

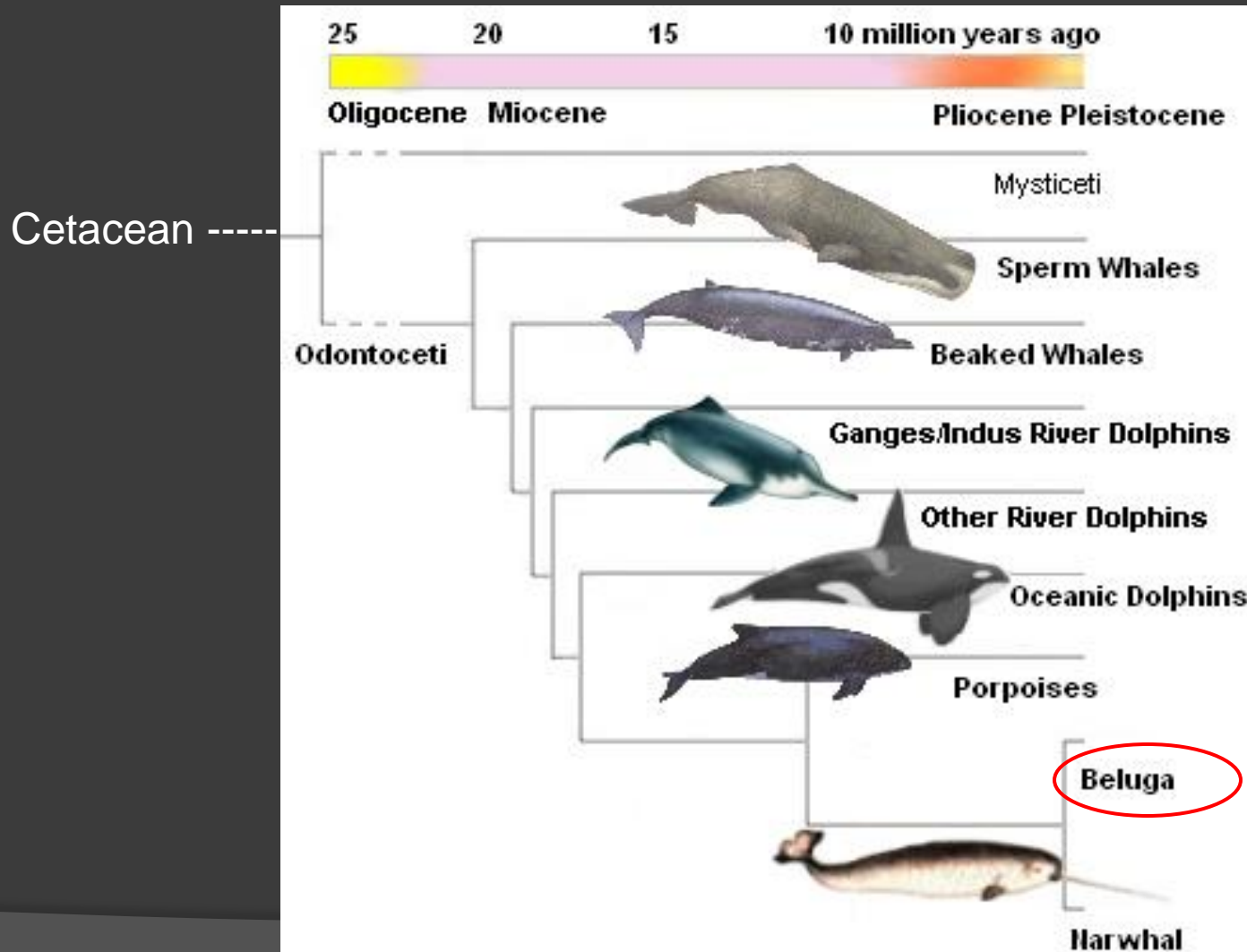
WHERE HAVE ALL THE WHALES GONE? A COOK INLET BELUGA WHALE STORY

By: Jenipher Cate, PhD
Josh Moffi

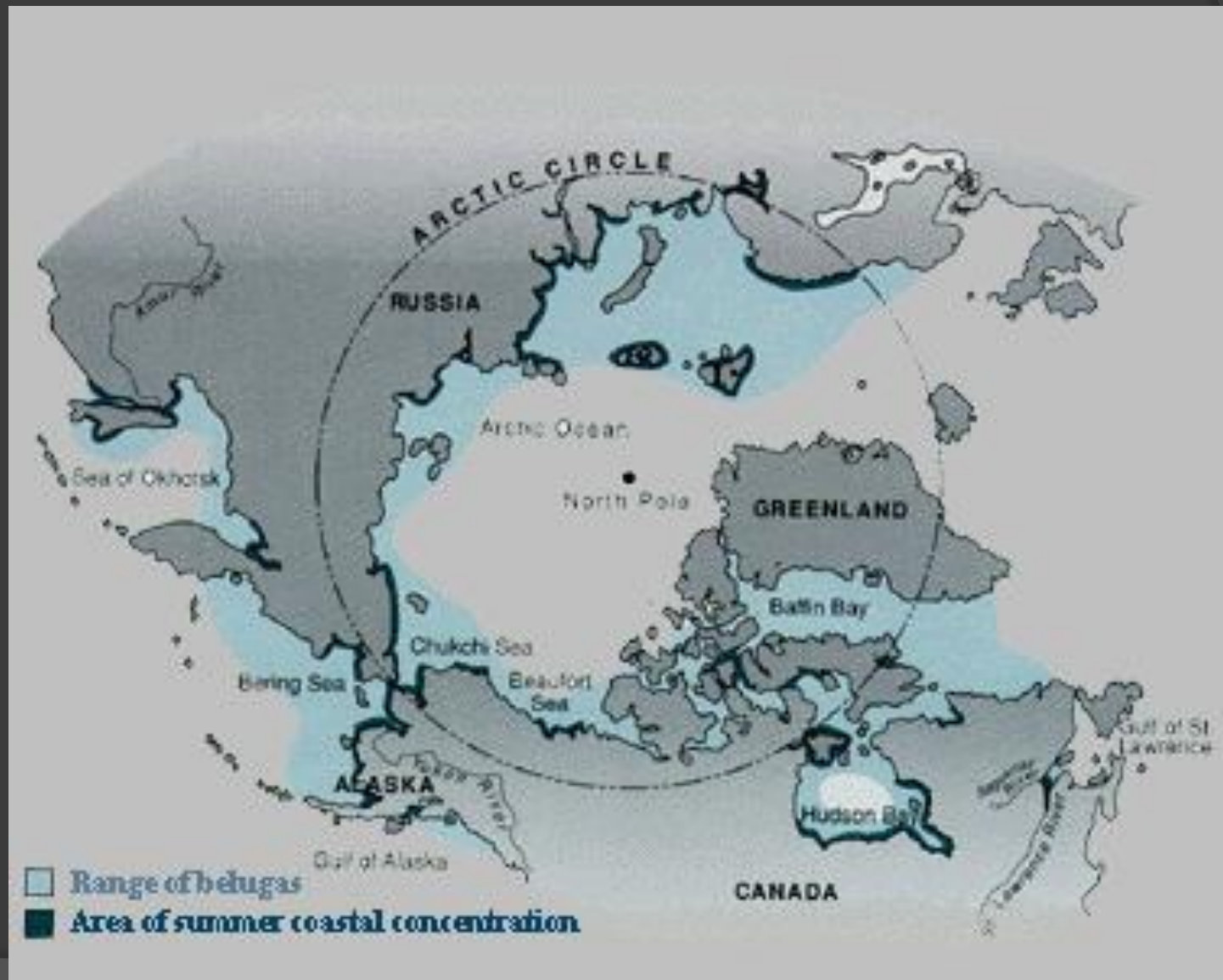


Beluga Whales - *Sisuaq*

Delphinapterus leucas



Around the world



Biology



Color distinguishes age



Carnivorous



What we normally see



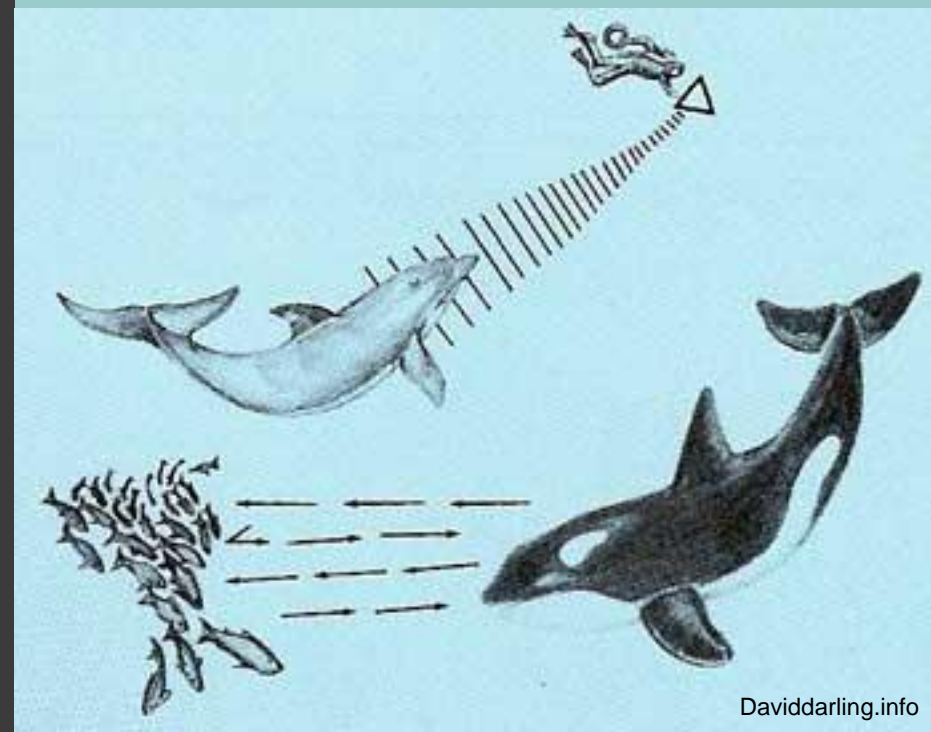
Photo courtesy of LGL Alaska Research Associates. MMPA/ESA research permit No. 14210

Gregarious



“Canaries of the sea”

- ⦿ Communication
 - Mating
- ⦿ Echolocate
 - Food
 - Navigation



Daviddarling.info



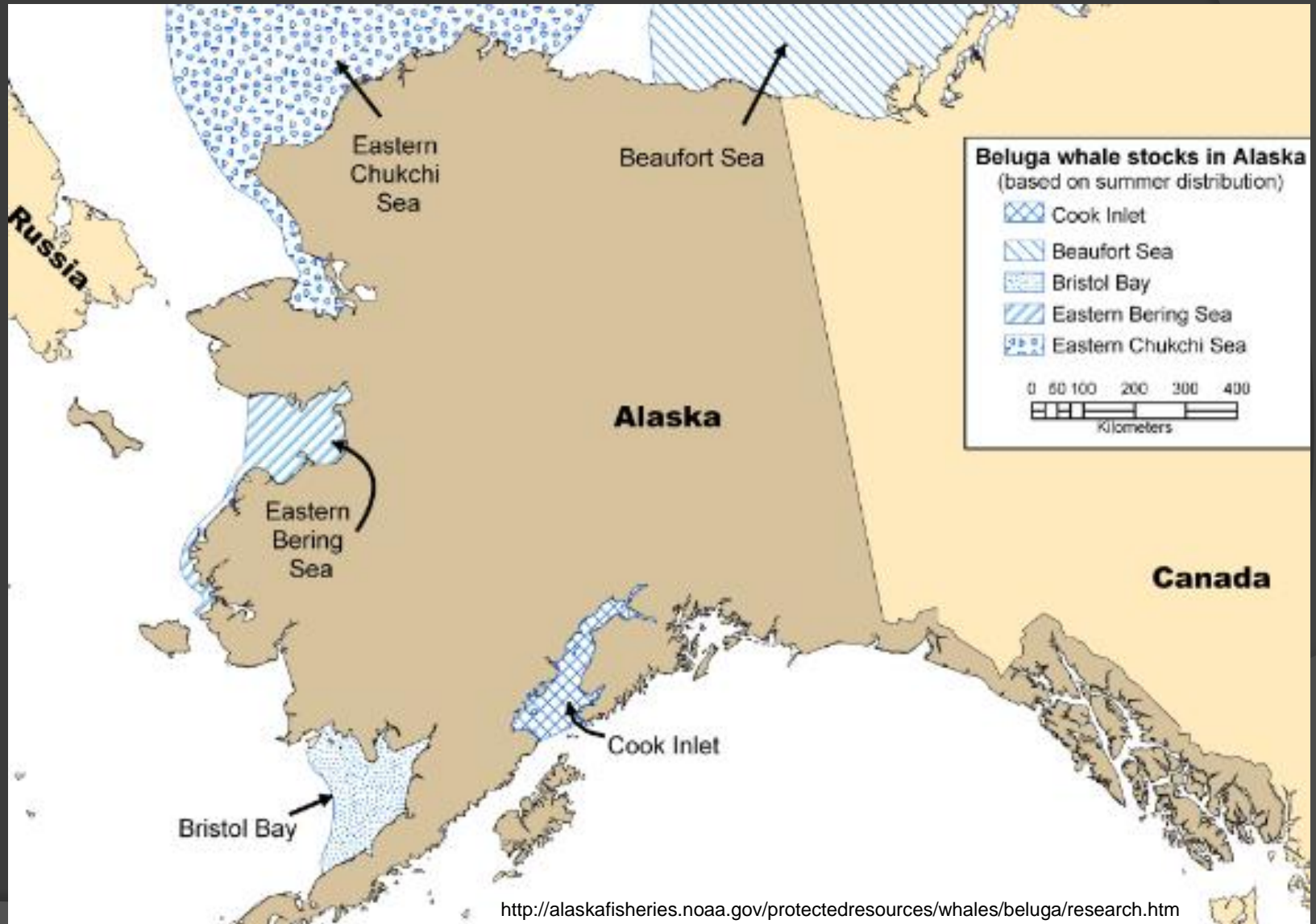
Ngm.nationalgeographic.com

Life history



Photo courtesy of LGL Alaska Research Associates. MMPA/ESA research permit No. 14210

Belugas of Alaska



Current Stats...

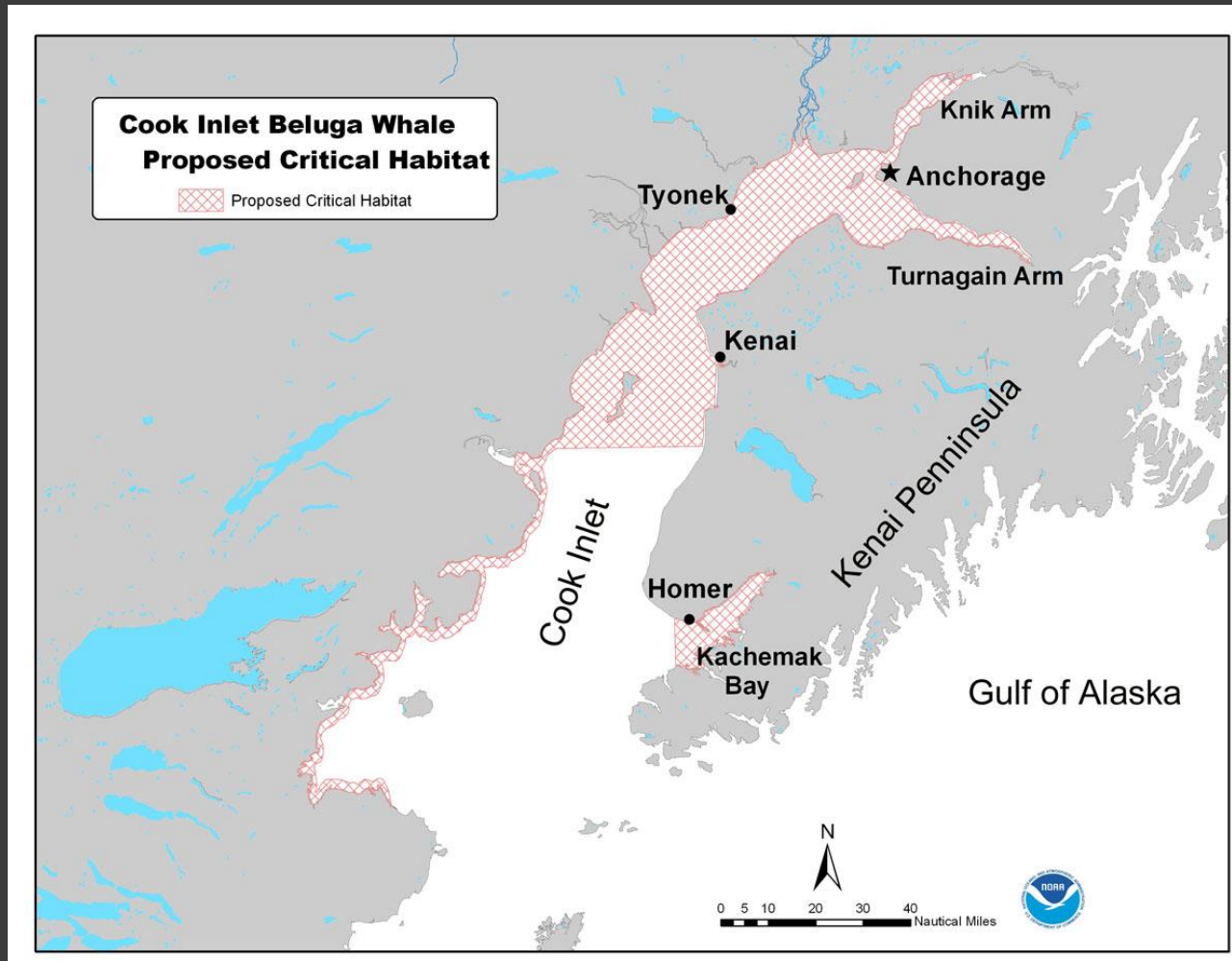
- Live only in Cook Inlet, Alaska
- 312 animals ~ 2012
- Critically endangered
- Non-migratory, except within Cook Inlet itself
- Decreased habitat range since 1990's
- Currently not hunted



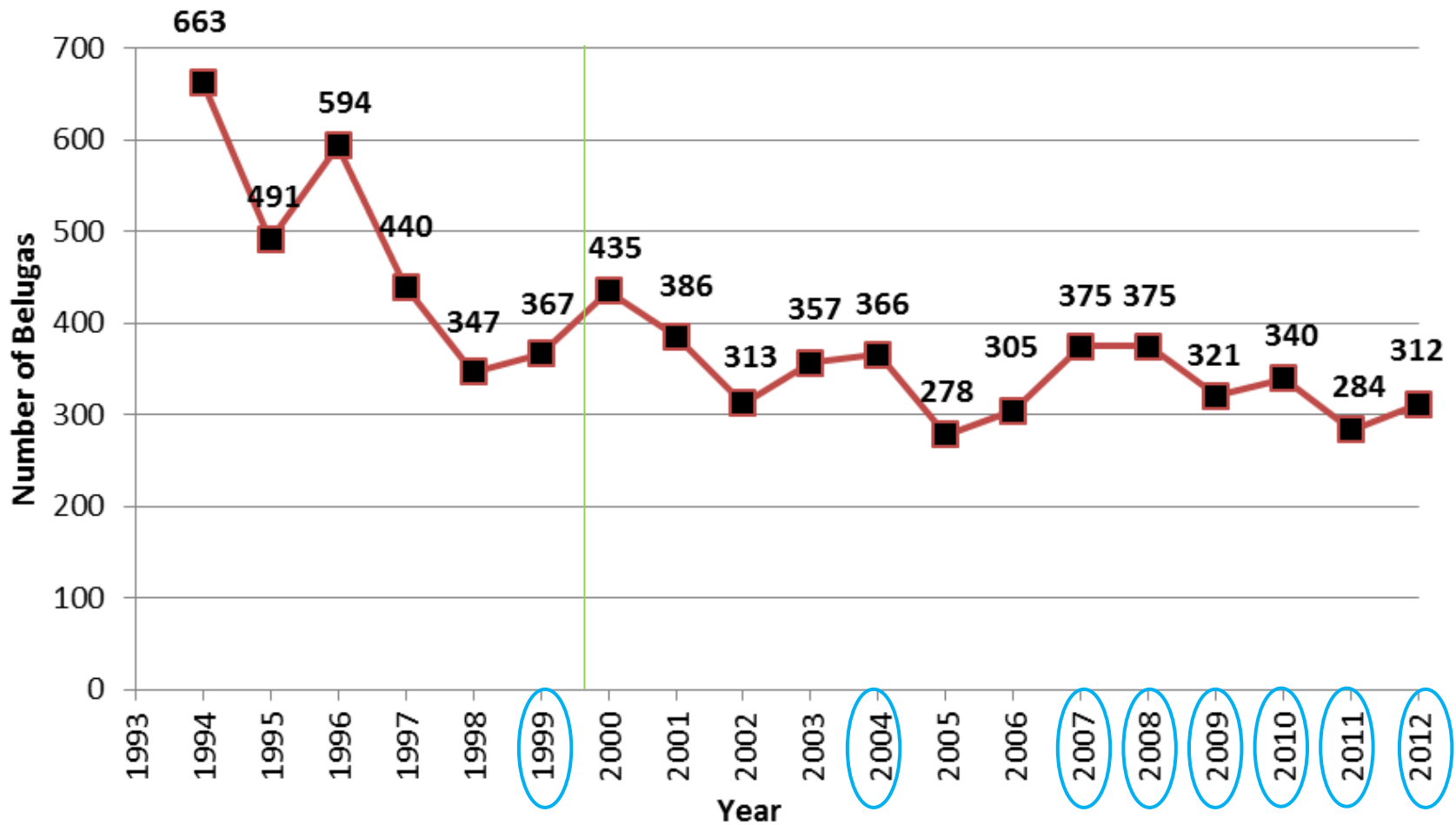
Why is this population isolated?



What we know about Cook Inlet Beluga Whales



Population trends 1994-2012



Past research efforts

- ⦿ Aerial monitoring
 - Consistent since 1991
 - Summer months
- ⦿ Photo-ID
 - Right and left side database
- ⦿ Satellite tagging
- ⦿ Genetic studies



Subsistence hunting

- ◎ Blubber
 - Oil, food, medicine, preservative
- ◎ Meat
 - Food
- ◎ Bone and teeth
 - Tools, art
- ◎ Sinew
 - Bow strings
- ◎ Stomach
 - Bags to for clams, then placed in blubber for winter

Threats

- ⦿ Natural



- ⦿ Human-related



Photo by randy smith



www.airphotona.com

- ⦿ Both

- Climate change
- Food availability



www.travelthusiast.com

As a result

- ⦿ Managed by National Marine Fisheries Services (NMFS)
- ⦿ Critically endangered population
 - On the brink of extinction

They still aggregate in areas of high human impact

- Port of Anchorage
- Upper Cook Inlet – Eagle Bay



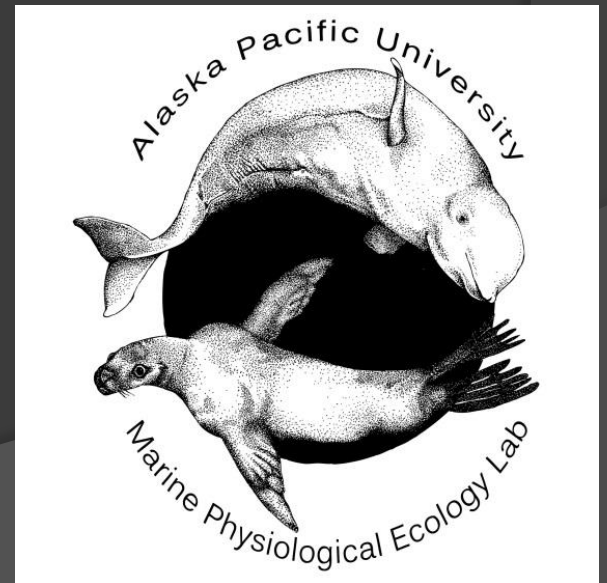
What we don't know

- ⦿ Winter habitat
- ⦿ Winter food source
- ⦿ Can't pinpoint one factor at fault for continued population decline
 - ~15 years post moratorium

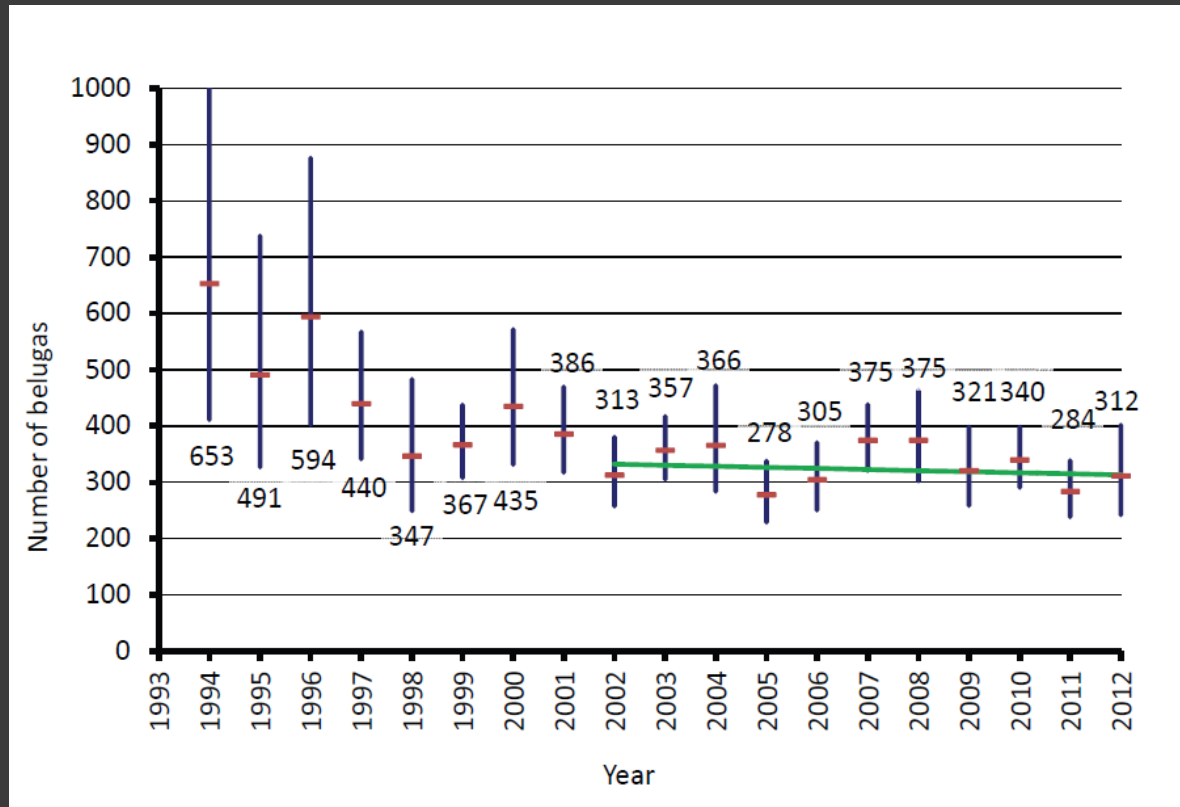
Questions?



My Background



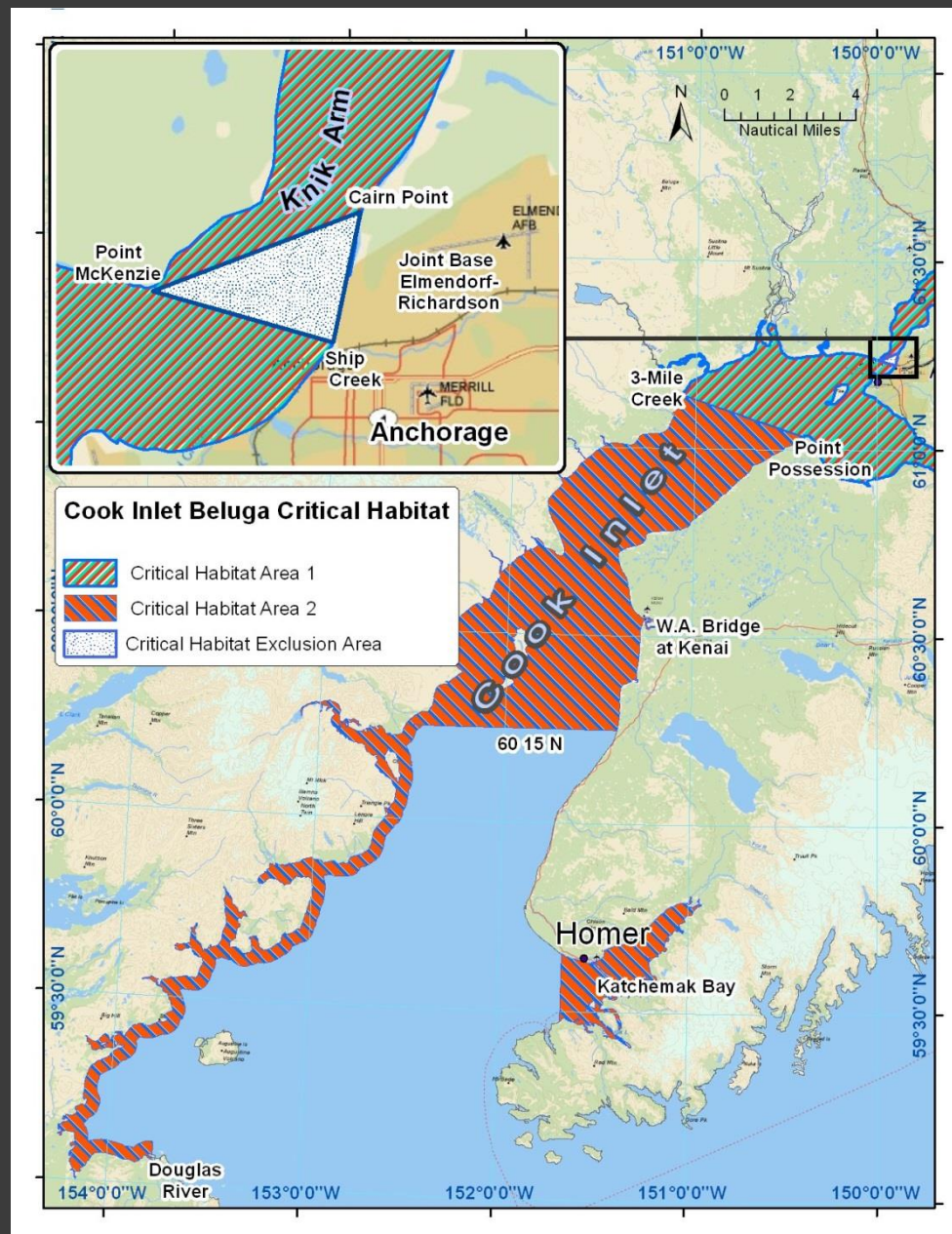
Current population trend



Abundance estimates for each year from 1994 to 2012. The red bars indicate the point estimates (numbers shown above and below the vertical bars). The vertical blue bars are 95% CI. The green trend line from 2002 to 2012 is -0.6% /year (SE = 1.1%). From Hobbs 2013.

Critically endangered

- NMFS declared the Cook Inlet beluga whales a distinct population in October 2008
- NMFS listed Cook Inlet beluga whale as endangered 2008
- Population has continued to decline
- Range contraction 2000 - 2005



CIBW Critical Habitat in Upper Cook Inlet, Alaska as designated by the National Marine Fisheries Service (2011). (NMFS 2013)

Where have all the
belugas gone?

Possibilities for decline

Biological factors

- ⦿ Changes in food availability
 - Salmon, eulachon, winter sources
- ⦿ Interspecific competition
 - Salmon sharks, harbor seals



Possibilities for decline

- ⦿ Environmental factors
 - Warmer water
 - Changing bathymetry
 - Changing tidal or river flows

- ⦿ Human factors
 - Hunting
 - Increased development
 - Increased vessel traffic
 - Oil and gas development



Possibilities for decline

- ⦿ Chemicals into the environment
 - Pharmaceuticals
 - Polychlorinated Biphenyl (PCBs)
 - Polybrominated Diphenyl Ethers (PBDEs)
- ⦿ Pollution

Current research

◎ Photo Identification database

- Headed up by Tamara McGuire, LGL Alaska Research Associates
- 312 distinct animals identified
- Sightings from Upper Cook Inlet to as far south as Kenai
- No distinct groups

Current research

- ◎ Collection of Traditional Ecological Knowledge (TEK)
- ◎ Remote studies
 - Passive Acoustic Monitoring (PAM)
 - Video Monitoring



My research

- ⦿ Compiling multiple data sets
- ⦿ Building a methodology to compare datasets
- ⦿ Building a methodology to compare platforms
- ⦿ Perform habitat use analysis over a larger area and time frame than previously possible

Data gaps

- ⦿ Winter food sources
- ⦿ Satellite tagging data
- ⦿ Hearing studies
- ⦿ Biopsy and toxicology studies

What does this mean for Cook Inlet?

⦿ Development

- Port of Anchorage
- Knik Arm Crossing
- Offshore energy
- Susitna Watana Dam
- Oil exploration and development
- Pipelines

⦿ Intrinsic value

Mitigation and Conservation

- Special permits
 - Incidental Harassment Authorizations
 - Limited number of animals
 - Limited time before NMFS ceases issuing
- Working at low tides
- Seasonal / Area restrictions
- Impose vessel restriction

Mitigation and Conservation

- Protected Species Observers



Summary

- ⦿ Endangered species
- ⦿ Population continuing to decline
- ⦿ Cause for decline unknown

References

- Ashford, J.R. T. Ezer, C.M. Jones. 2013. River discharge predicts spatial distributions of beluga whales in the Upper Cook Inlet, Alaska, during early summer. *Polar Bio.* 36:1077-1087
- Cornick, L., Ph.D. S. Love, L. Pinney, C. Smith, Z. Zartler Distribution, Habitat Use and Behavior of Cook Inlet Beluga Whales and Other Marine Mammals at the Port of Anchorage Marine Terminal Redevelopment Project June – November 2011 Scientific Marine Mammal Monitoring Program 2011 Annual Report. . Prepared for Integrated Concepts and Research Corporation and the U.S. Department of Transport Maritime Administration. pp 55
- HDR Alaska. 2010. A Review of Beluga Whale Response to In-Water Structure. Report for KABATA. January 15, 2010. pp 158.
- Hobbs, R.C. 2013. Detecting Changes in Population Trends for Cook Inlet Beluga Whales (*Delphinapterus leucas*) Using Alternative Schedules for Aerial Surveys. U.S. Dep. Commer., NOAA Technical Memo NMFS –AFSC-252, 59p.
- McGuire, T., A. Stephens, and L. Bisson. 2014. Photo-identification of Cook Inlet Beluga Whales in the Waters of the Kenai Peninsula Borough, Alaska. Final Report of Field Activities and Belugas Identified 2011–2013. Report prepared by LGL Alaska Research Associates, Inc., Anchorage, AK, for the Kenai Peninsula Borough. 92 p. + Appendices.
- Markowitz, T., and T. McGuire, eds. 2007. Temporal-spatial distribution, movements and behavior of beluga whales near the Port of Anchorage, Alaska. Prepared for Integrated Concepts and Research Corporation and the U.S. Department of Transport Maritime Administration by LGL Alaska Research Associates, Inc., Anchorage, Alaska. pp 93.
- NMFS (National Marine Fisheries Service). 2013. Map of Critical habitat as proposed by National Marine Fisheries Service, Area 1. NMFS, Juneau, AK http://alaskafisheries.noaa.gov/protectedresources/whales/beluga/chabitat/maps/area_1.jpg
- Raach, M., M. Lebeuf, E. Pelletier. 2011 PBDEs and PCBs in the liver of the St Lawrence Estuary beluga (*Delphinapterus leucas*): a comparison of levels and temporal trends with the blubber. *J. Environ. Monit.* 13, 649-656.
- Ross, P.S. 2016 Fireproof killer whales (*Orcinus orca*): flame-retardant chemicals and the conservation imperative in the charismatic icon of British Columbia, Canada. *Can. J. Fish. Aquat. Sci.* 63: 224-234.



Polar Lab: Think Up Here

Scientific Perspectives on the Alaskan Environment and Industry

- **Feb 12:** Evolution of the Endangered Species Act
 - *Meghan Larson and Stacy Aughe*
- **Feb 26:** Salmon of Alaska
 - *Samantha Simpson and Sabrina Larsen*
- **March 12:** Climate Change
 - *Megan Blee and Robyn Miller*
- **March 26:** Local and statewide invasive plants of Alaska
 - *Rachel Mills and Heather Stewart*