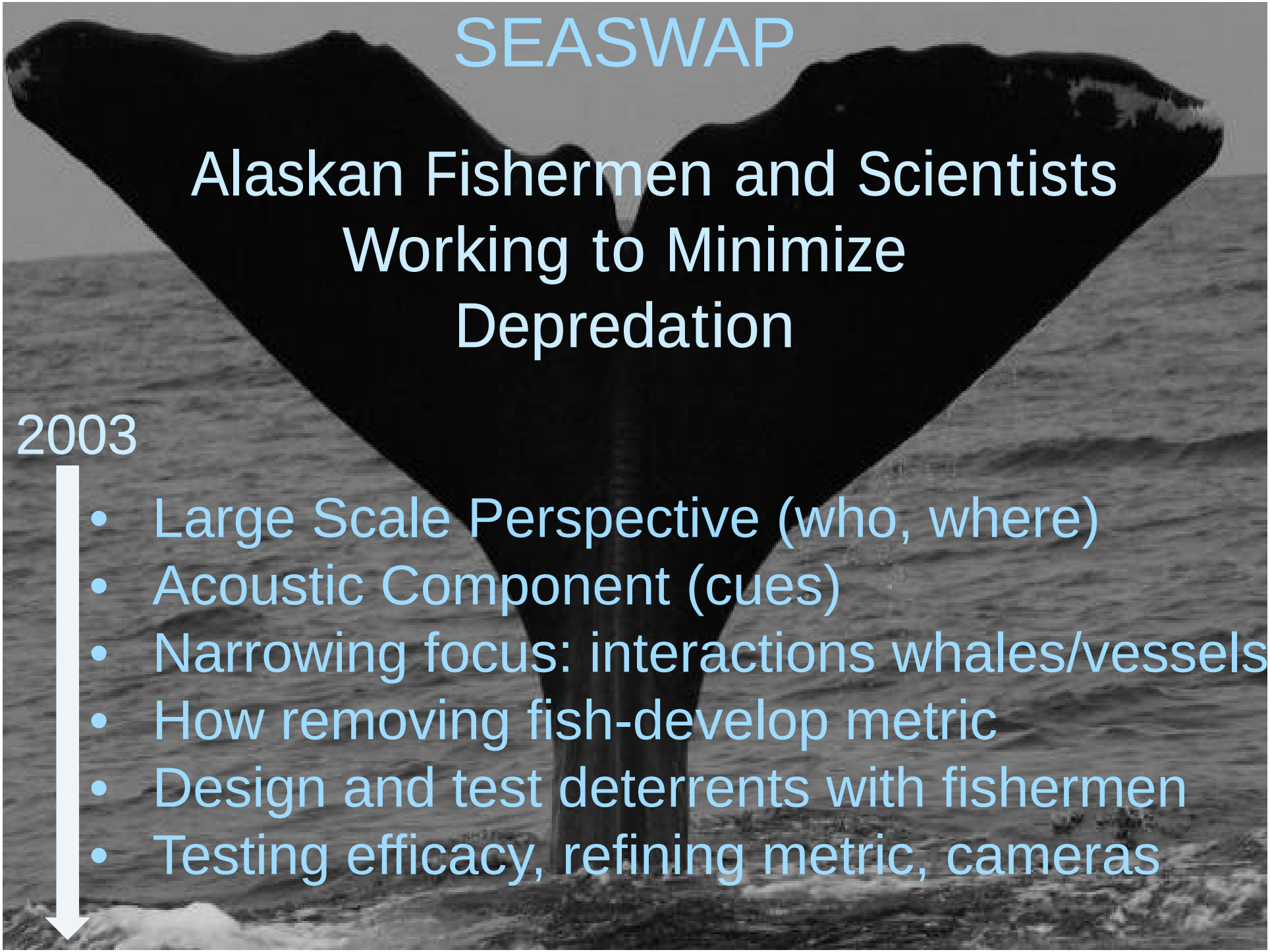


An Overview of Deterrent Efforts by Fishermen and Scientists to Reduce Sperm Whale Depredation in the Alaskan Longline Fishery

Presented by Jan Straley
University of Alaska Southeast
International Marine Mammal
Longline Bycatch Mitigation Workshop
10.23.13



SEASWAP

Alaskan Fishermen and Scientists Working to Minimize Depredation

2003

- Large Scale Perspective (who, where)
- Acoustic Component (cues)
- Narrowing focus: interactions whales/vessels
- How removing fish-develop metric
- Design and test deterrents with fishermen
- Testing efficacy, refining metric, cameras

Southeast Alaska Sperm Whale Avoidance Project

co-authors: A Thode, V O'Connell, L Behnken, D Falvey, L Wild, R Andrews, C Lunsford, D Mathias

Central Bering Sea Fishermen's Association

Alaska Longline Fishermen's Association

Sitka Sound Science Center

Scripps Institution of Oceanography UCSD 1903 Centennial 2003

National Geographic

Alaska SeaLife Center windows to the sea

UAF University of Alaska

UAS

National Oceanic and Atmospheric Administration U.S. Department of Commerce NOAA

Alaska Department of Fish and Game

NPRB

In 2006 this happenend….

- Gear rolled backwards into water, with sablefish baited above camera, 45 min deployment


2006 5 31 10:47:03

Implications for Depredation Research

"Creak sound" is diagnostic of depredation attempt

--a measuring stick for refining "depredation rate?"

--important for quantifying scale of problem and potentially evaluating solutions

Scale of problem underestimated?

--Depredation can leave empty, undamaged hooks.

--Line under tension and vibrates during bite

Recommendations for reducing depredation (early SEASWAP)

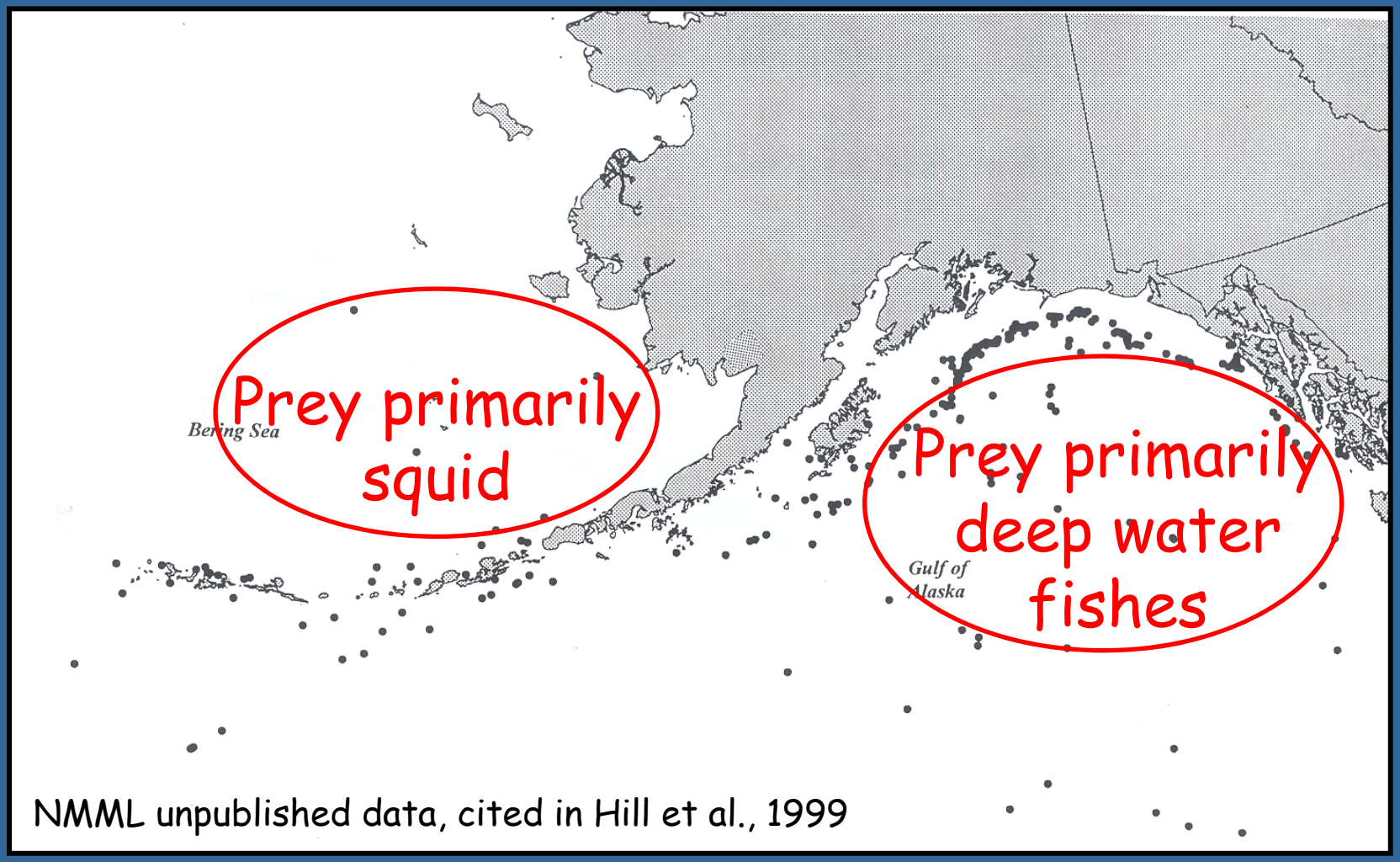
--Minimize engine cycling

--Avoid broadcasting vessel presence/

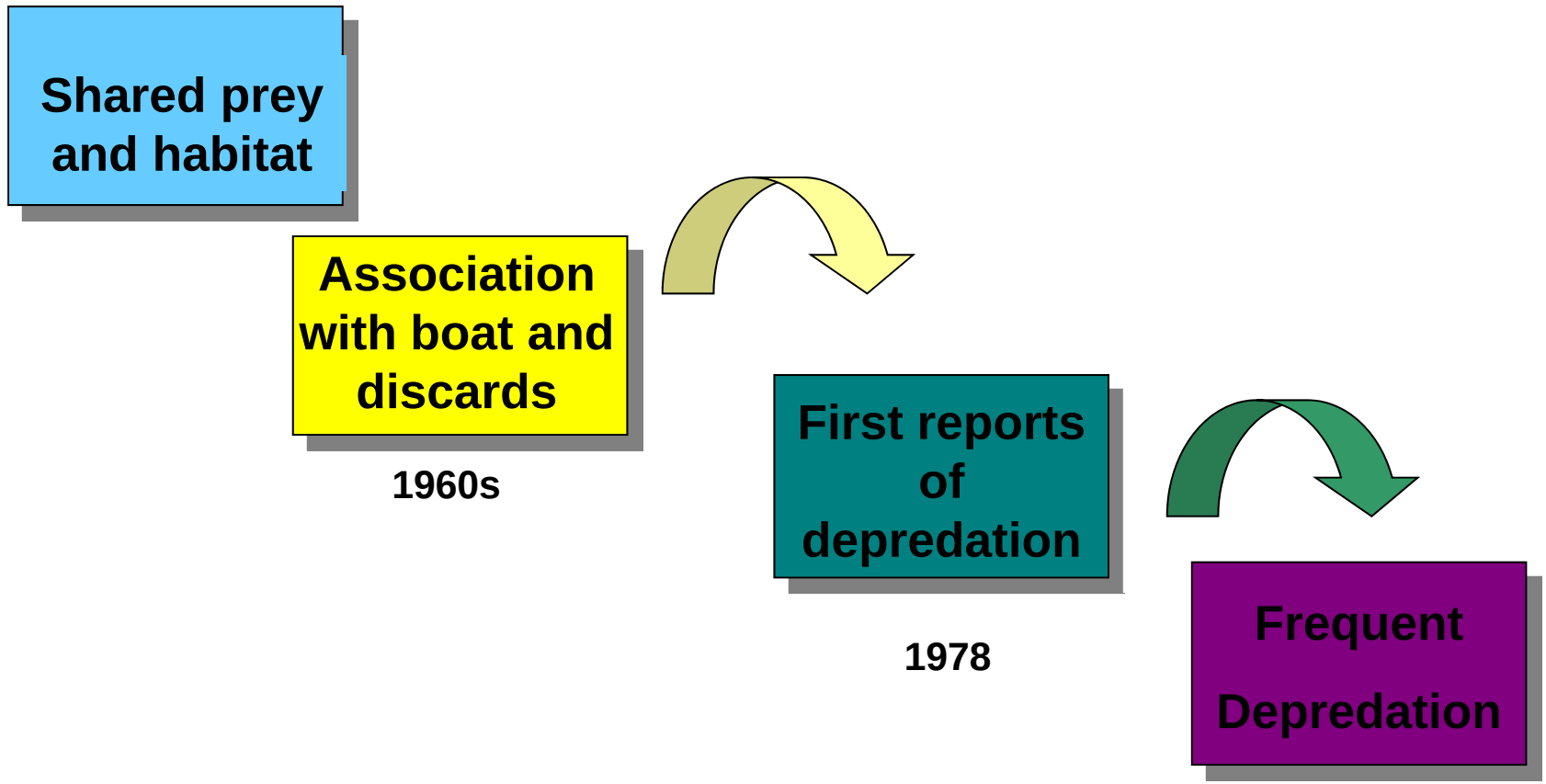
--Now Active and Passive deterrents & Avoidance

Photo: Dan Falvey

Sperm Whale Sightings (1958-1995)



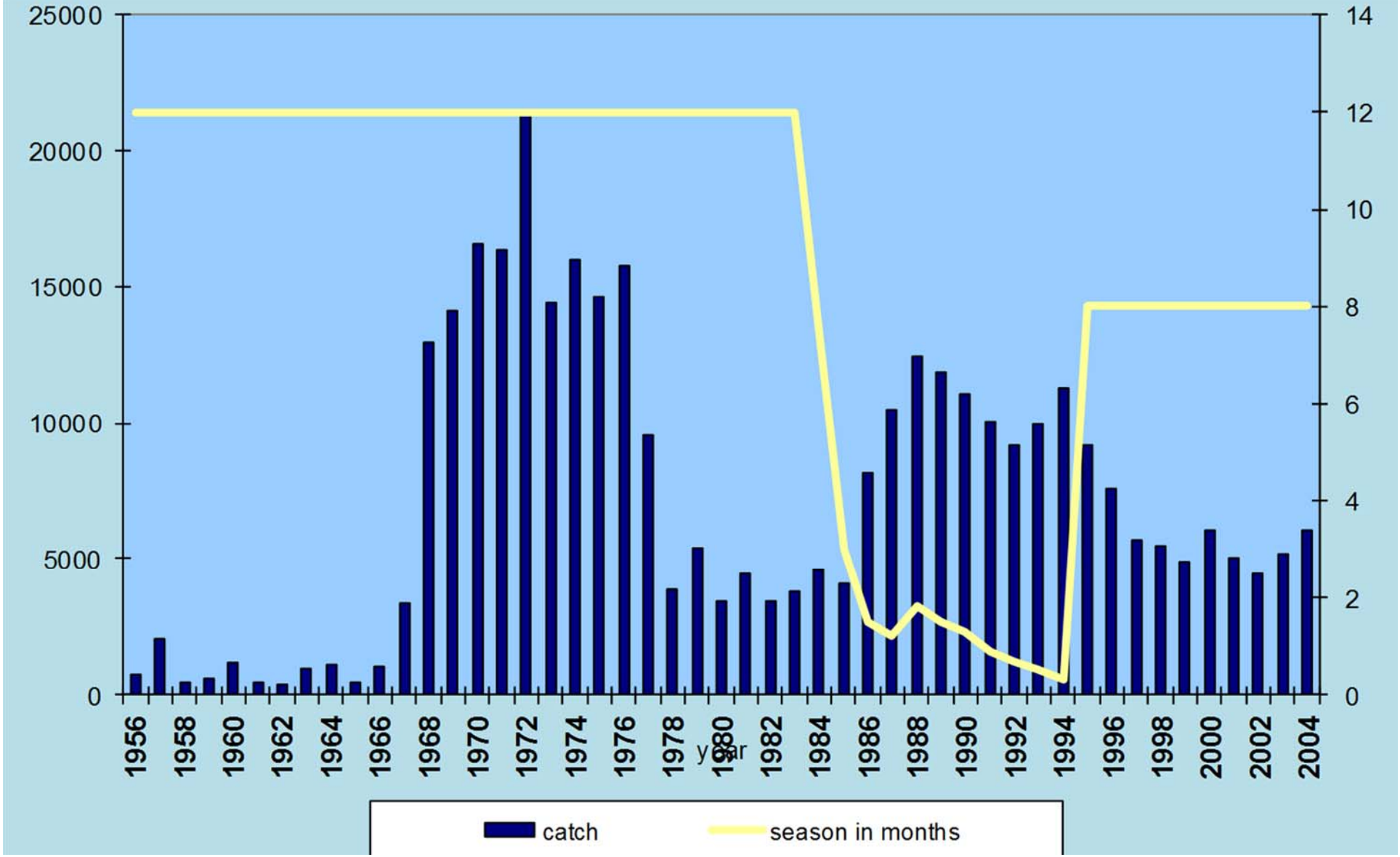
Sperm Whale-Longline Interactions in Gulf of Alaska



Economic loss to fishermen
some serious injury to whales (NOAA SAR)

Eastern Gulf of Alaska

Sablefish Catch(mt) and Season Length (mo)



Sablefish bottom longline sets:

For example:

100 fm skates

40” spacing on hooks

4,500-6,300 hooks per set

Typically 3 nm in length

BUT:

Everyone is different – makes between vessel comparisons difficult…

SEASWAP Goals & Objectives

To cooperatively investigate this problem to recommend deterrents to reduce depredation

Photo shows a fish shredded by a sperm whale

1) Who are the sperm whales in the GOA (#'S, who?) Broad Perspective

2) Narrowing to interactions using acoustics to monitor

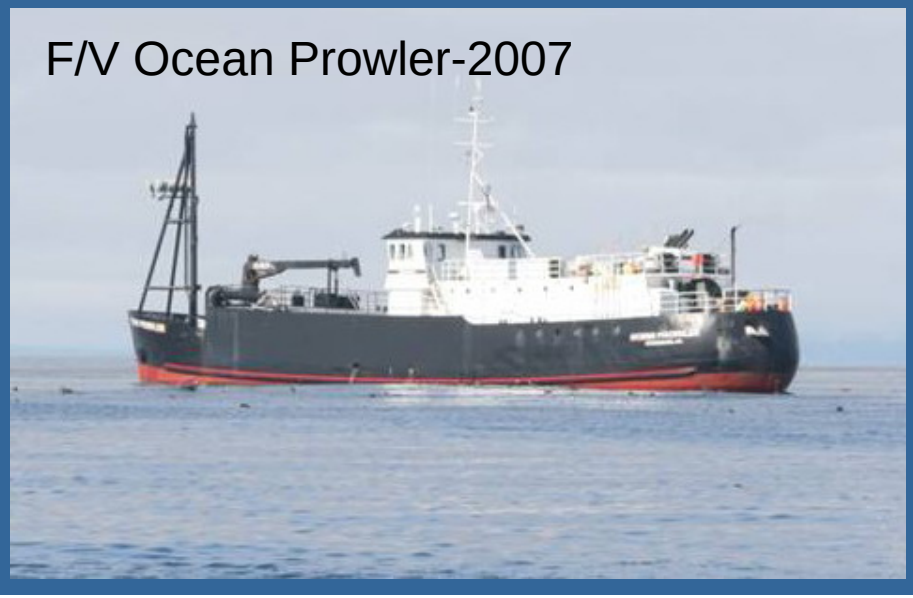
3) Now testing deterrents

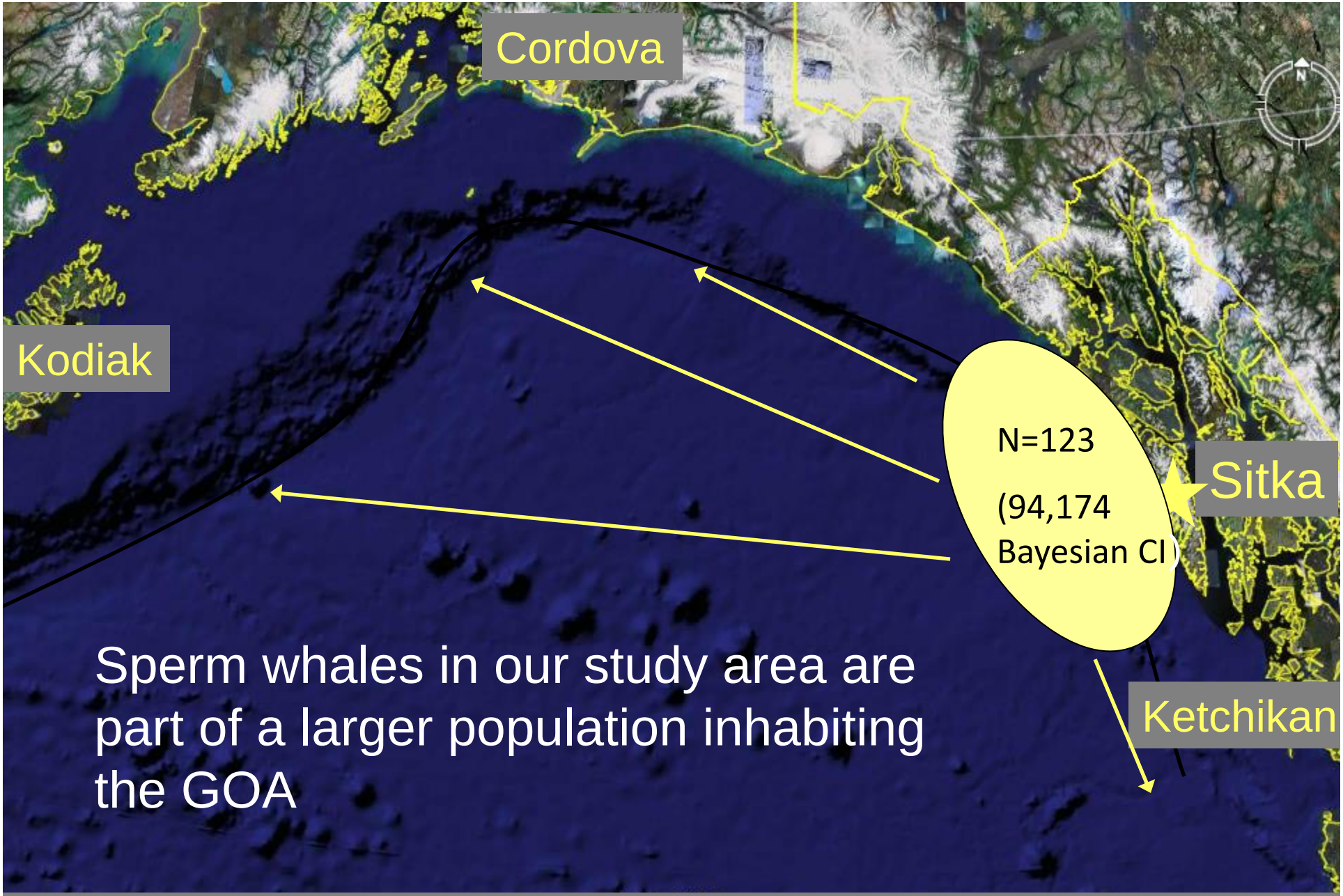
Goal: Understanding the Problem Through Acoustics

- Need observations before modifying gear, testing deterrents
- How are whales finding gear?
  - What sounds are acoustic cues?
  - How far away can whales detect gear?
- How are whales taking fish?
  - Visual or acoustic?
  - What depth are they taking fish?
- Is avoidance a viable strategy?
  - How far away can we hear whales with hydrophones?
  - Will near real time via sat tags help fishermen?

Is this a discrete group of sperm whales using the eastern GOA?

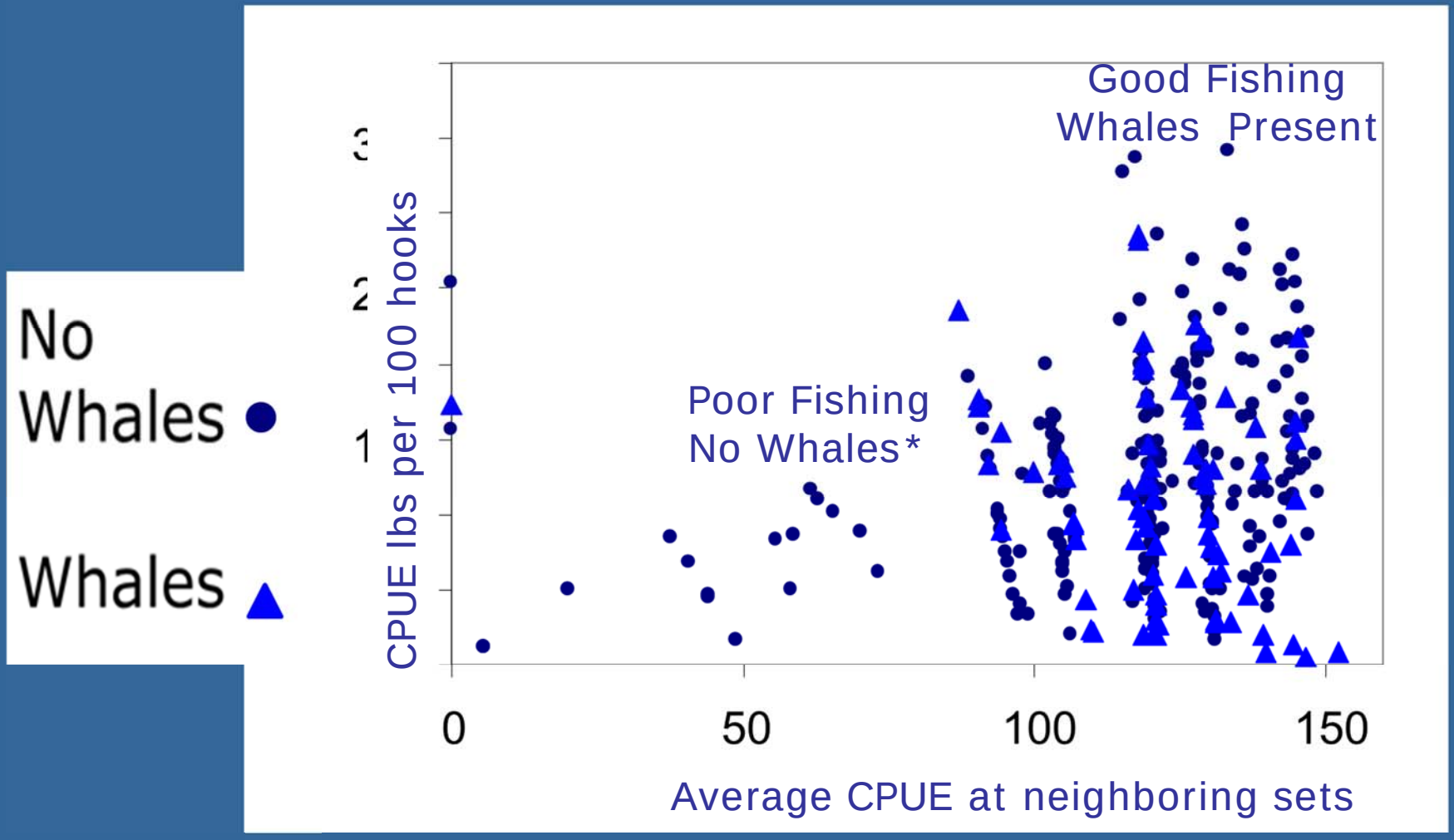
- 2003 SEASWAP (ALFA UAS SIO)
- 2006 & 2007 & 2009-12 collaborated with NOAA sablefish assessment surveys
- Collect biopsy samples
- Record the behavior of sperm whales around fishing operations
- Photo-identify sperm whales
- Acoustic deployments





Over 1/3 seen outside SEASWAP Study Area from NOAA sablefish assessment surveys

Whales and fishermen overlap temporally and spatially at better catch locations



CPUE positively correlated with average *CPUE* at neighboring sets. Whale presence located where *CPUE1* > 90. (CPUE=catch per unit effort) *one set had whales

Satellite Tags designed by Russ Andrews

Wildlife computers Spot5

- 36-42 grams
- Location only
- Remote monitoring

- Deployed using Crossbow
- Dorsal fin or dorsal ridge
- Medical-grade titanium darts

Tagged August 15 2010 off Cross Sound (repeat offenders)

SWSAT13 = GOA-023 Tagged Aug 15 2010 off the Spencer Spit (23nm west Yakobi Island)

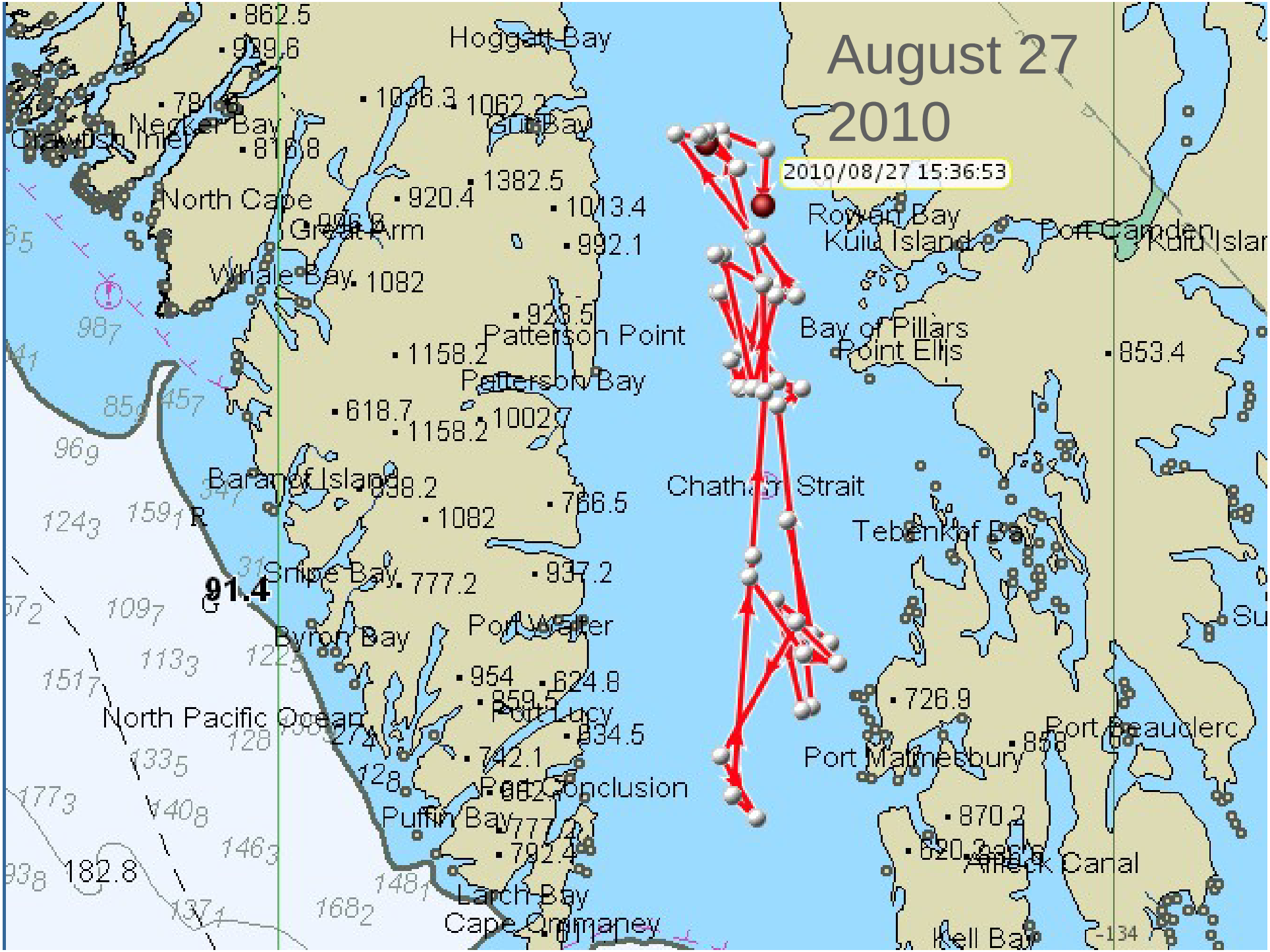
© SEASWAP 2010

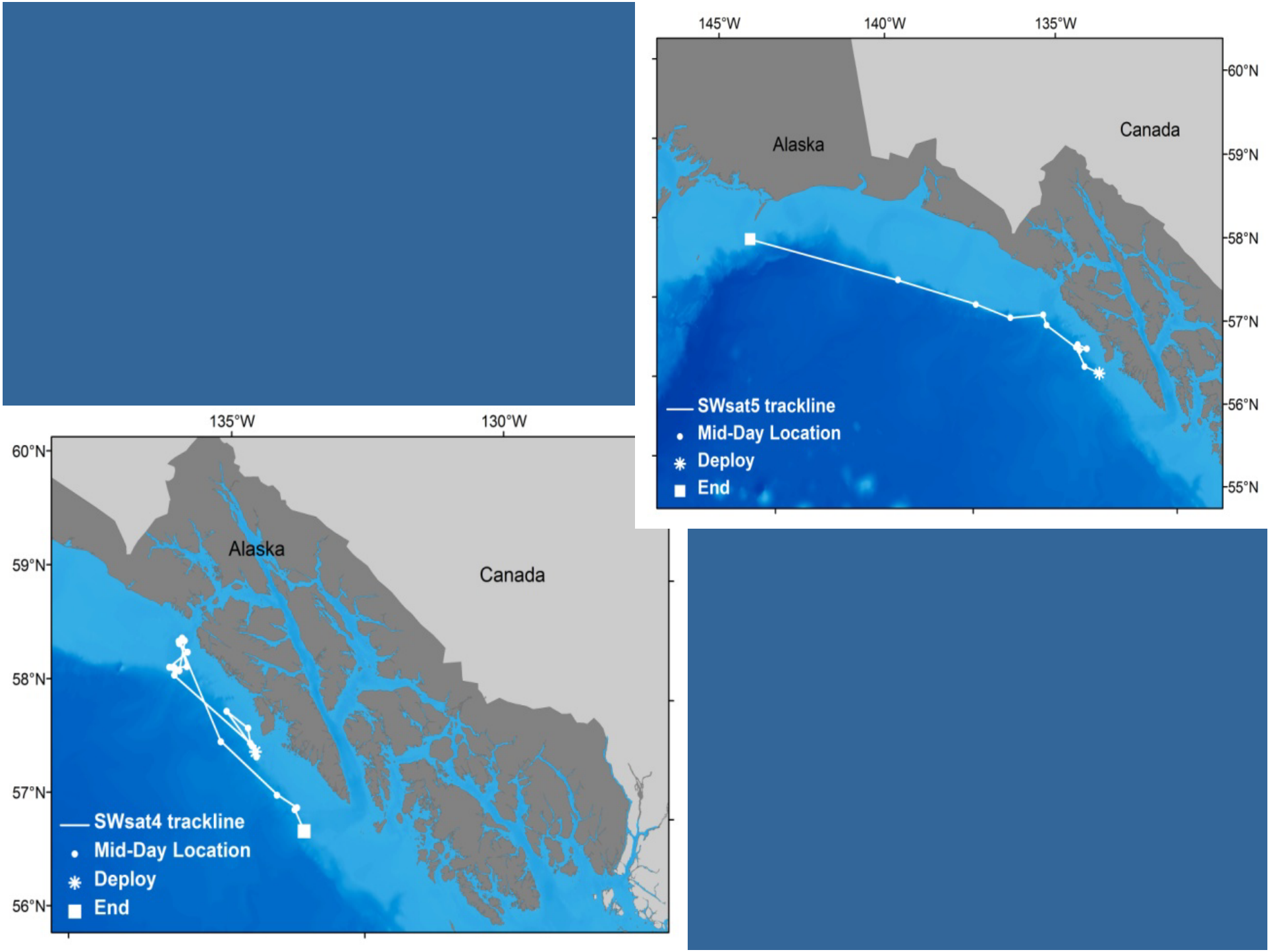
Send photos of the dorsal fin with the tag (right side) to: victoria.oconnell@gmail.com

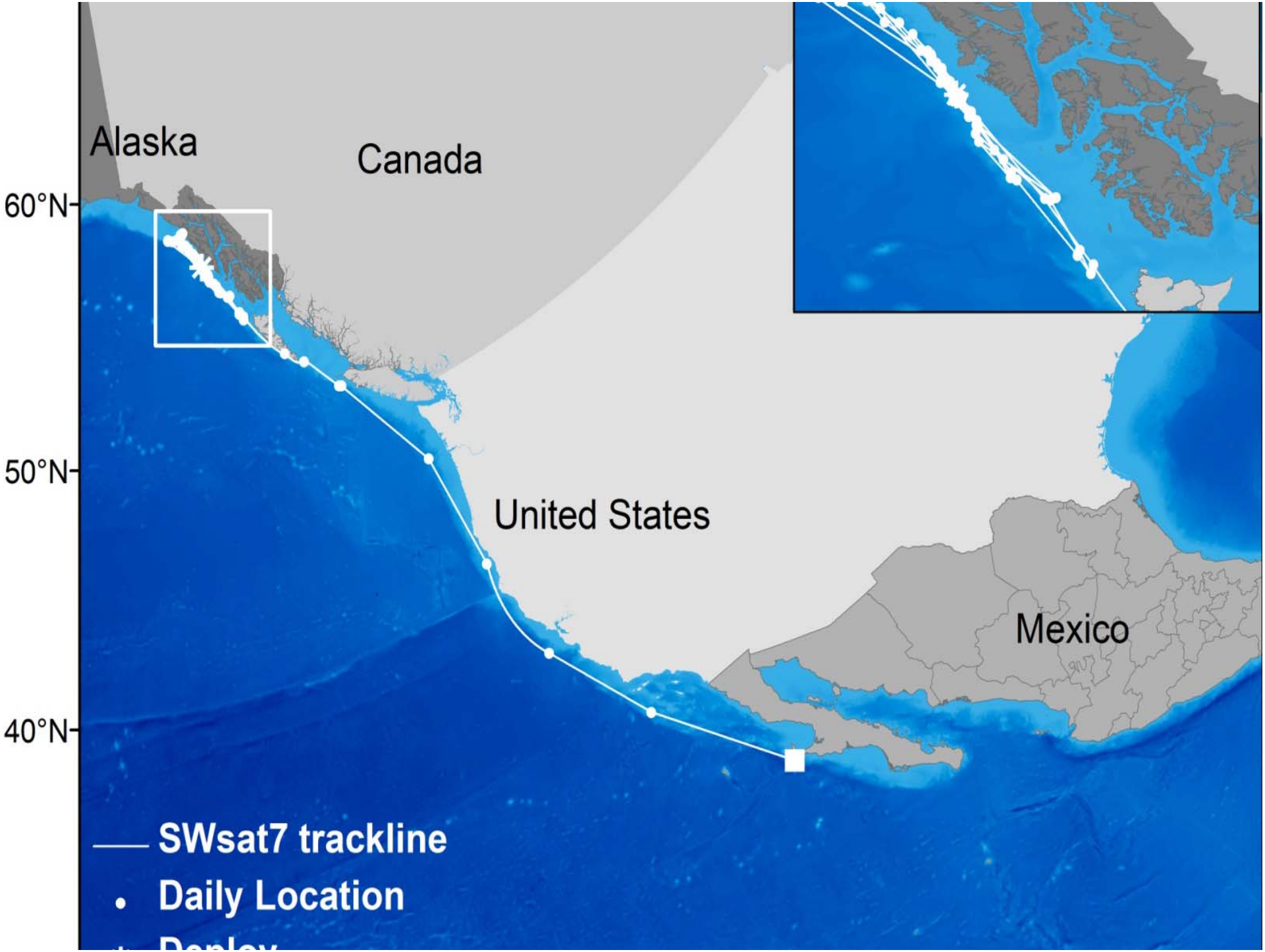
SWSAT15 = GOA-091 Tagged Aug 15 2010 off the Spencer Spit (23nm west Yakobi Island)

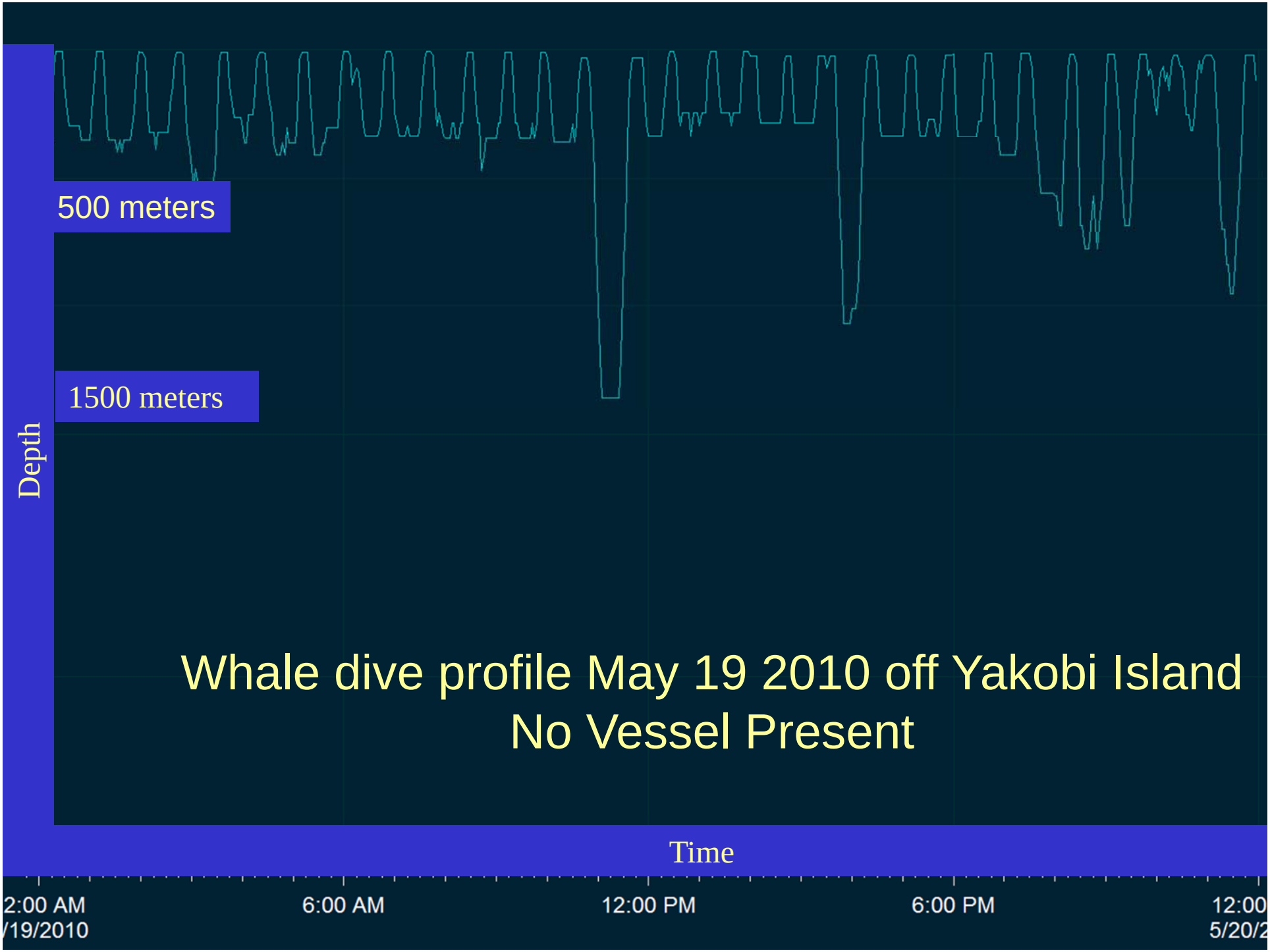
© SEASWAP 2010

send photos of the dorsal fin with the tag (right side) to: victoria.oconnell@gmail.com
SEASWAP collaborators for 2010 tagging:
Dr. Russ Andrews, Alaska SeaLife Center, University of Alaska Fairbanks


August 27
2010
2010/08/27 15:36:53
Hoggatt Bay
Necker Bay
Crawfish Inlet
North Cape
Great Arm
Whale Bay
Patterson Point
Patterson Bay
Baranof Island
Snipe Bay
Port Walter
Byron Bay
North Pacific Ocean
Port Lucy
Port Conclusion
Puffin Bay
Larch Bay
Cape Ommaney
Chatham Strait
Rowan Bay
Kuiu Island
Port Camden
Bay of Pillars
Point Ellis
Tebenkof Bay
Port Malmesbury
Port Beauclerc
Ahnek Canal
Kell Bay
91.4
862.5
1062.2
1382.5
920.4
1013.4
992.1
1082
923.5
1158.2
618.7
1002
766.5
777.2
954
624.8
859.5
934.5
742.1
792.4
182.8
726.9
870.2
853.4


145°W
140°W
135°W
60°N
59°N
58°N
57°N
56°N
55°N
Alaska
Canada
SWsat5 trackline
Mid-Day Location
Deploy
End
135°W
130°W
60°N
59°N
58°N
57°N
56°N
Alaska
Canada
SWsat4 trackline
Mid-Day Location
Deploy
End

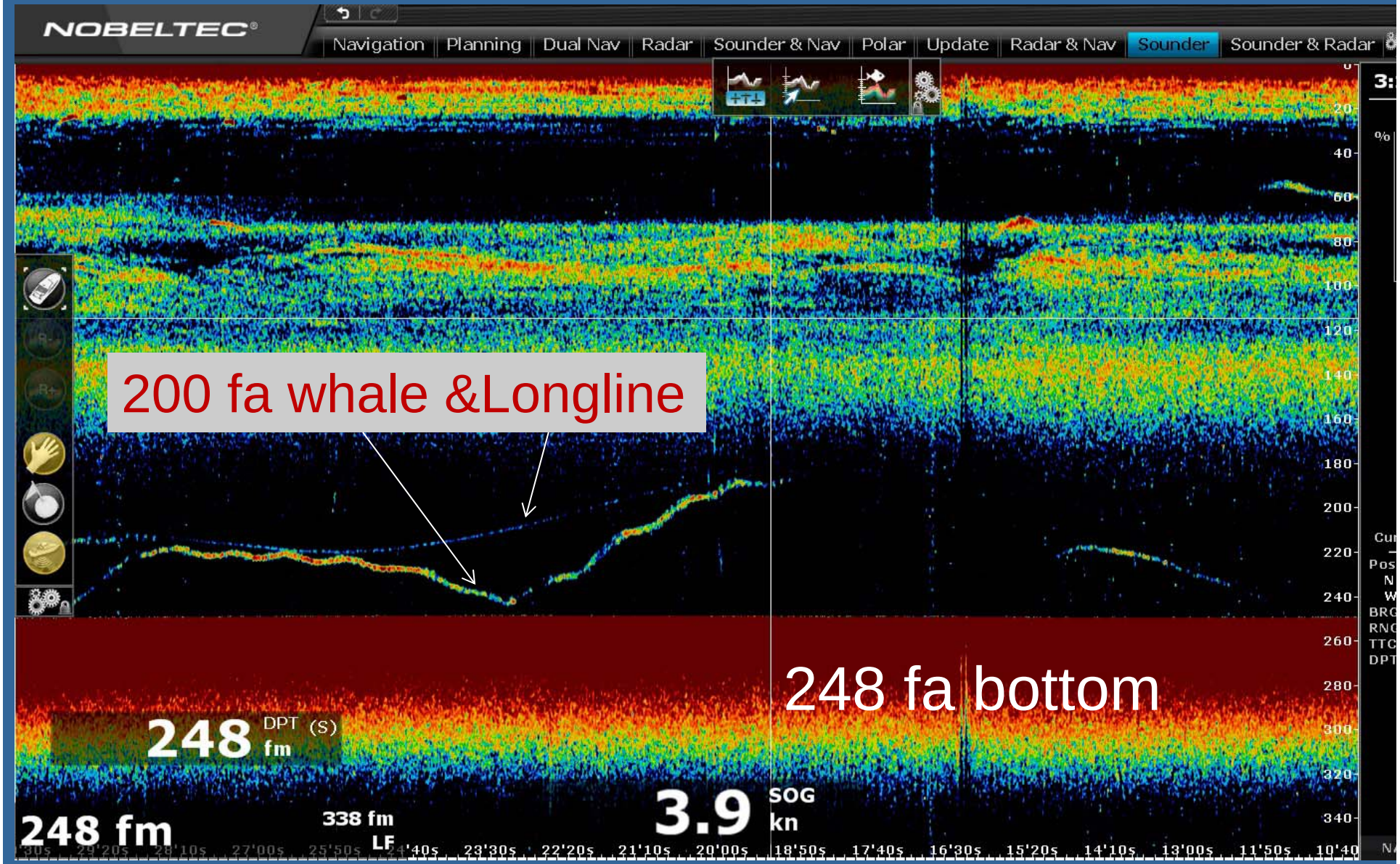

Alaska
Canada
60°N
50°N
United States
Mexico
40°N
SWsat7 trackline
Daily Location


500 meters
1500 meters
Depth
Whale dive profile May 19 2010 off Yakobi Island
No Vessel Present
Time
2:00 AM
/19/2010
6:00 AM
12:00 PM
6:00 PM
12:00
5/20/2

Other Results/Summary

- Whales found feeding offshore when no fishing boats present; presumed to be eating fish
- Depredation lowest early in season (March)
- Not all whales near vessels were eating fish off longline gear (could be eating discard or ‘spin-offs’) (cameras/sat/depth/location tags will inform)

- Conflict is overlap spatially and temporally for same resource (sablefish and halibut)
- Whales removing fish deep (200 fa) and shallow


NOBELTEC
Navigation
Planning
Dual Nav
Radar
Sounder & Nav
Polar
Update
Radar & Nav
Sounder
Sounder & Radar
200 fa whale &Longline
248 fa bottom
248 DPT (S) fm
248 fm
338 fm
LF
3.9 SOG kn
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340

Fishermen Ocean Observing Network

Other Acoustic Findings from SEASWAP:

- Whales were very vocal; clicks generated echoes off ocean floor
- Acoustic component can track whales at depth

SEASWAP

- Commercial vessels deploying recorders/design/test deterrents
- NOAA sablefish surveys deploying recorders as part of survey effort.

Industry providing financial and logistical support (ALFA and Central Bering Sea Fishermen's Association, JIP)

SEASWAP acoustic recorders designed by fishermen to monitor vessel/whale
a) behavior b) quantify deterrent

Jammers-
R&D

Bubbler

Decoy

Recorder

Beads

More information? ALFA website, NPRB http://seaswap.info & NPRB documentary (contact NPRB.org)

Photo: Nellie Warner