

Mom knows best: Killer whale culture in Prince William Sound

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Oil Spill Trustee

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AT9, "Chenega"
Born est. 1965



Photos: Dan Olsen, John Durban, taken under NMFS permit #15616

AT1 Transient Group

These three animals alive in 2013



AT7 (1989)
Male

AT4 (1974)
Paddy (female)



AT3 (1984)
Ewan (male)



AT1 TRANSIENT GROUP

These four animals alive in 2013



AT9, "Chenega"
AT1s, "Chugach Transients"



AT9, "Chenega"
Born est. 1965

calls from

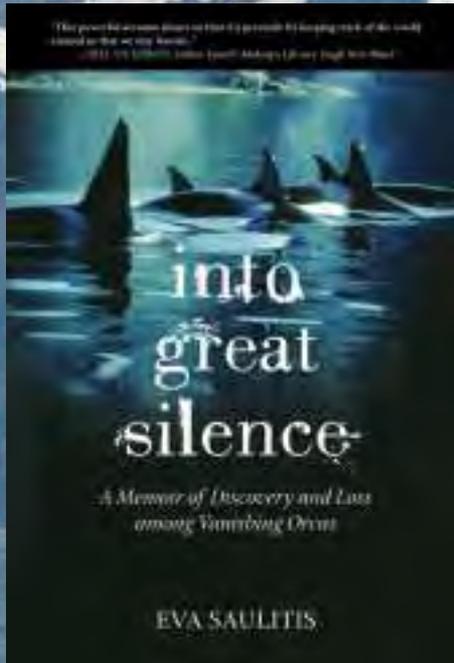
Resurrection Bay, August 13, 2004

Knight Island Passage Sept. 14, 2007



"into great silence"

Eva Saulitis



Exxon Valdez Oil Spill 1989

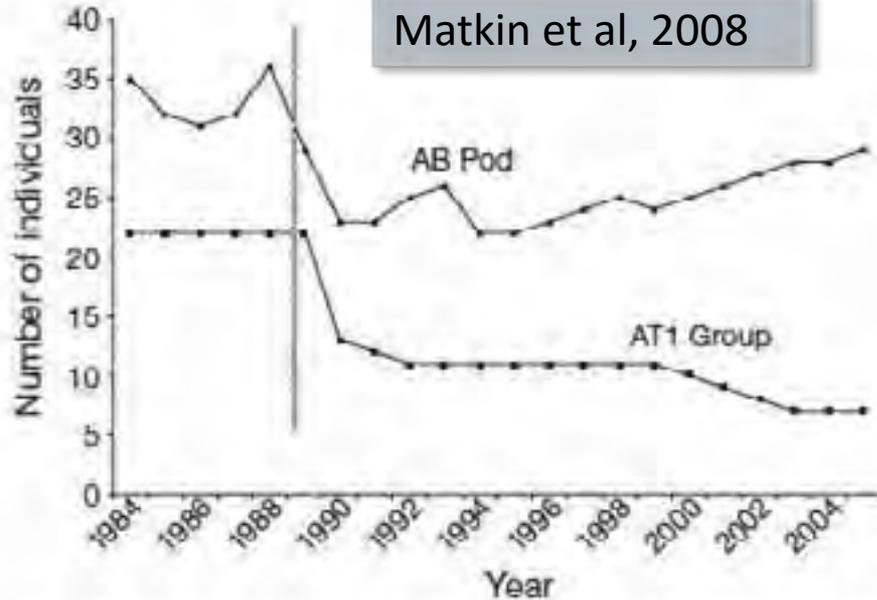


Fig. 4. *Orcinus orca*. Number of whales in AB Pod and AT1 Group 1984 to 2005 (vertical line: 'Exxon Valdez' oil spill)



Photo: LA Times

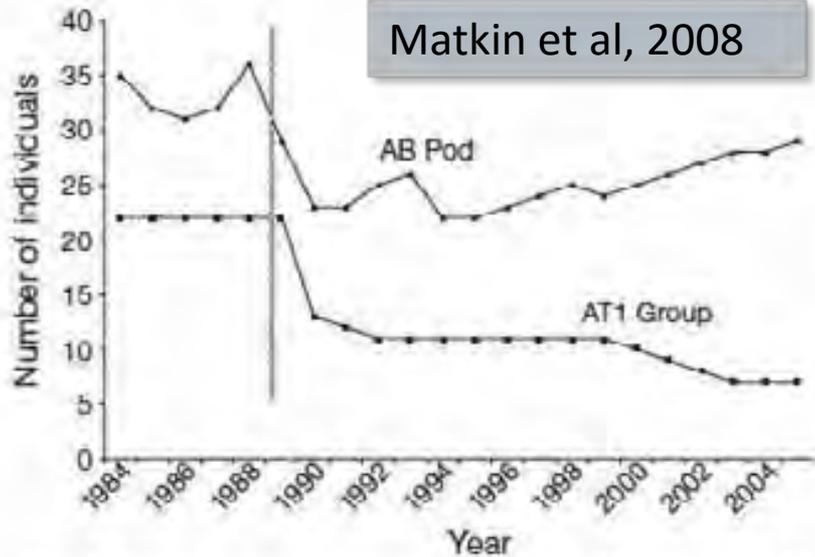
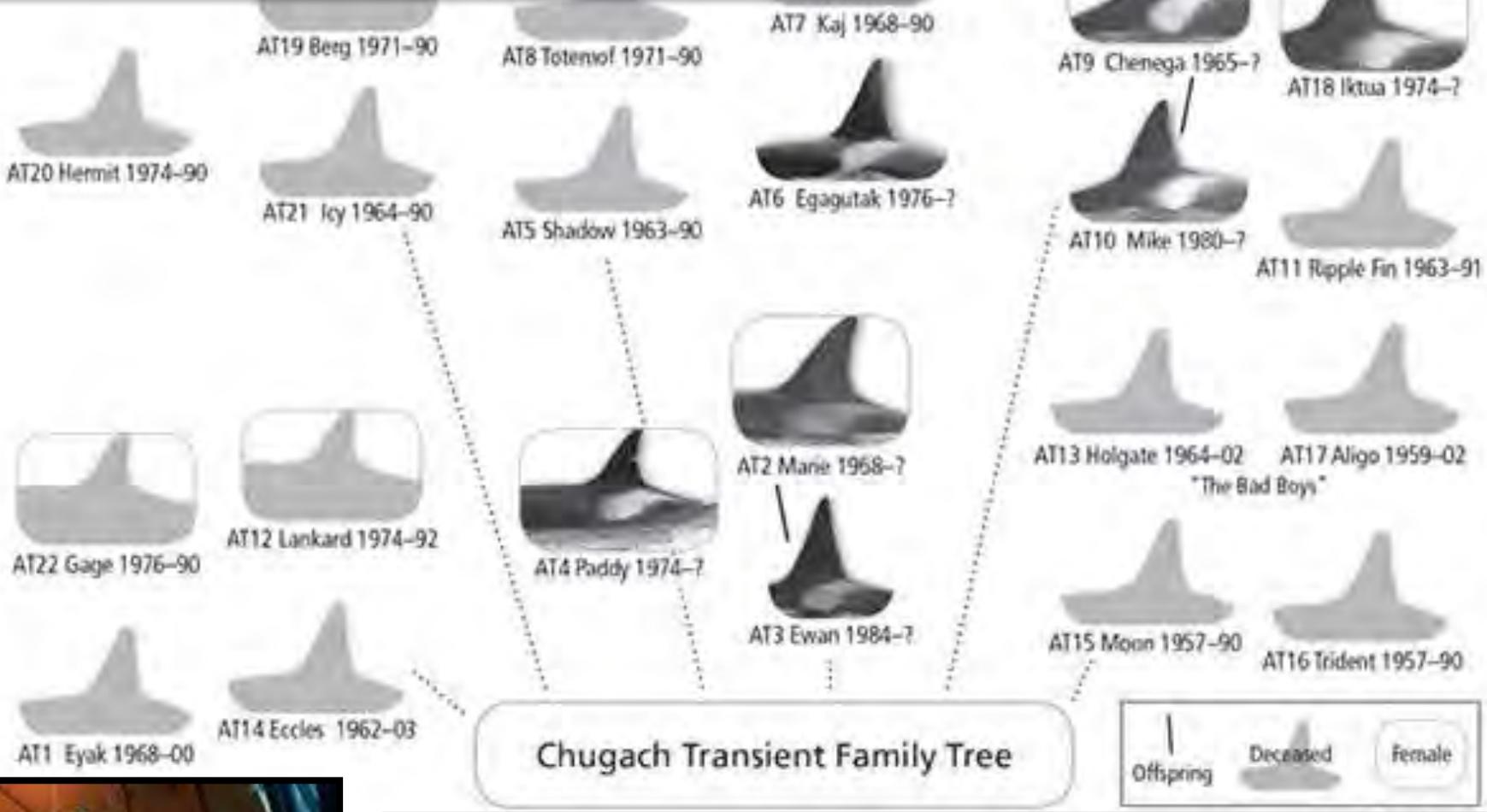


Fig. 4. *Orcinus orca*. Number of whales in AB Pod and AT1 Group 1984 to 2005 (vertical line: 'Exxon Valdez' oil spill)



AT1s, "Chugach Transients"



7 remaining from 22 whales pre-spill



Photo Identification

Population health

Genetics

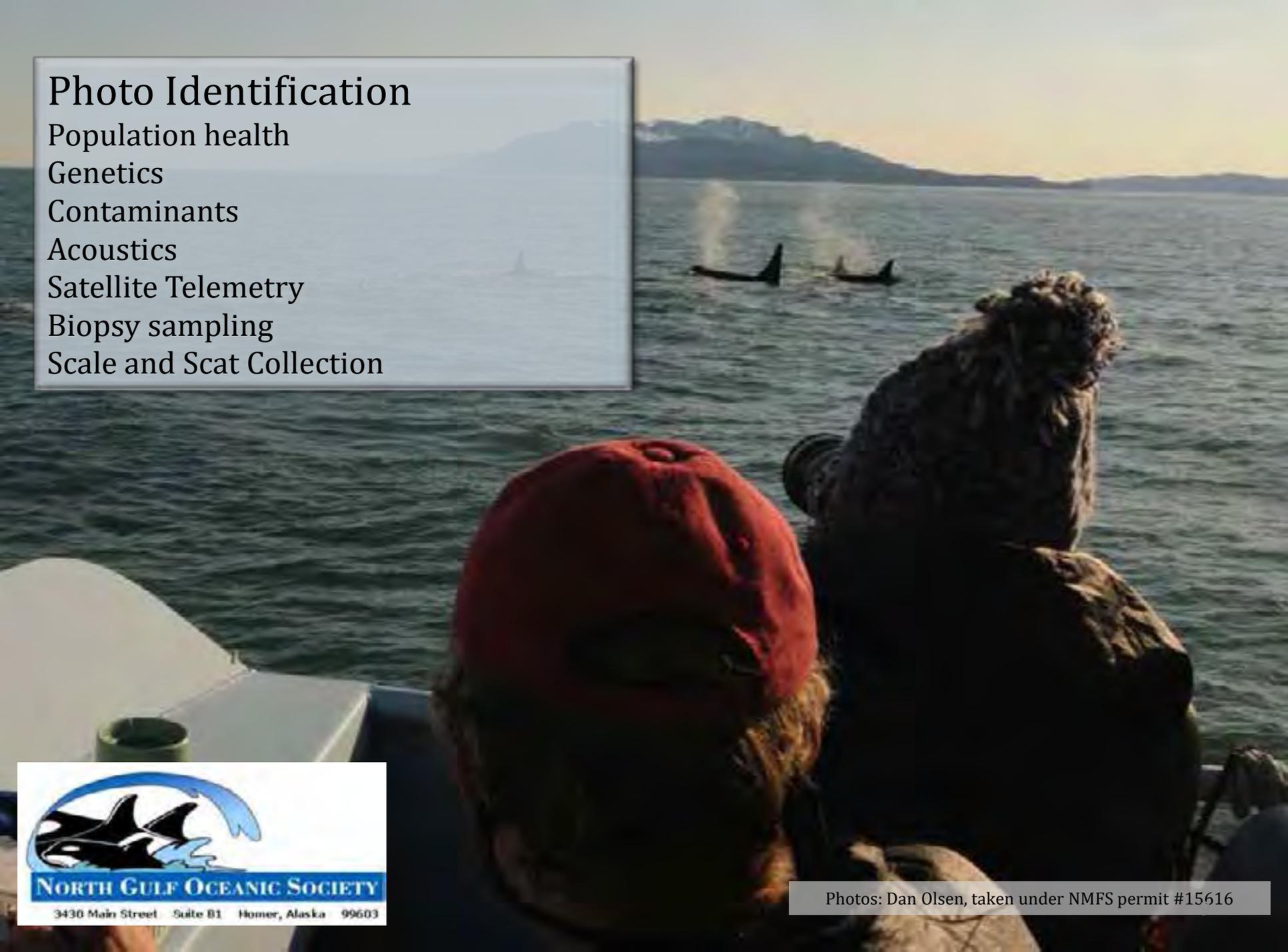
Contaminants

Acoustics

Satellite Telemetry

Biopsy sampling

Scale and Scat Collection



NORTH GULF OCEANIC SOCIETY

3430 Main Street Suite B1 Homer, Alaska 99603

Photos: Dan Olsen, taken under NMFS permit #15616

Photo Identification



Photos: D. Olsen, C. Matkin, G. Moore, taken under NMFS permit #15616

AD11 POD

AD11 (1966)
Aurora



A1319 (1981)
Harving Pete



A1377 (1996)
Angiak (male)



A1344 (2001)
Nawalek



A1348 (2017)
Rugged



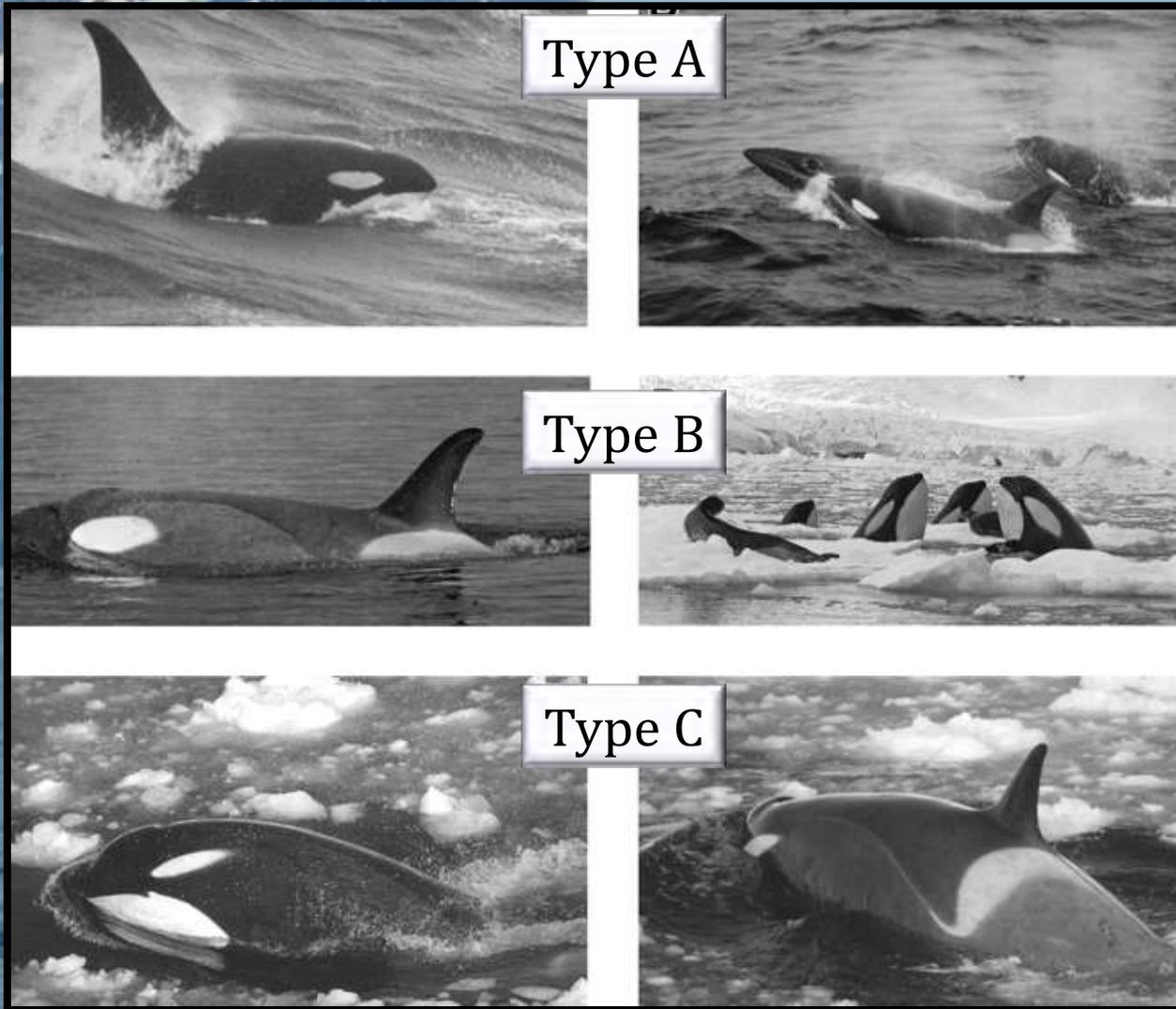
A1349 (2017)
Pippen



More than one species???



3 Ecotypes in the Antarctic A, B (large and small), C, D



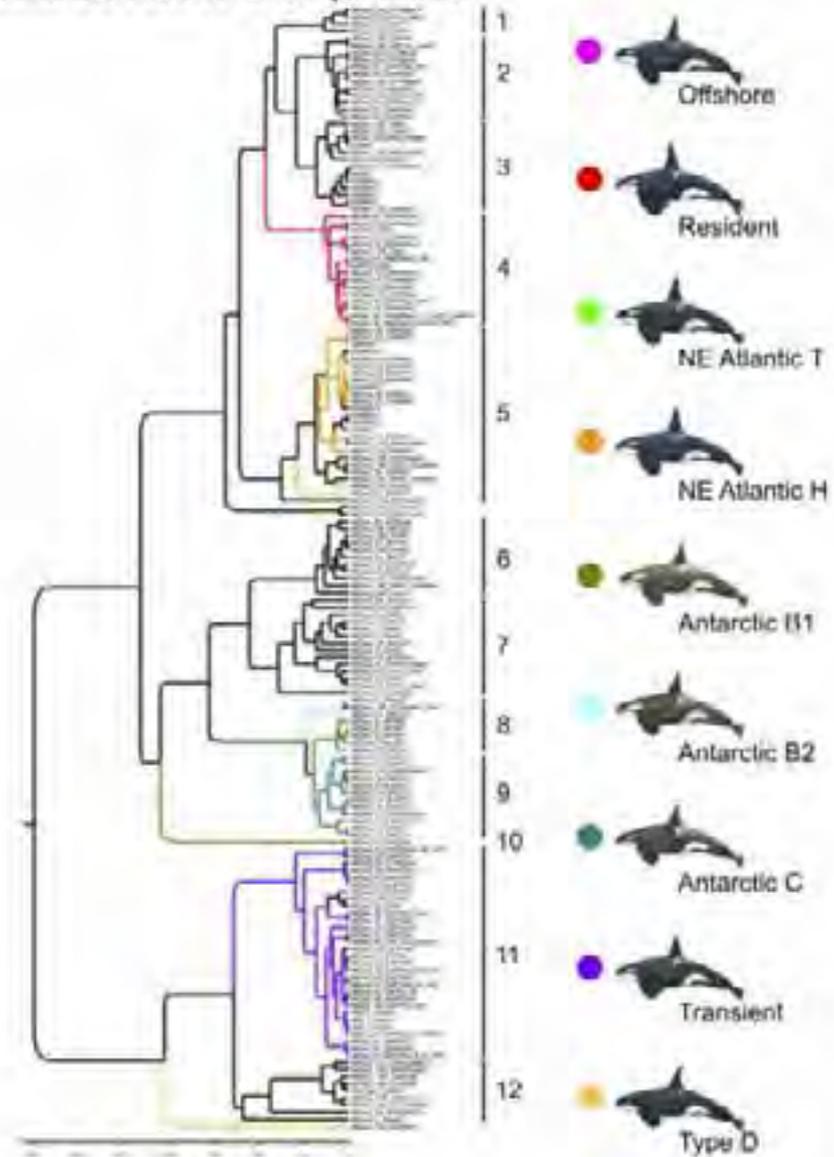
5 large type B killer whales 'wave washing' a seal cooperatively



More than
one species???

Figure S2:

This figure is the same as Figure 2 in the main text, but with sample names that indicate the haplotype ID and abbreviated geographic locations where the haplotype was found. See Table S1 for sample details.



KILLER WHALES

Northern Hemisphere ecotypes & forms

Resident Killer Whale



Bigg's Killer Whale (transient)



Offshore Killer Whale



Type 1 Eastern North Atlantic



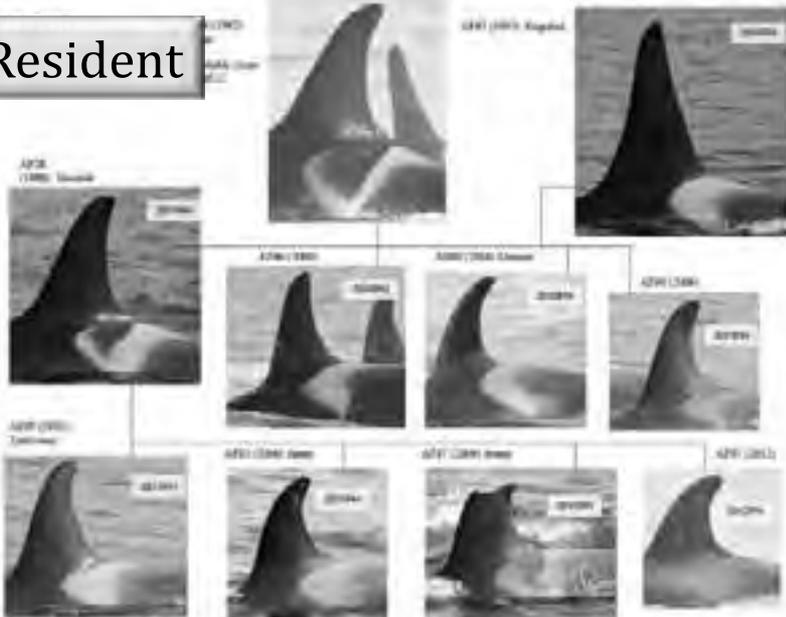
Type 2 Eastern North Atlantic



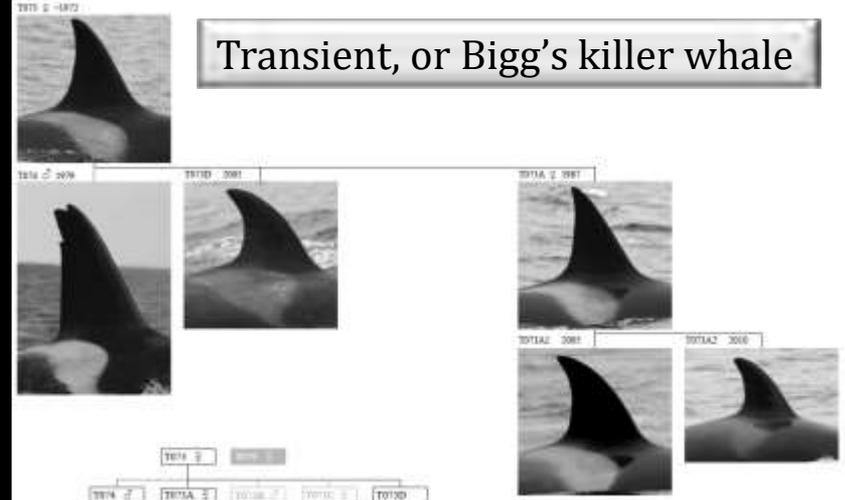
American Cetacean Society

3 Ecotypes in the North Pacific Residents, Transients (Biggs), and Offshores

Resident



Transient, or Biggs' killer whale



Offshore



Types differ by:
Group size
Behavior
Fin Shape
Saddle Patch
Acoustics

Hinchinbrook Entrance

May 13, 2015



Transients (Biggs): Quiet. Stealthy.
Mammal hunters.



Offshore killer whales



There is a lot to be learned about Offshore Killer Whales, but we know that they have a huge range (1000's of kilometers), are very vocal, travel in groups of 30-100, and eat shark!

Offshore predation on Pacific Sleeper Shark



Photos: Dan Olsen, John Durban, taken under NMFS permit #15616

AD11 POD

AD11 (1966)
Aurora



Resident (Piscivorous) calls
Mother's call repeated by calf

A1319 (1981)
Herring Pete



2011PH
201081
199508?

A1377 (1996)
Angiak (male)



2014PH
201081

A1344 (2001)
Nawalak



2014PH

A1348 (2017)
Rugged



2014PH



2014PH

A1349 (2017)
Pippen



Resident (Piscivorous) calls
Mother's call repeated by calf

Resident (Piscivorous) calls Missing Mother



AD22 (1993)
Skana



AD37 (2004)
Brit



AD42 Little Mary Lowell (2007)



AD47
Veresbegan
(2011)



AD35 (2001)
Tantlek



Photos: North Gulf Oceanic Society,
taken under NMFS permit #15616



AK POD

AK6 (1917) *Tina*
DEAD 2018

AK3 (1948)
Ive

AK7 (1978)
Claval

AK17 (1961)
Low



AK17 (1997)
Eldorado (male)

AK14 (1998)
Sasha

AK18 (2002)
Spa



AK24 (2011)



Similar sounding calls by
cousins

AK POD

(2 generations in 2011)

AK2 (1948)
Therese



AK1 (1985) *Evel*



AK19 (1985) *Sasha*



AK10 (1985) *Quinn*



AK13 (1985) *Olivia*



AK17 (1985) *Elle*



AK18 (1985) *Spa*

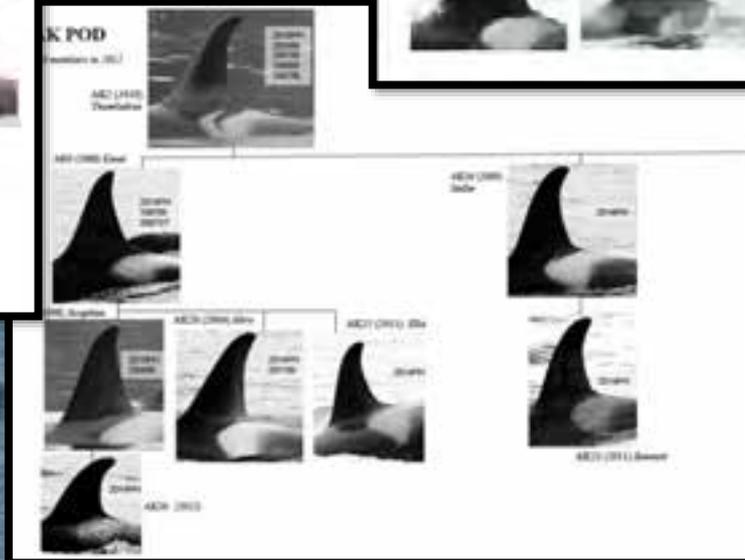
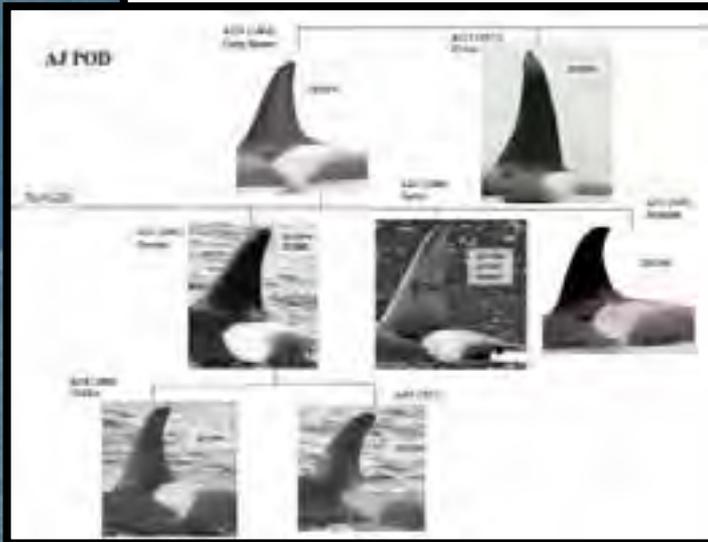
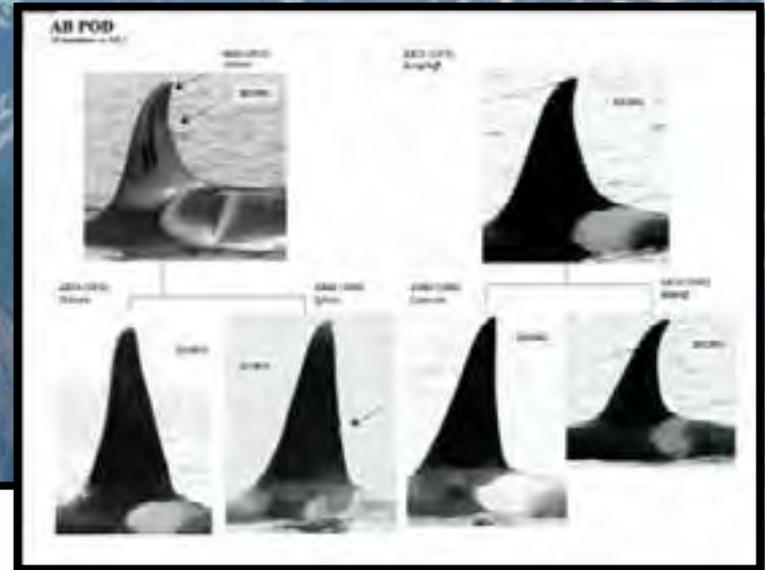
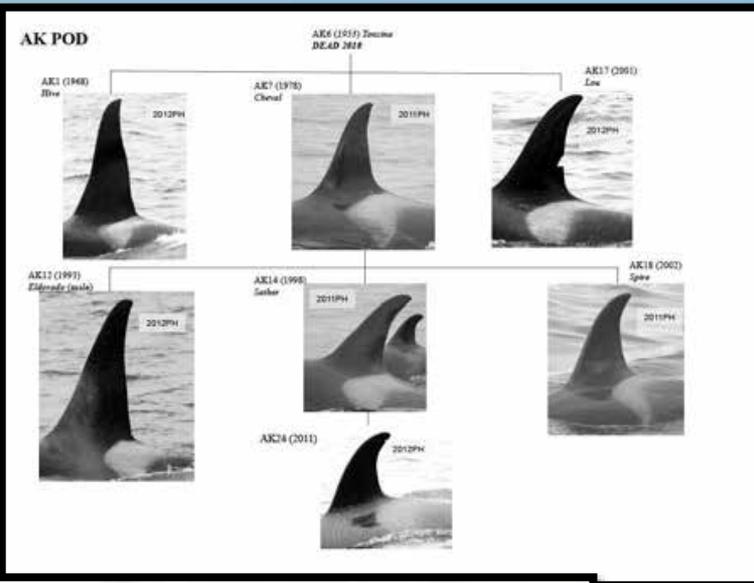


AK20 (2011) *Shannon*

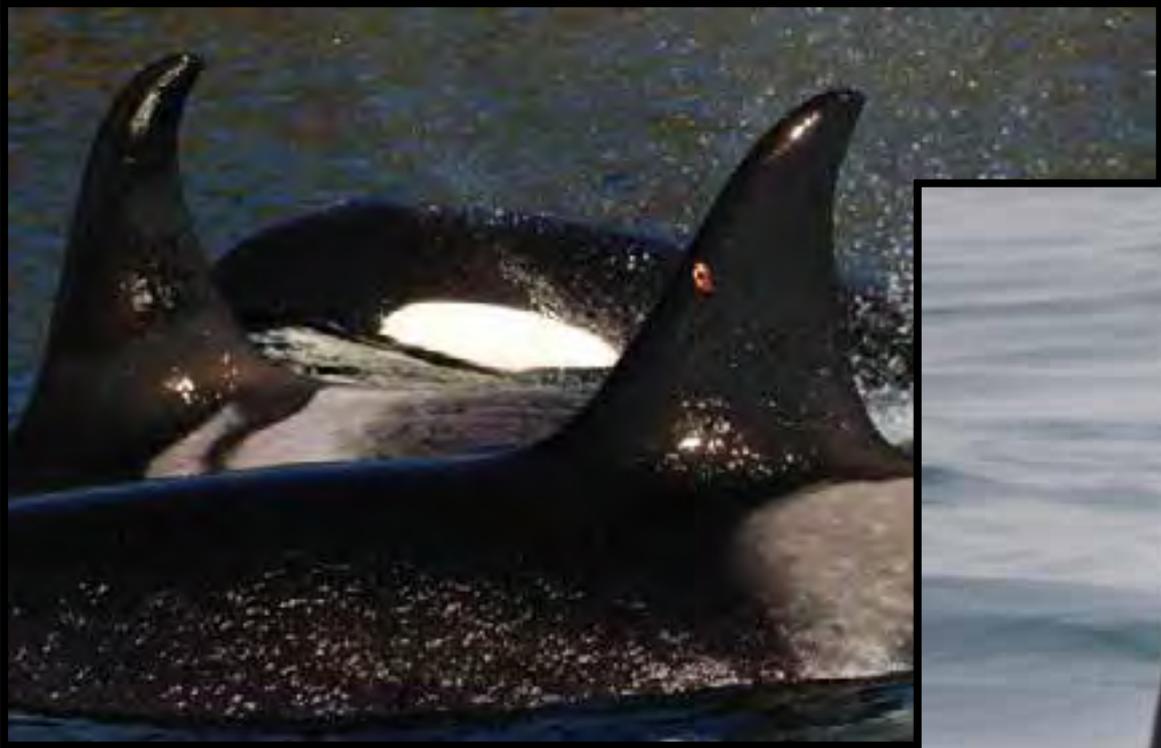


AK21 (2011)

Calls during
superpod!



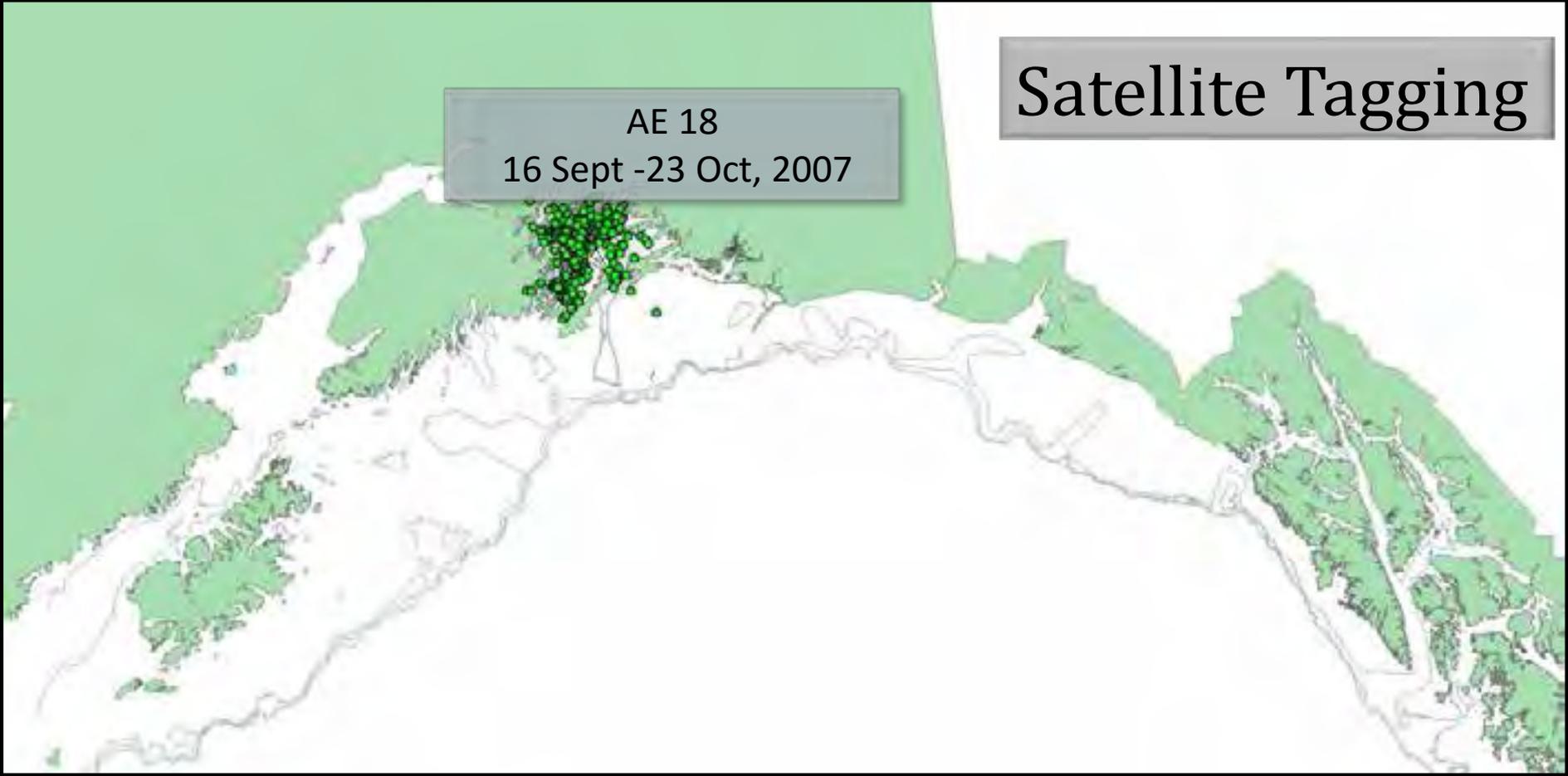
Satellite Tagging



Photos: Craig Matkin, taken under NMFS permit #15616

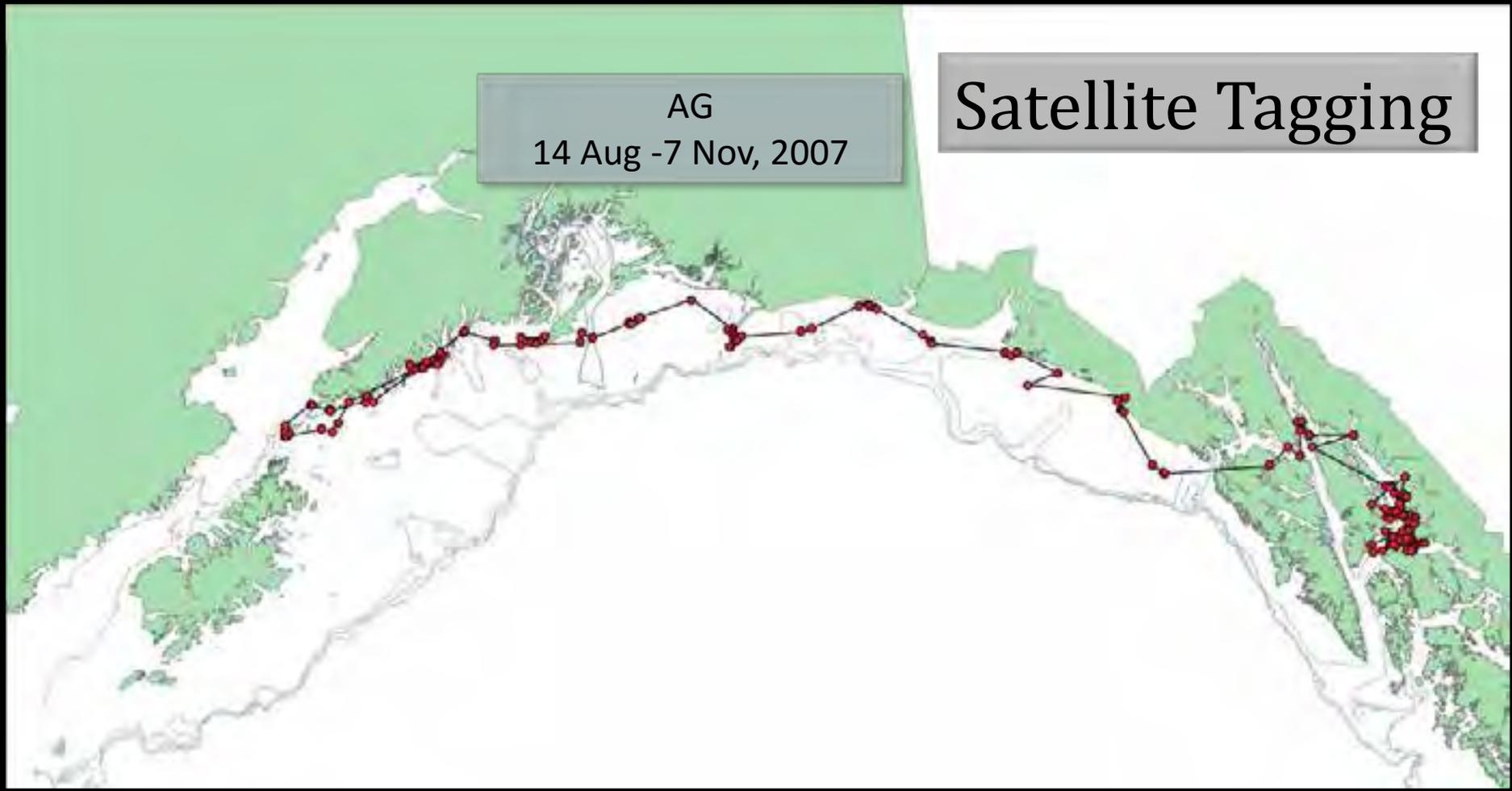
Satellite Tagging

AE 18
16 Sept -23 Oct, 2007



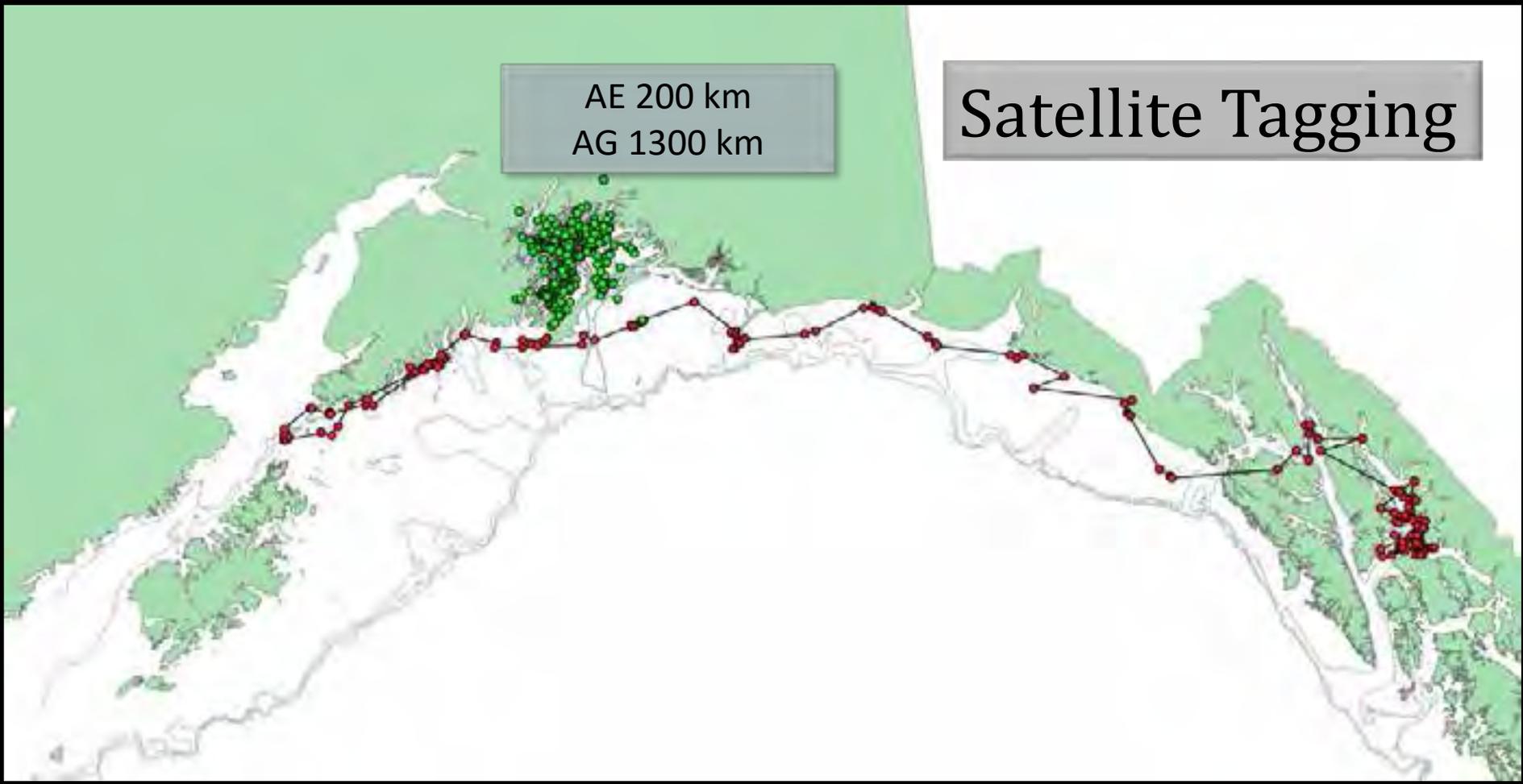
Satellite Tagging

AG
14 Aug -7 Nov, 2007



Satellite Tagging

AE 200 km
AG 1300 km



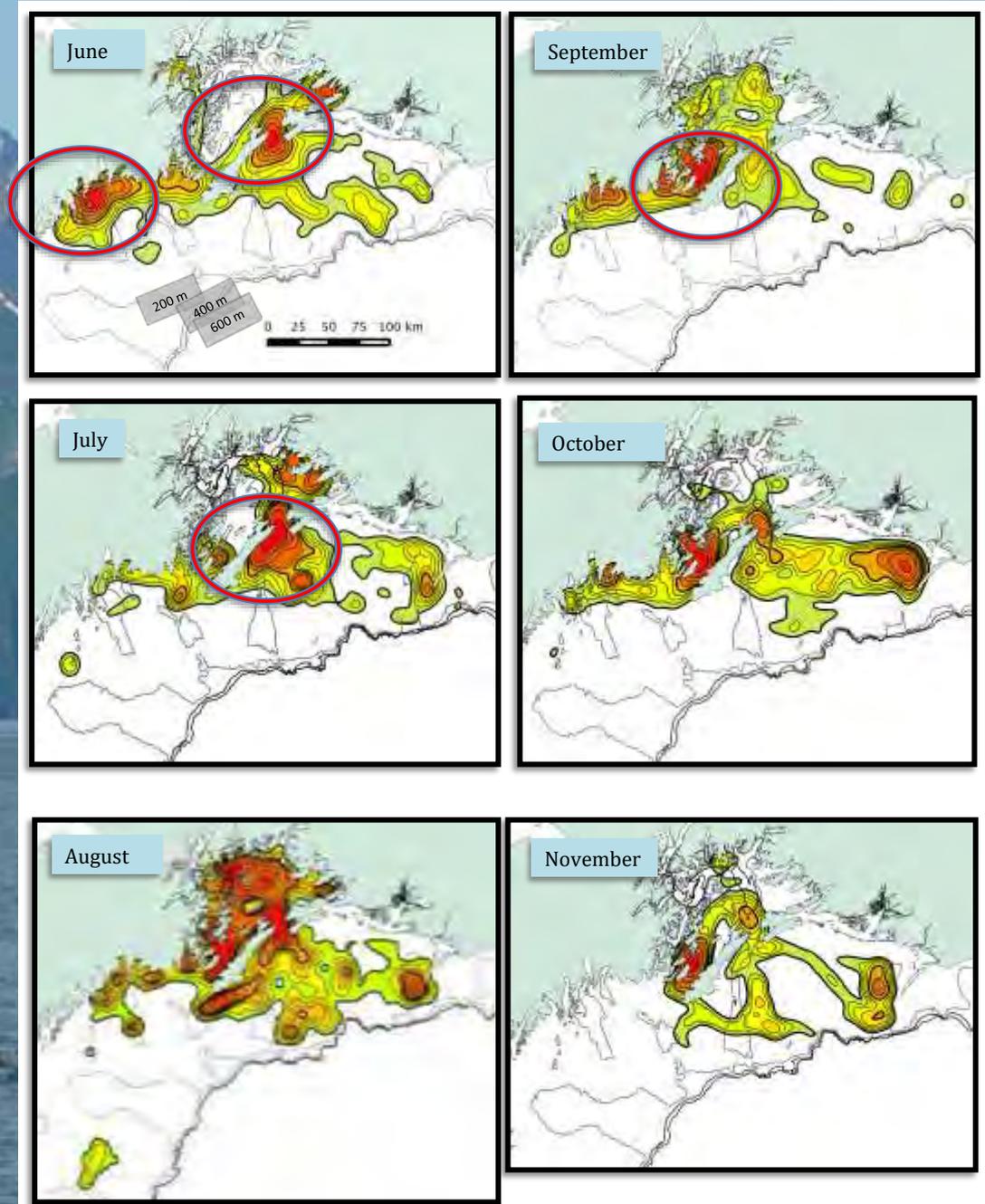
Variation by Season

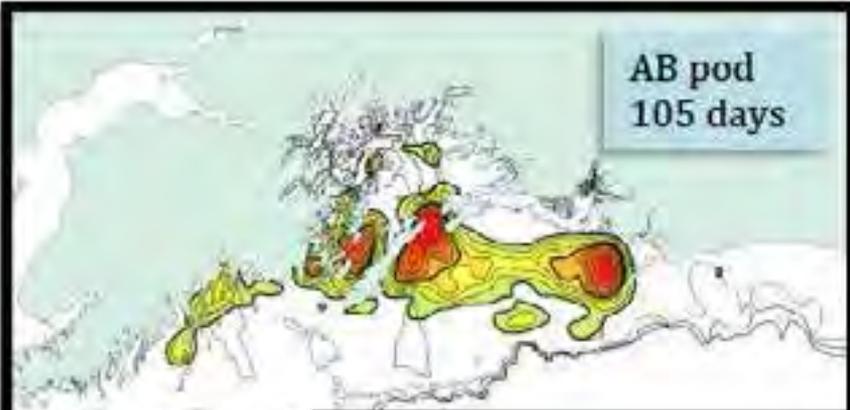
Hot spots have a strong seasonal component, and appear to be related to seasonal returns of Chinook, Chum, and Coho salmon.

June in Resurrection Bay is likely related to returning Chinook salmon.

June and July in Hinchinbrook Entrance is likely related to returns of Chum salmon.

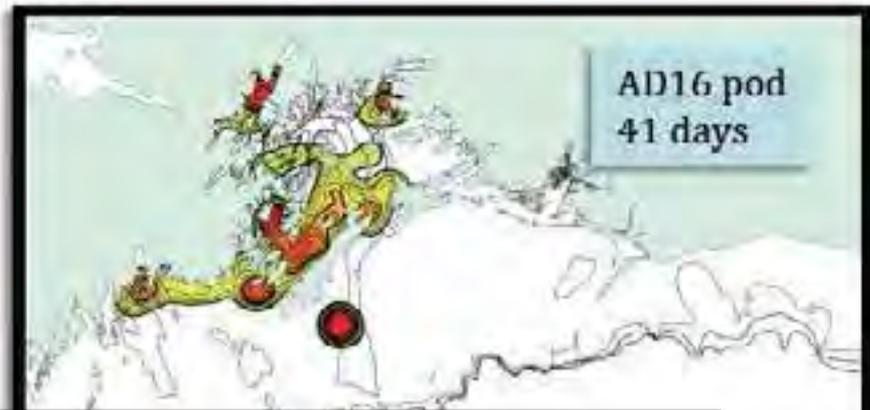
Diffuse habitat use in August is likely related to returns of Coho salmon.





AB pod
105 days

This map shows the activity of the AB pod over 105 days. The activity is concentrated in the offshore shelf and the entrances to Prince William Sound, indicated by yellow and red shaded areas. The pod's path is shown as a series of connected points.



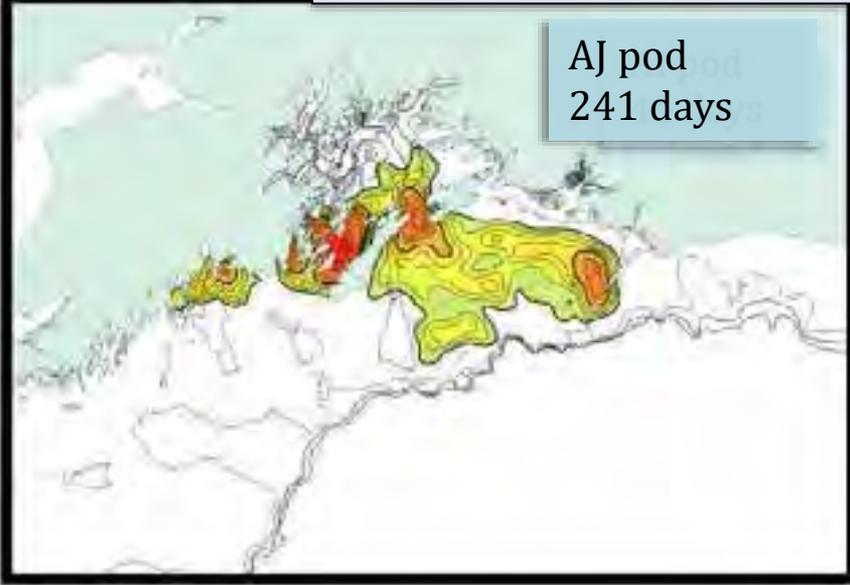
AD16 pod
41 days

This map shows the activity of the AD16 pod over 41 days. The activity is concentrated in the inshore and inside waters, long fjords, indicated by yellow and red shaded areas. The pod's path is shown as a series of connected points, with a prominent red dot in the lower right.

Variation by pod

AB, AJ pods used offshore shelf and entrances to Prince William Sound.

AD16, AK pods used inshore and inside waters, long fjords.



AJ pod
241 days

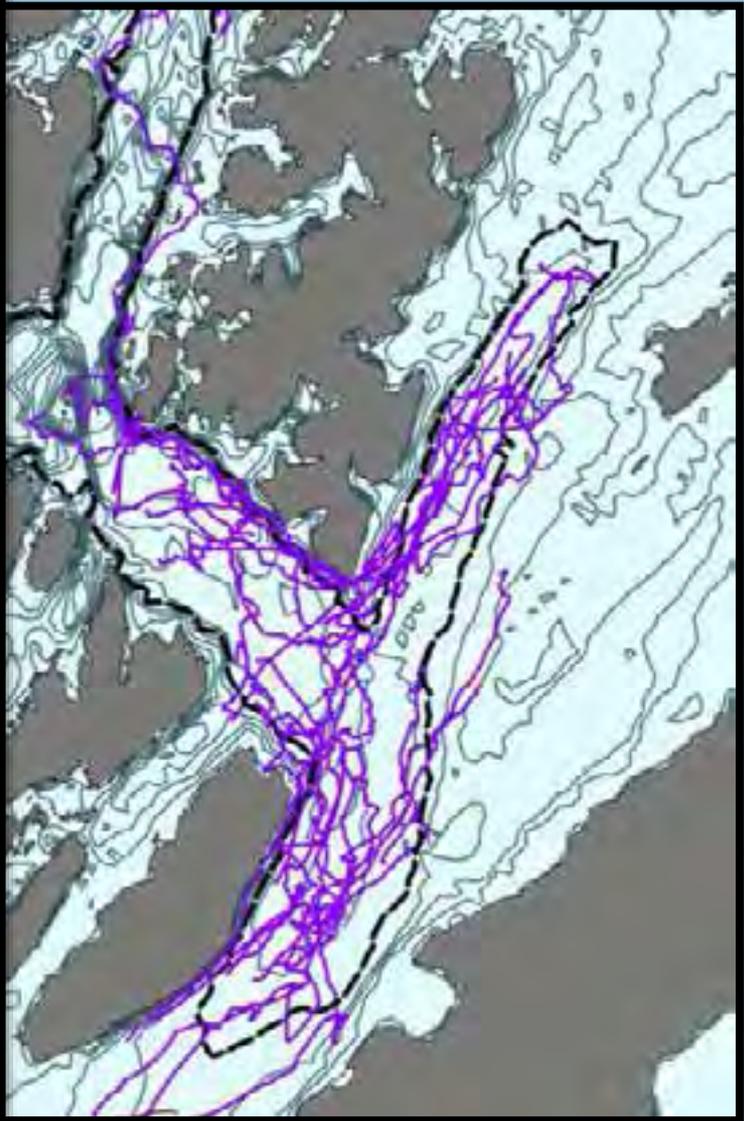
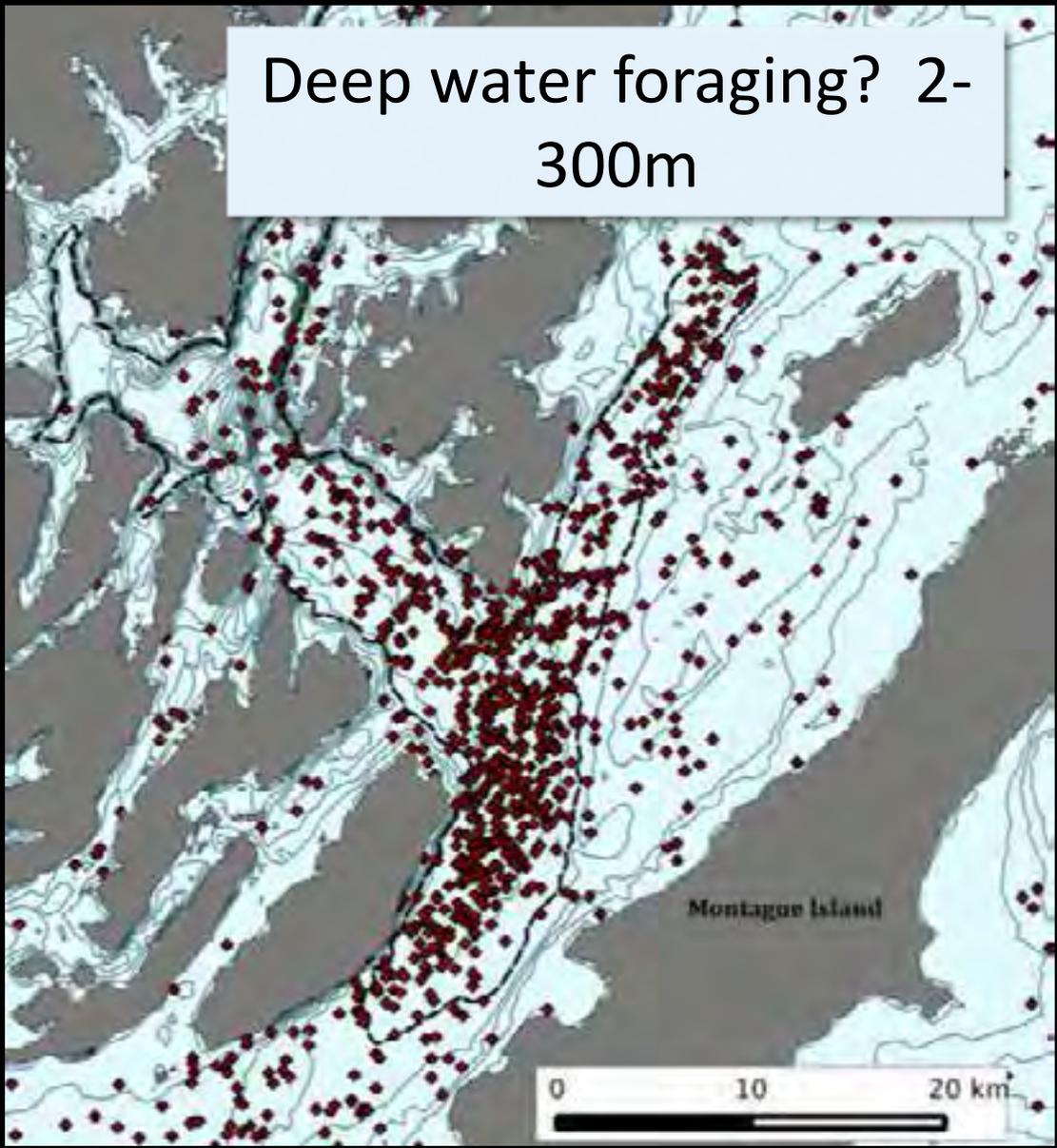
This map shows the activity of the AJ pod over 241 days. The activity is concentrated in the offshore shelf and the entrances to Prince William Sound, indicated by yellow and red shaded areas. The pod's path is shown as a series of connected points.

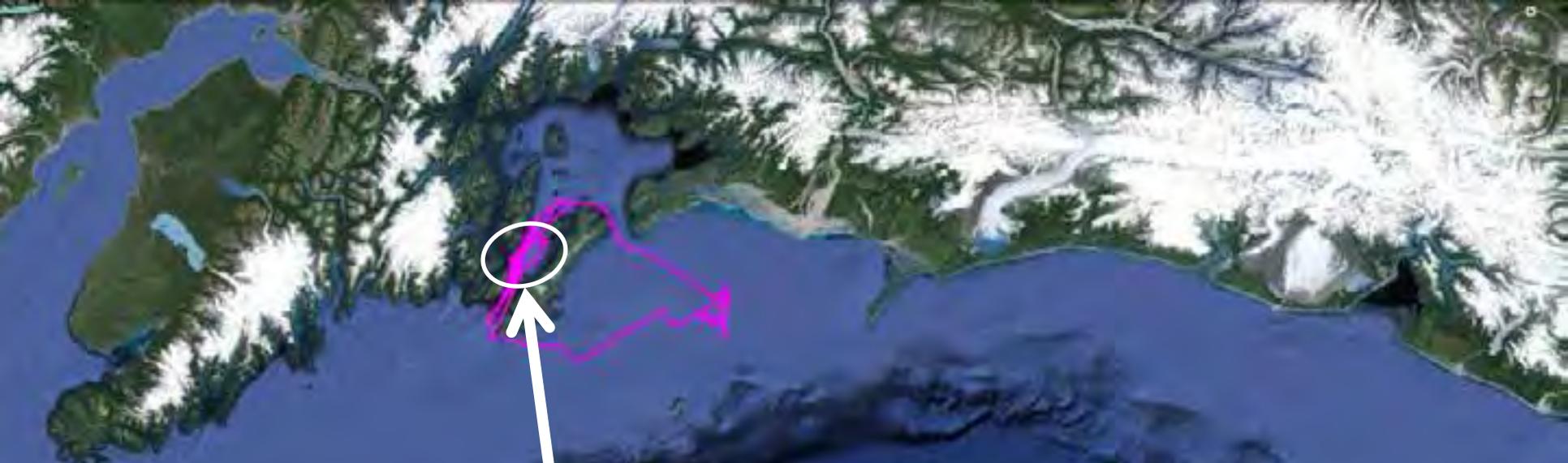


AK pod
93 days

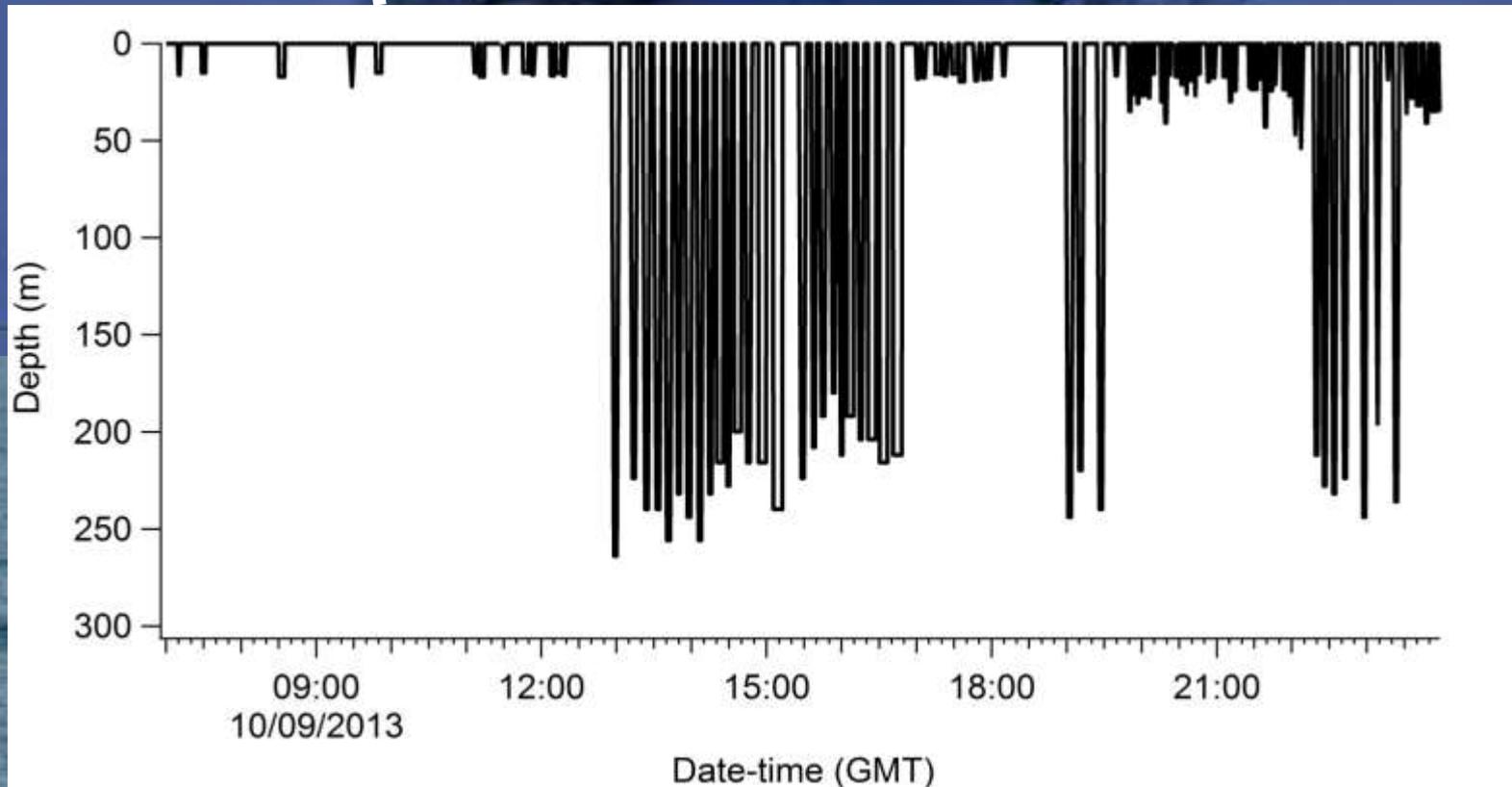
This map shows the activity of the AK pod over 93 days. The activity is concentrated in the inshore and inside waters, long fjords, indicated by yellow and red shaded areas. The pod's path is shown as a series of connected points.

Deep water foraging? 2-300m





AJ36



Future Research:

-  Hydrophones in PWS/ winter use
-  Scat collection
-  Stable isotopes/ fatty acids
-  Contaminants
-  Collaboration with salmon studies



Thank you!

Identification photos to contribute?

Dan Olsen

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Questions?



Photos: Nick Docken February 27, 2016

“A Killer Whale cannot be properly depicted or described except as an enormous mass of flesh armed with savage teeth.” Pliny the Elder, circa AD 77–79

Orcinus Orca

Aaxlu (Inuit)

Cetacean

killer whale

Takxukua (Chugach)

dolphin

whale

blackfish

Keet (Tlingit)

Orca

grampus

Skana (Haida)