

Photo-identification of Beluga Whales in Upper Cook Inlet, Alaska

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The Photo-Id Team

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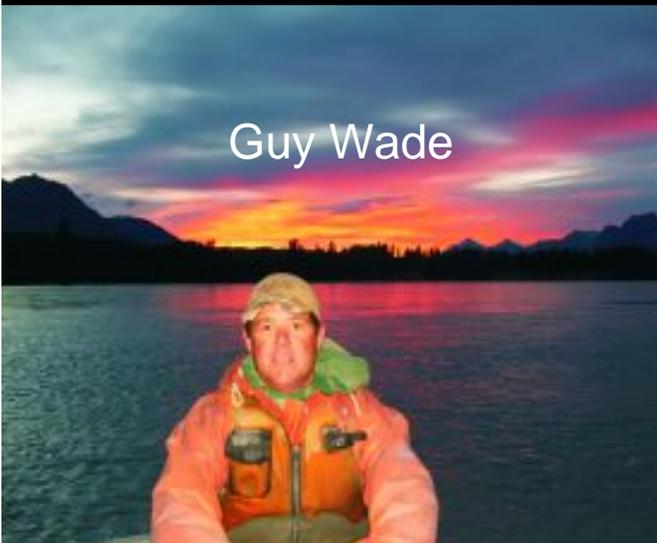
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Jennifer Goertz

Shane StClair, Axiom

Behind-the-Scenes Team

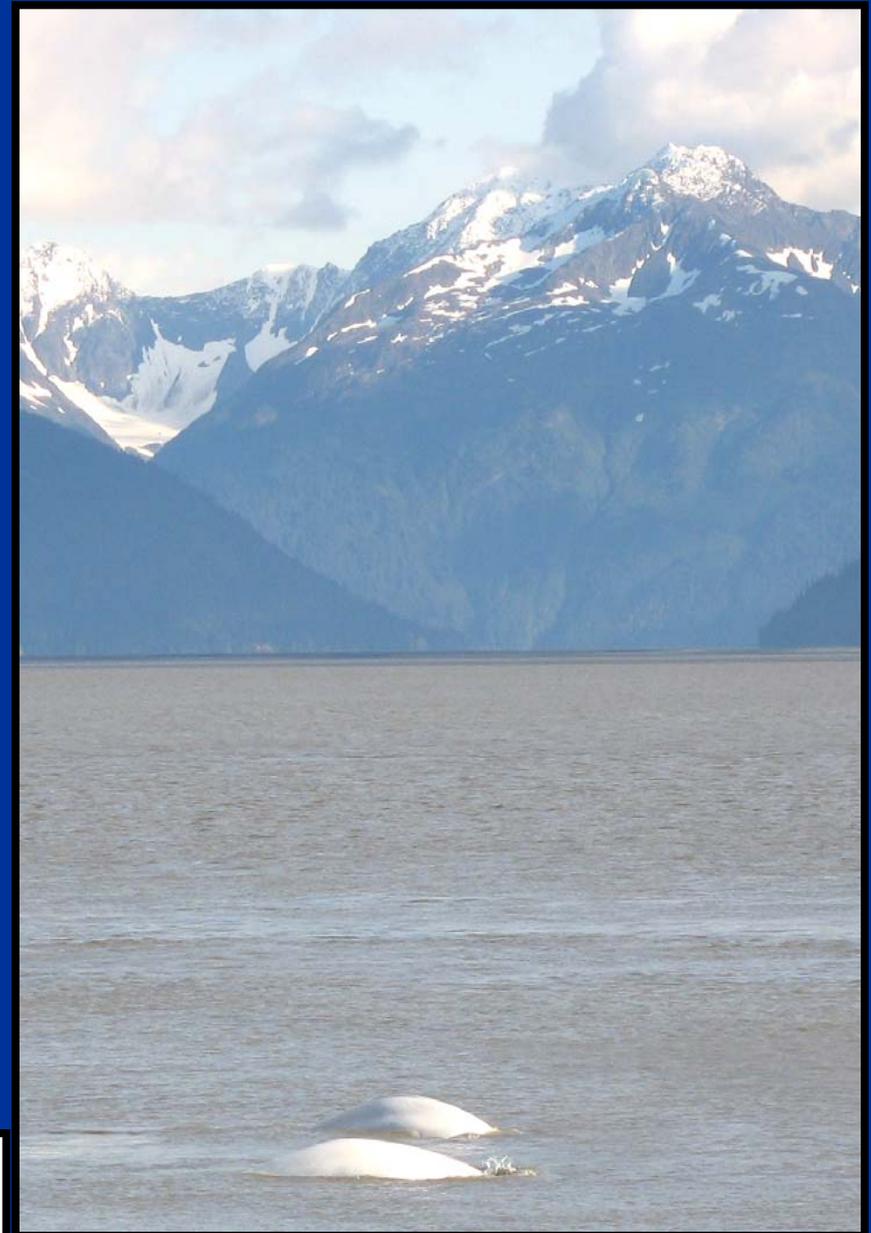
- **Sponsors:**

- National Fish and Wildlife Foundation
- Chevron
- ConocoPhillips Alaska, Inc.
- NOAA
- USFWS
- LGL

The North Pacific Research Board

- **Special thanks to:**

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NMFS Cook Inlet Beluga Whale Science Conference

Mandy Migura, Barb Mahoney NMFS
Keri Lestyk, Steve Robey URS



Turnagain Arm/Chickaloon Bay, September 2008

Talk Outline

- Background
- Objectives of the Study
- General Methods
- General Results



please note slide numbers for questions

Cook Inlet Beluga Whales

- Considered a Distinct Population Segment
- Recently listed as an Endangered Species
- More information needed about:
 - Habitat use
 - Movement and residency patterns
 - Reproduction
 - Mortality
 - Population health and threats

Different Methods Used to Study Cook Inlet Beluga Whales

	Strengths	Limitations
Satellite tags	Can track whale constantly over life of tag. Individuals are identified.	Tag life limited to <1 year. Tags are invasive, whales must be captured.
Aerial surveys	Gives an over-all snapshot of where all of the whales are in Cook Inlet on same day. Population size and distribution.	Conducted for a few days each June and August. Can't identify individuals.
Acoustics	Can often hear whales that can't be seen. Can be conducted remotely, year-round. Indicates presence of whales.	Can't detect quiet whales. Limited range of detection. Can't tell how many in a group.
Photo-id	Can track whales over years. Whales are not captured. Individuals are identified.	Can only conduct boat-based surveys during ice-free months. Will only know where whales were during survey.

Photo-id Study Objectives

1. Determine if individual beluga whales can be identified from photographs of naturally-occurring marks
2. Build a photo-id catalog of marked individuals and track them over time
3. *Use re-sight histories to study habitat use, movement and residency patterns, reproduction, mortality, group age structure, and social structure*
4. Use re-sight histories to develop a population estimate

Why photo-identification?

- Allows us to study whales as individuals
- Individuals may be followed over time
- Individuals may be assigned to groups
 - mothers and calves
 - geographic sub-groups

Individuals -> groups-> population

Why photo-identification?

- “Tag-like” life history of individuals
- No handling of whales required
- Marks last longer than tags

(whales tagged 1999-2001 still tracked by tag scars in 2010)

7 October 2005



Photo-identification of Beluga Whales in Upper Cook Inlet, Alaska

METHODS

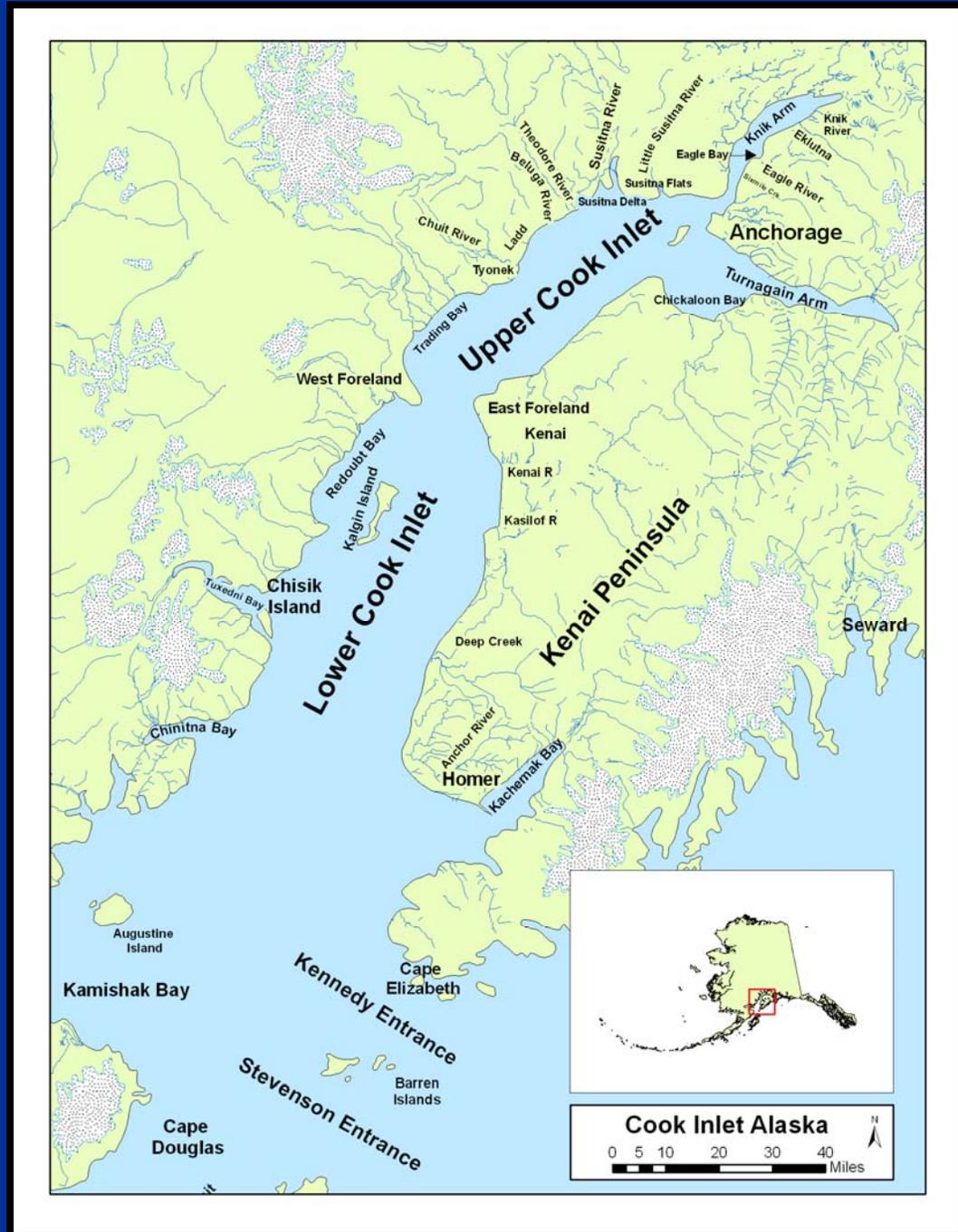
Where?

Upper Cook Inlet

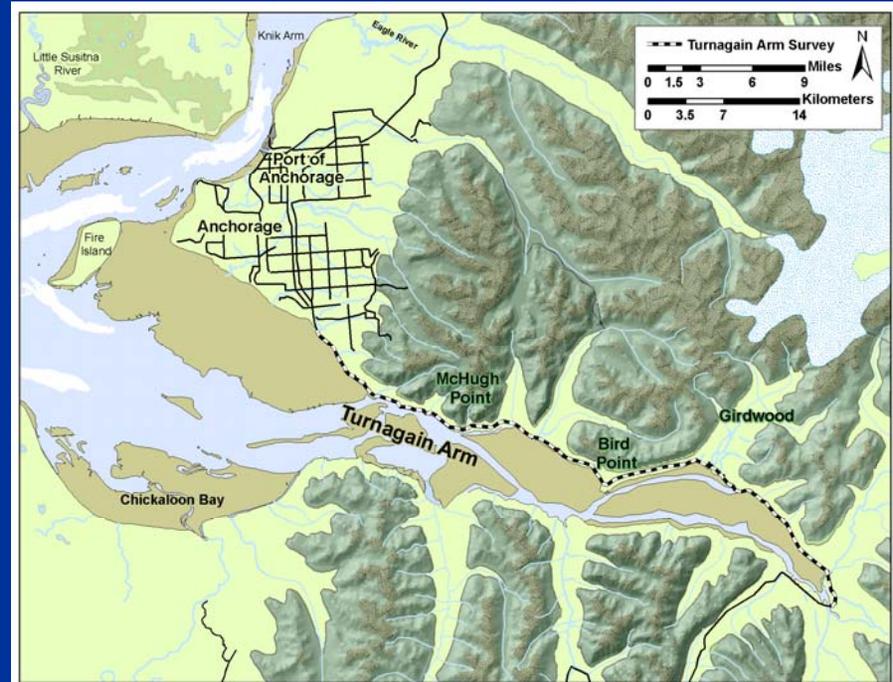
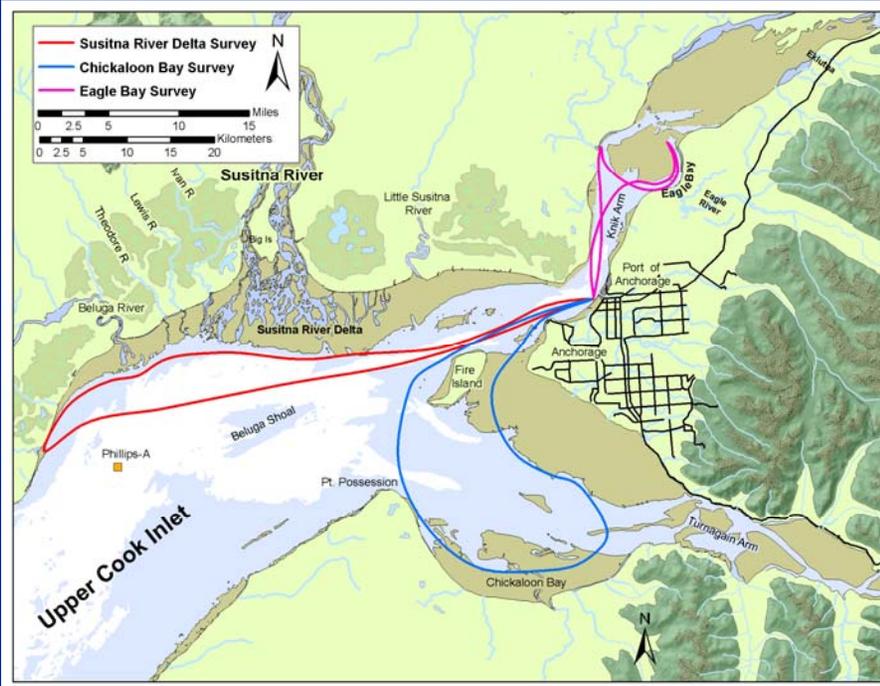
When?

2005-2010 April-October

(and hopefully 2011
and beyond....)



How?





Nikon D70 Digital Camera

Nikon AF VR-Nikkor 80-400mm Lens

For each group note:
location, size, behavior, colors, calves

Photo-processing

1. **View** digital images on the computer
2. **Delete** images without whales
3. **Archive** poor images (too blurry, too dark, etc.)
4. **Sort** the images into folders according to side of animal
5. **Catalog** images (matching individuals to the catalog). Cataloging not automated and is time-consuming.

2005

“Gray” Beluga 139



2006



2007



2008



“White” Beluga 024

14 September 2005

2005



23 September 2006

2006



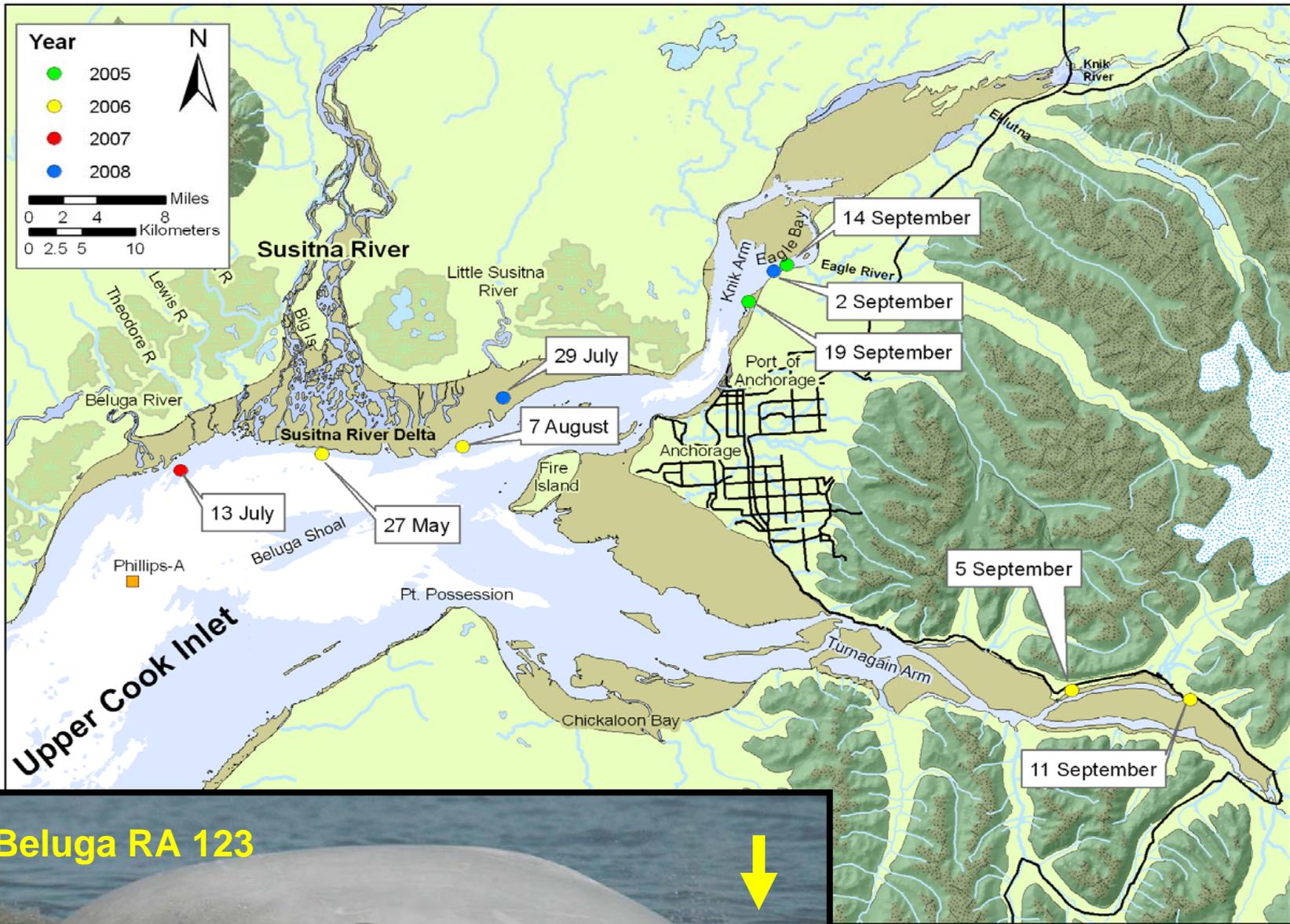
2007



RESULTS

What are we learning with photo-id about Cook Inlet belugas?

- The project is ongoing;
 - data from 2009 are being analyzed (report out Jan 2011)
 - data from 2010 are still being collected.



Sighting histories of calves and presumed mothers



Calving intervals,
length of
mother/calf bond,
are there mother/calf
groups and habitats?

Beluga RA 145 was photographed with a maturing calf in 2006, 2007, 2008, and 2009.



2006 Knik Arm



2007 Susitna Delta



2008 Susitna Delta



2009 Susitna Delta and Knik Arm

Can we learn about population age structure
from photographs?



Shades of Gray



DIFFERENT LIGHT – SAME WHALE



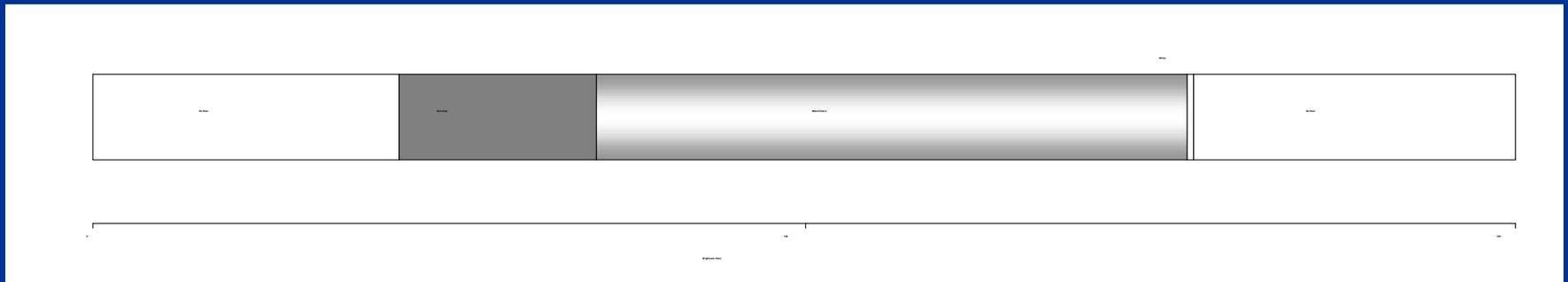
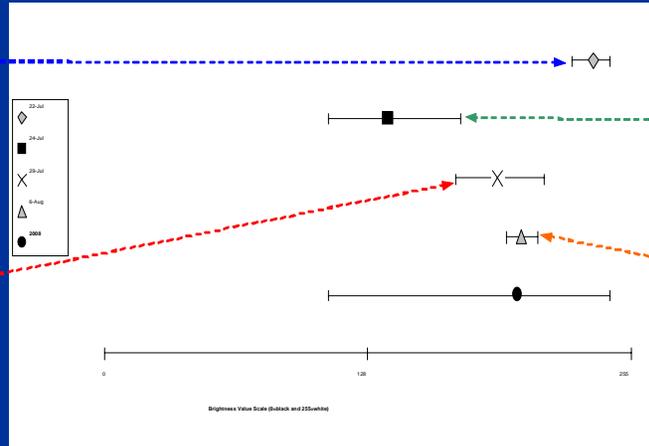
Lighting can make a white whale look gray

(these photos of same whale, same year)



Many of the mothers are gray, not white

Be careful equating whale color with maturity! 23



Numerical Gray Scale
See Blees et al. poster

Groups with calves and newborns seen in all areas, 2005-2008

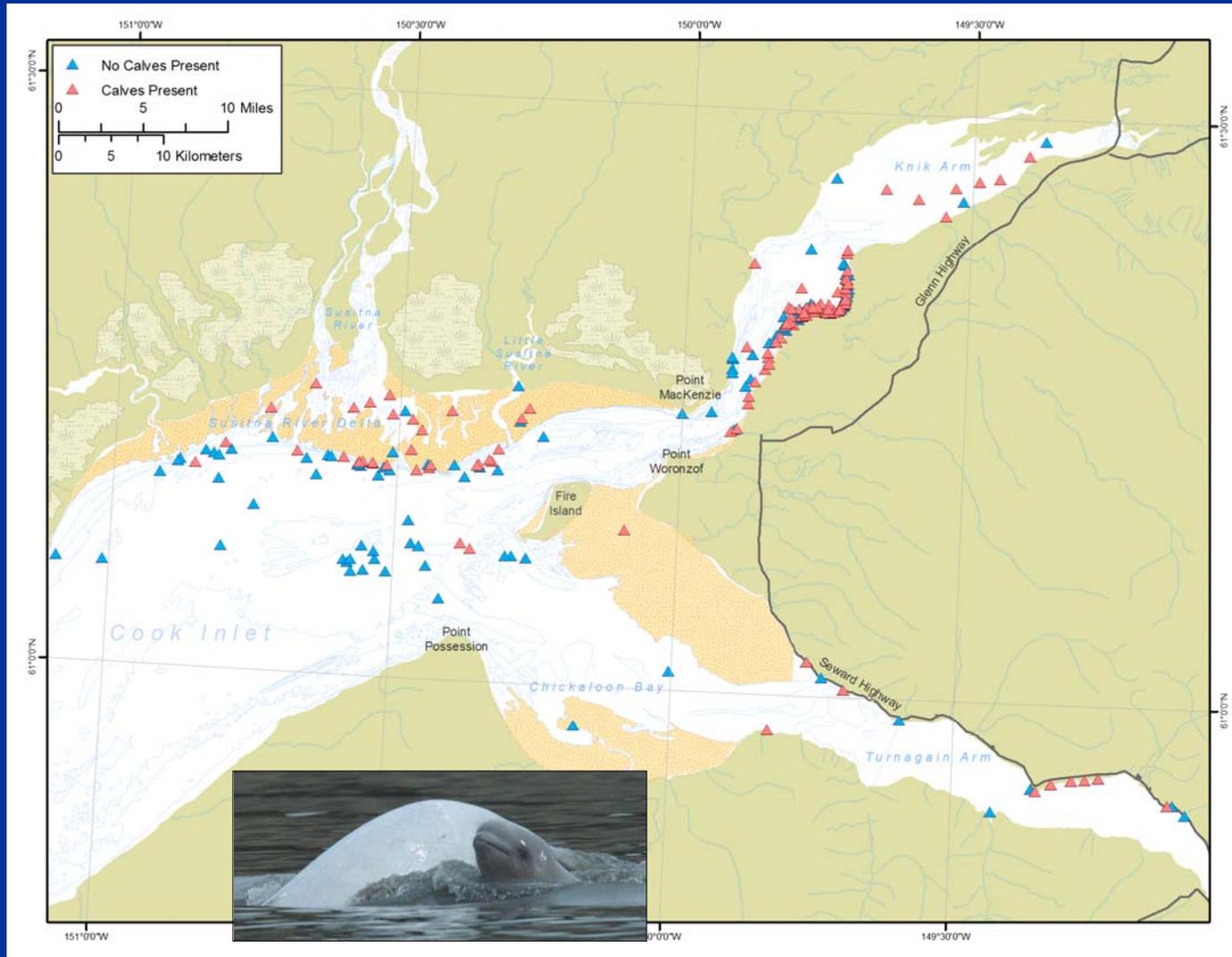


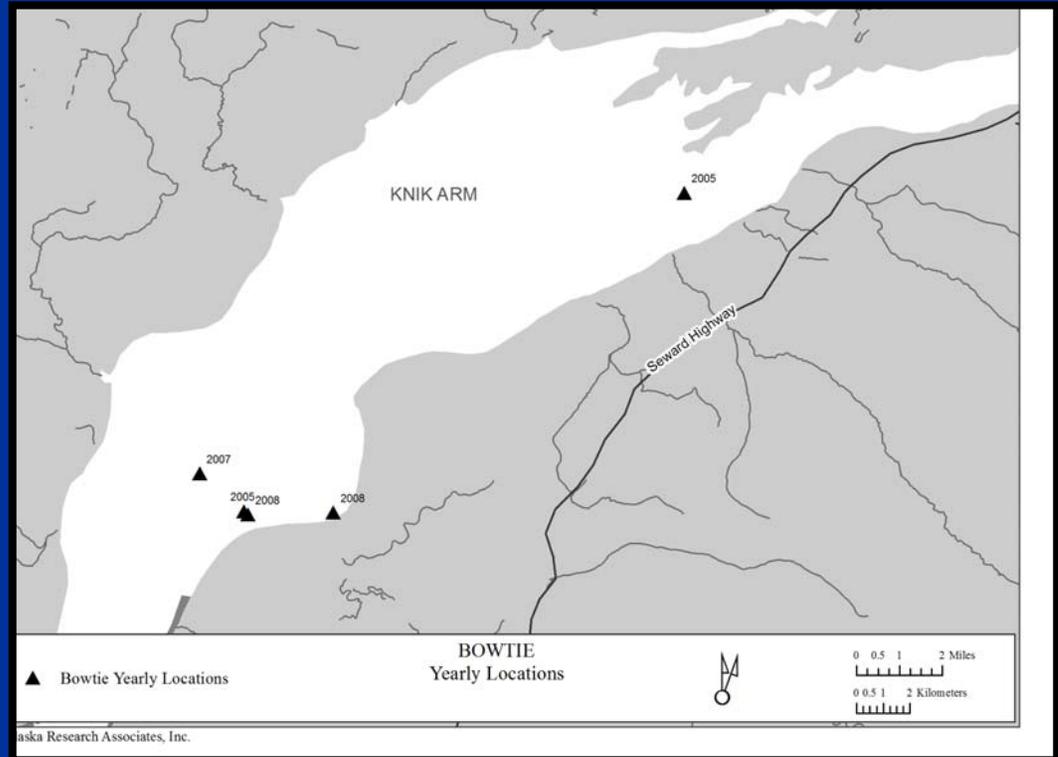
Photo-id and Survival Data

- Potential for documenting sources of injury, disease, and mortality
- Resights of satellite-tagged animals (tagged 1999-2002)
- Necropsies of known individuals



Beluga RS 055

Tracked photographically since 2005
Never photographed outside of Knik Arm
Seen with calf in 2005, 2008, 2009
Not seen in 2006. Seen in 2007 but no calf



Pregnant Female
Dead Oct 2009, Mouth of Chester Creek
Examined by Dr. Kathy Burek

Sources of External Injury

Manmade sources

- Ship strikes (propellers and bows)

- Bullets

- Harpoons

- Net and rope entanglements

- Satellite tagging

Natural

- Predation

- Other belugas

Predation, Propellers or Entanglements?



15 September 2005



7 October 2005



23 September 2006

Bullets?



14 September 2005



25 September 2006

TOOTH-RAKES (from belugas or predators)



Predation marks

Sir Elton John



Dame Eltona John

Roped Beluga 2010 Susitna River Delta



May 26, 2010



July 16, 2010



July 29, 2010



August 27, 2010

The Right-Side Catalog

As of May 1, 2010 the catalog had:

**254 belugas in the right-side catalog
(2005-2009)**

Cataloging of right-side photos taken in 2010 will occur this winter

What counts as an identified individual?

“individual” = complete profile set of high-quality photos

back



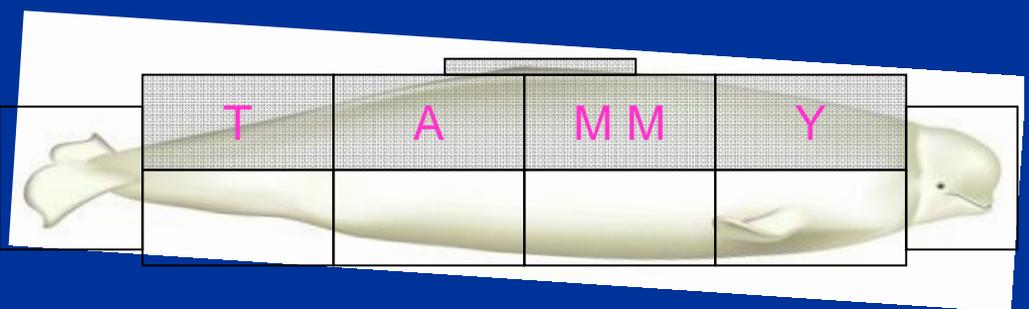
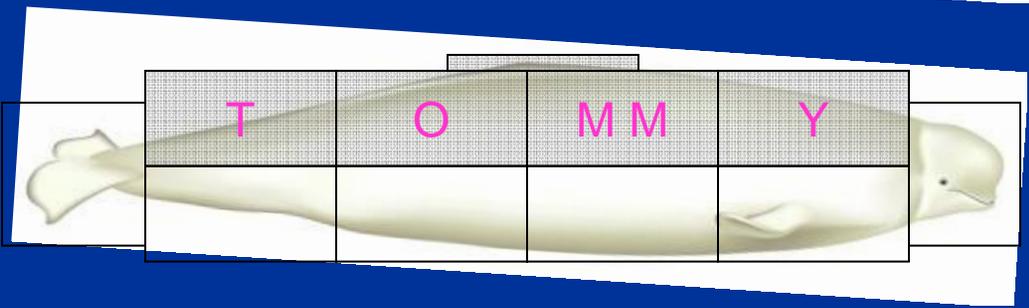
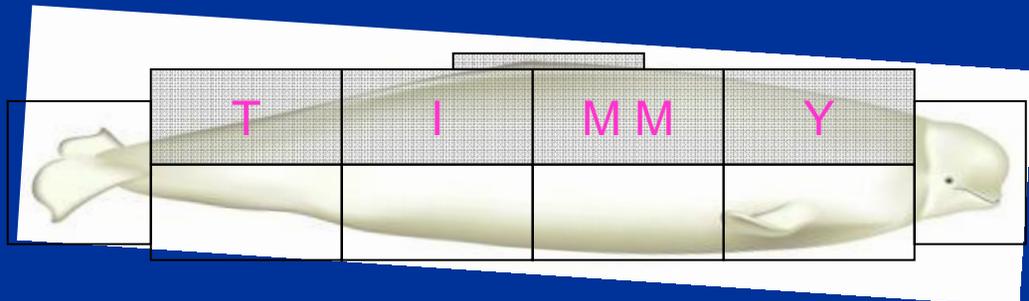
middle

front



1 back+1 middle+1 front = 1 beluga (right side)





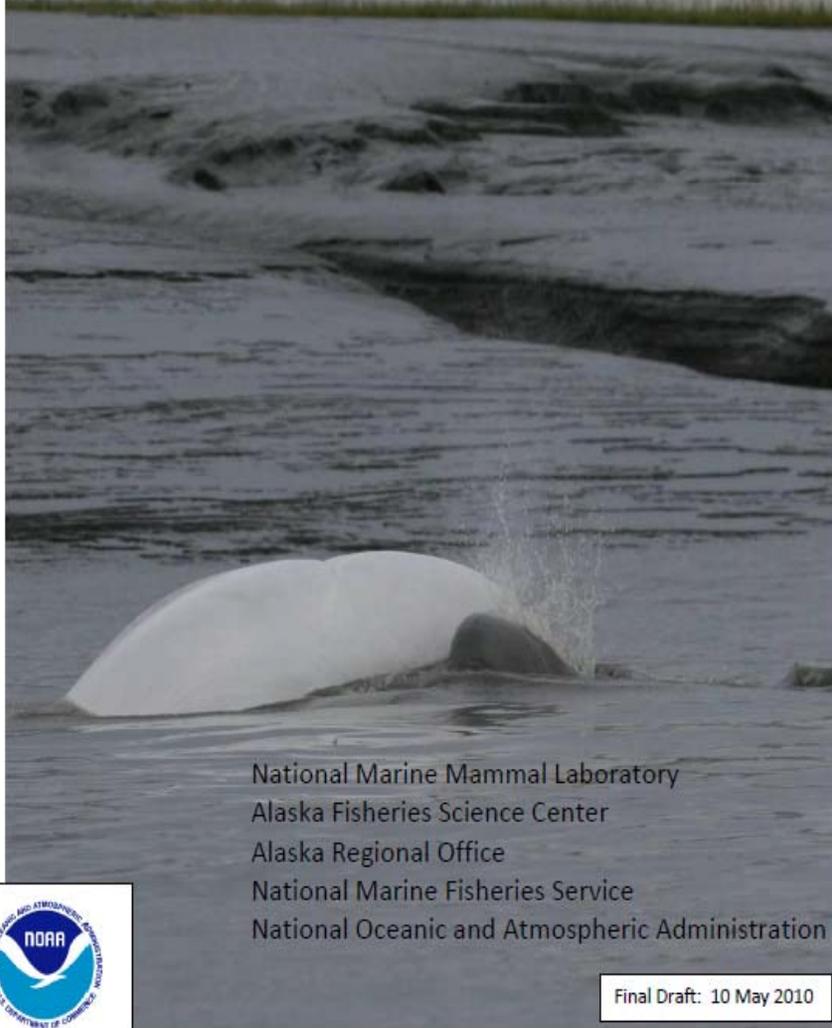
Need
complete
profiles for
complete
identification

Left-Side Catalog

- **Funding 2009-2010 from the North Pacific Research Board to catalog archived photos taken 2005-2008:**
- **183 belugas in the left-side catalog (2005-2008).**
- **10 belugas matched left-side to right-side**

COOK INLET BELUGA WHALE

Research Plan



National Marine Mammal Laboratory
Alaska Fisheries Science Center
Alaska Regional Office
National Marine Fisheries Service
National Oceanic and Atmospheric Administration



Final Draft: 10 May 2010

Left-Side Data & Collaboration

Cover photo
Chris Garner, DOD
Taken 2007 Eagle Bay

In LGL photo-id catalog:

2006 (with newborn calf)

2008

NOAA Cook Inlet Beluga Website

- <http://www.fakr.noaa.gov/protectedresources/whales/beluga.htm>
- Beluga Information
- Conservation Plan
- Project Reports
- Research
- Development Issues

Acknowledgements

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Killer Whale Presence in Upper Inlet

Photo-id surveys conducted 2005-2010 = 209

Killer Whale sightings = 0

Questions?



Turnagain Arm/Chickaloon Bay
September 2008