

Where are they now? Use of long-term photo-identification records to monitor individual Cook Inlet belugas following acute disturbance events and chronic disease.

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Strandings, disease, and human disturbance, including disturbance from research methods, have all been listed as possible threats to the endangered Cook Inlet beluga whale population (CIBW; *Delphinapterus leucas*). While it remains unknown how these threats may affect the population as a whole, longitudinal studies of individuals who have experienced these events may provide insight.

The Cook Inlet Beluga Whale Photo-ID Project has identified over 400 individual beluga whales by using natural marks visible in photographs collected from 2005-2018. Photographs have also been provided by the public and by colleagues.

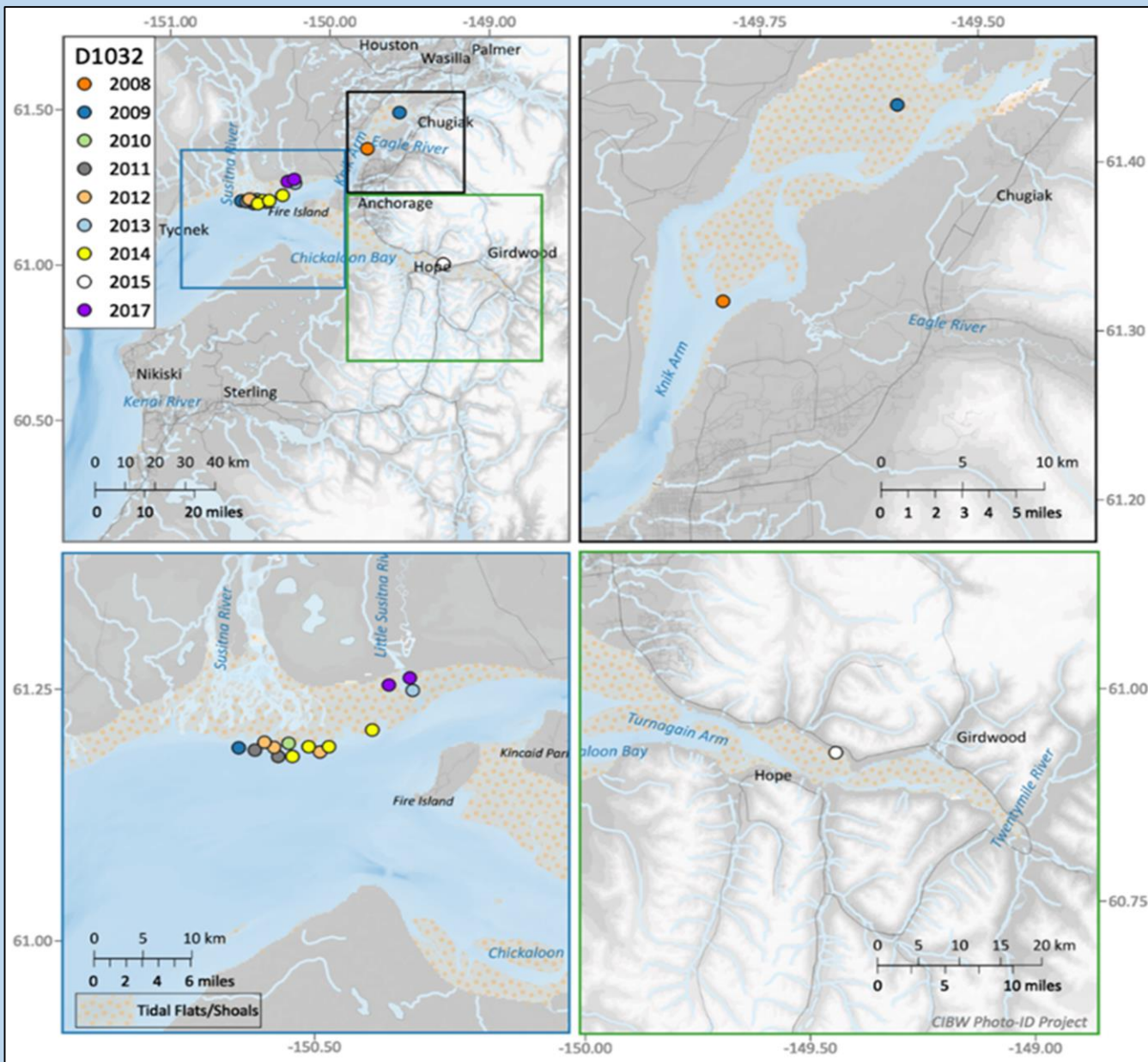
Marks used for identification are long-lasting and allow information on individual survival, habitat use, social association, and reproduction (for females) to be collected over time.

Although little of a beluga's body is visible in the turbid water of Cook Inlet, photographs also allow for examination of marks resulting from injury and disease on those parts of the body visible above water. Thus, photographic records collected over time following a disturbance event provide a record of wound healing/infection and body condition of affected individuals, while also providing information on survival and reproduction of these individuals.

Here we present photographs and post-event sighting histories of identified individual Cook Inlet beluga whales that have experienced live stranding, entanglements, ship strikes, and/or invasive research (tagging, biopsy, flipper banding), and demonstrate the use of long-term photo-id records to monitor individual Cook Inlet belugas following acute disturbance events and chronic disease.

Live Stranding

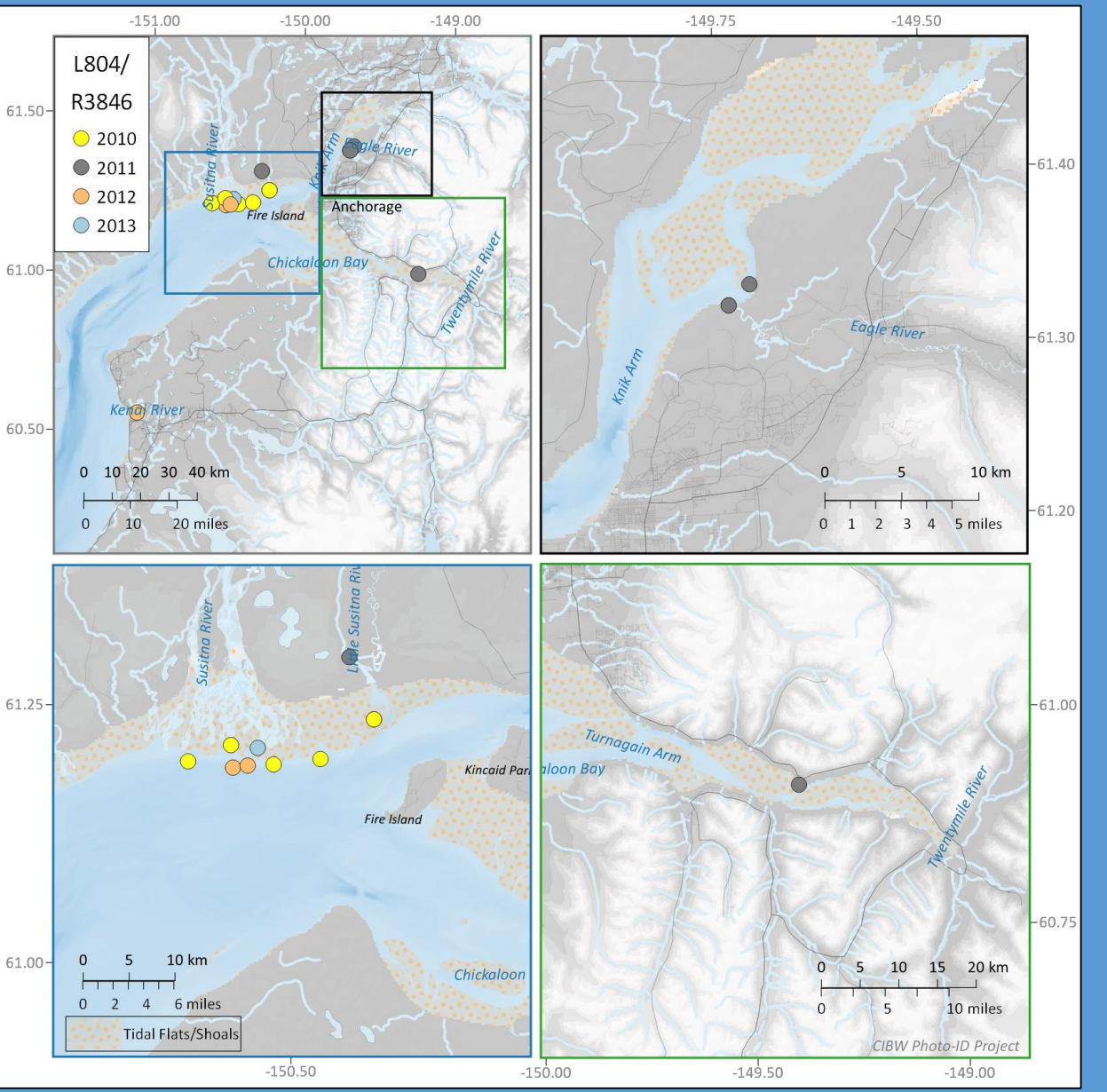
Beluga D1032 with calf live-stranded in 2015 in Turnagain Arm (middle photo below). D1032 and her calf were seen swimming away with the rising tide after the live-stranding event, but was not photographed again later that year or during the 2016 field season, which raised concerns that she may have suffered post-stranding complications and died. She was photographed on several occasions in 2017 along with a calf, indicating she survived the live-stranding event.



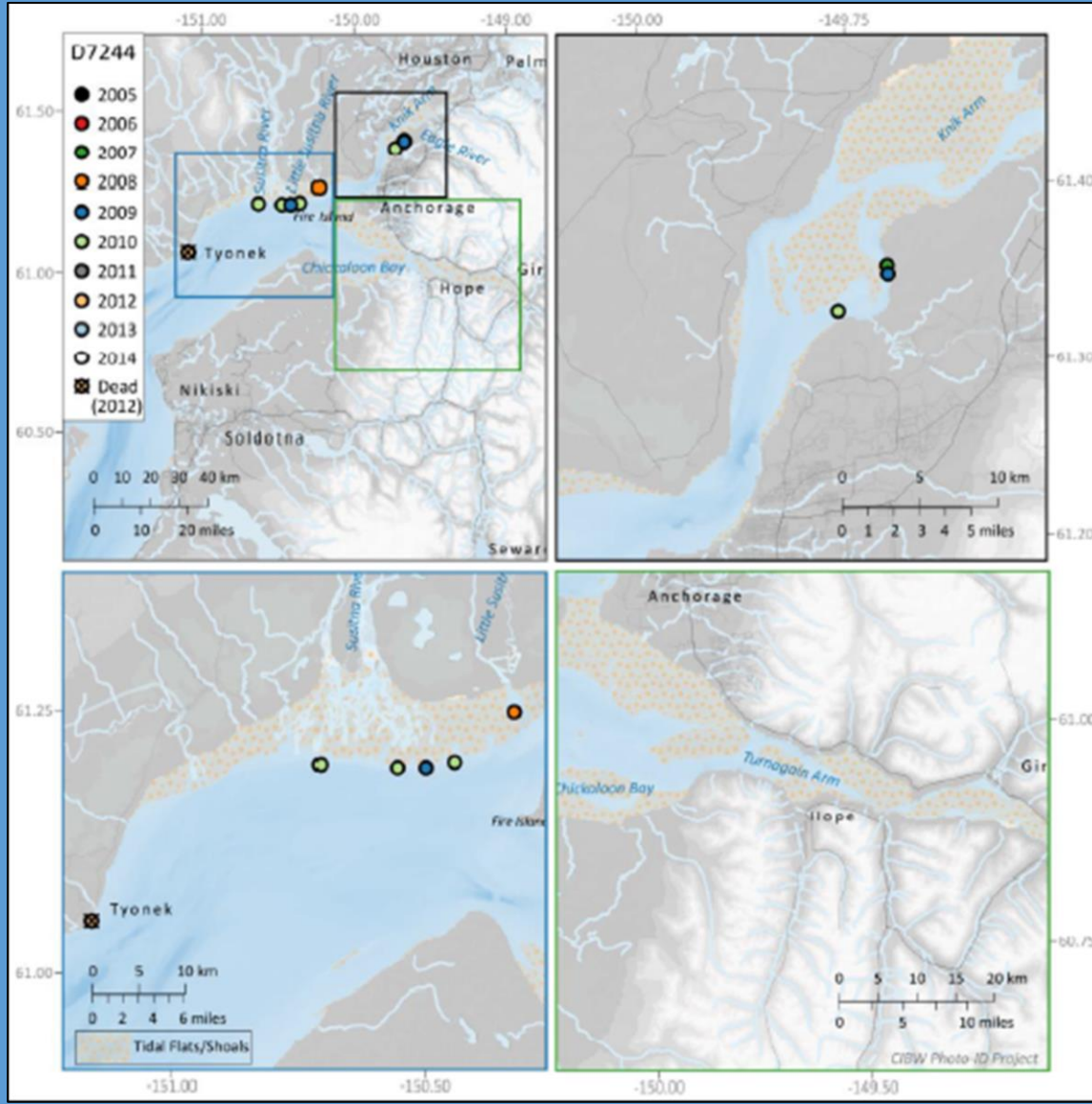
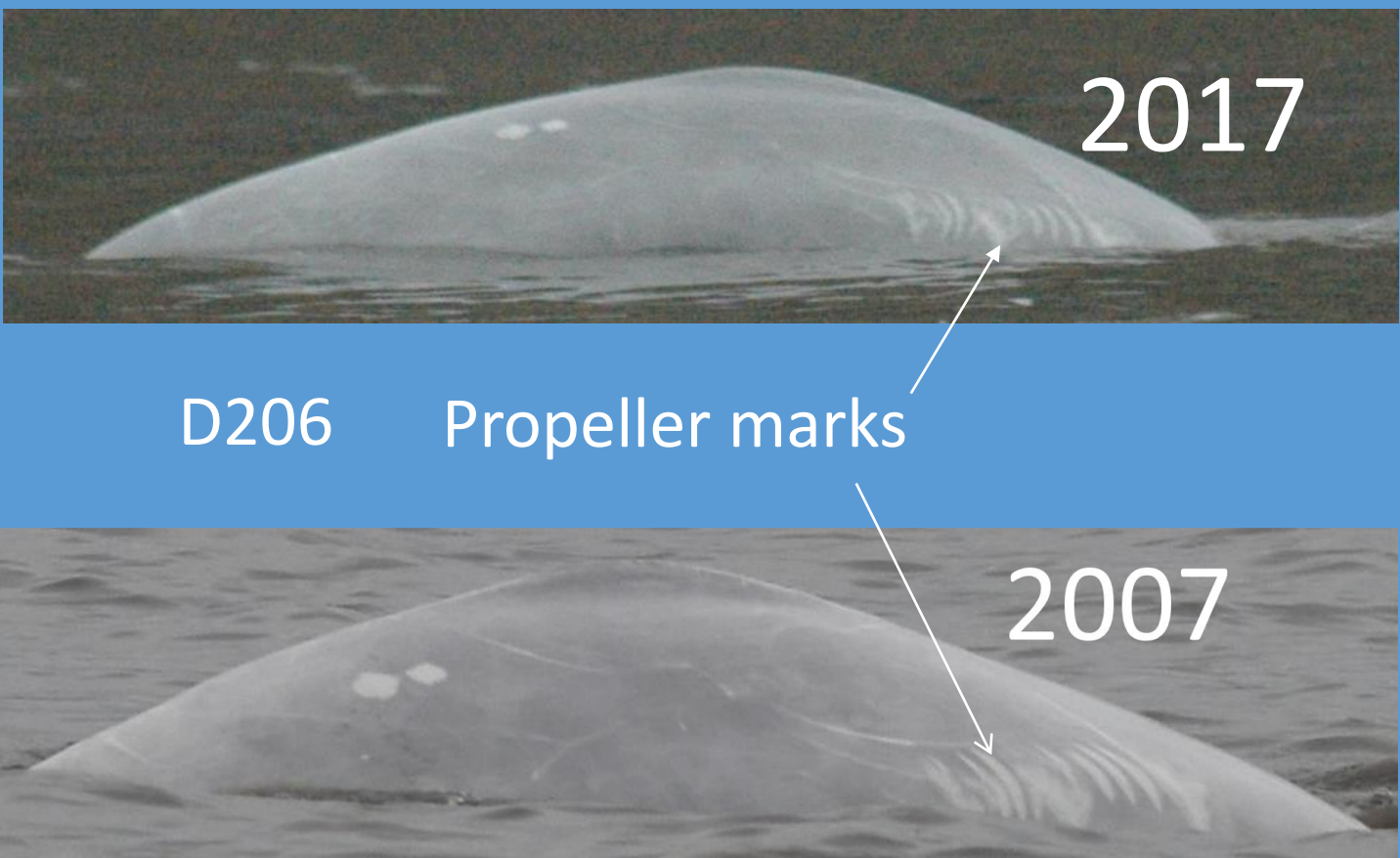
Stranding photo courtesy of the Alaska Marine Mammal Stranding Network

Entanglement

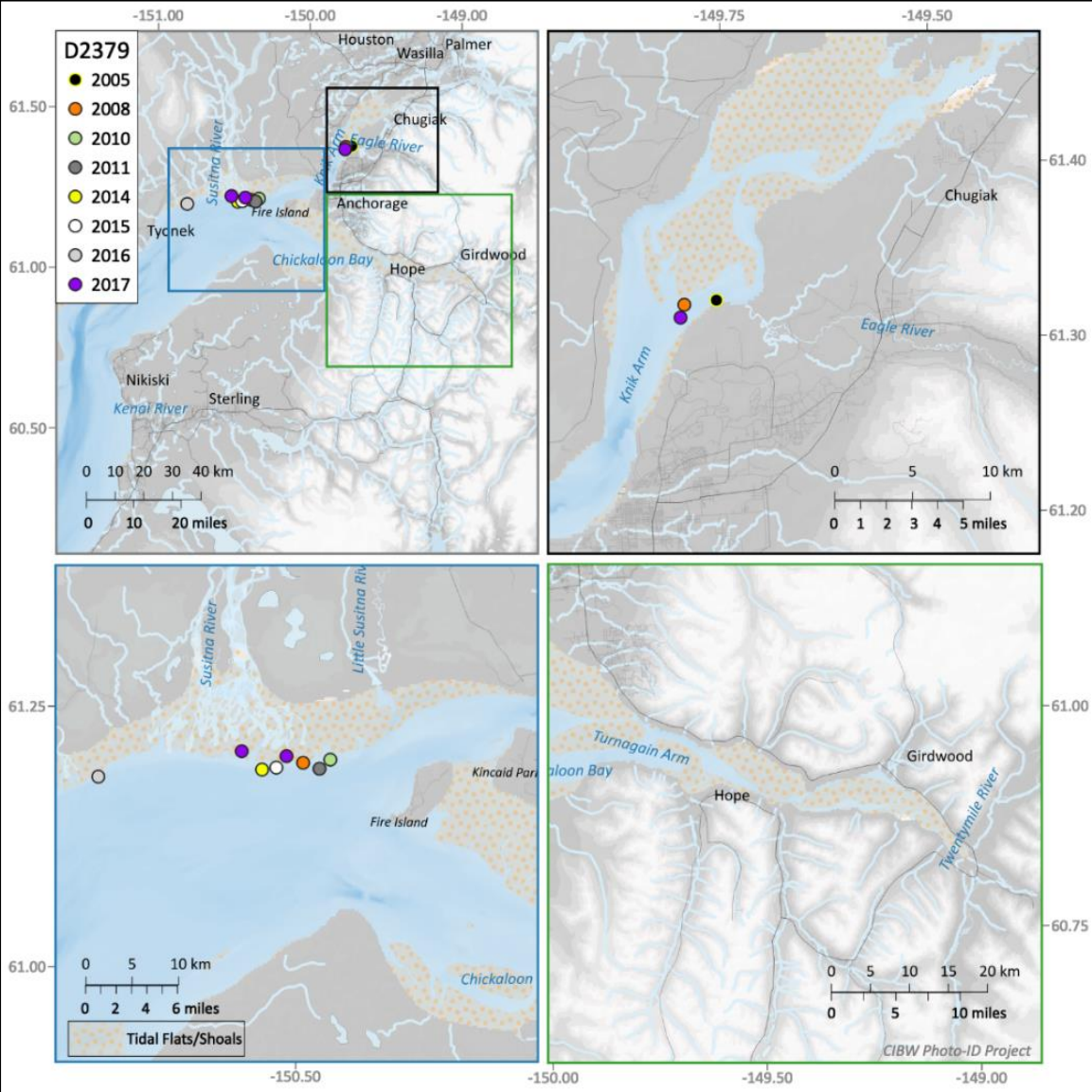
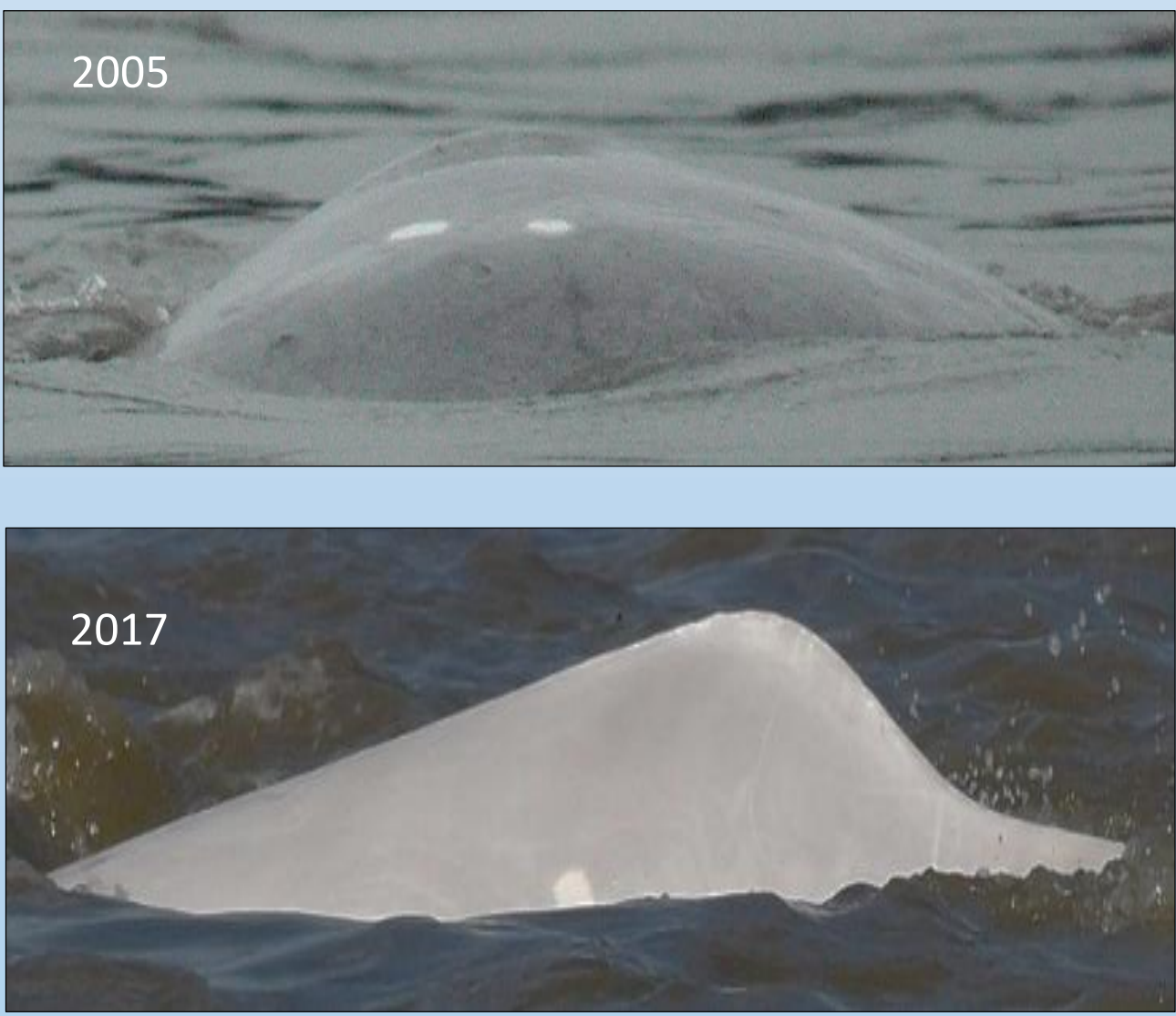
Left-side photographs of an entangled beluga whale, L804/R3846. This whale was not seen before 2010 or after 2013, and was not seen with a calf.



Ship Strike



Disease



One of the whales biopsied in 2017, D2379, had a pronounced concavity behind the dorsal crest. This individual was first photographed as a large calf in 2005, was not photographed in 2006 or 2007, but was seen to have a slight sway in the back in photos from 2008 that appeared to become more pronounced with each year. Photographs are of the left side of the whale, note the concavity behind the dorsal crest in 2017 that was not present in 2005.

Disturbance from Research Activities

NMFS tagging #	CI -02- 08
sex	male
Photo-Id catalog name	D115
Date tagged	2002
Years photographed	Yearly 2005-2014
Comments	Dead 2014



2002 Flipper band attachment on left pectoral fin during satellite tagging



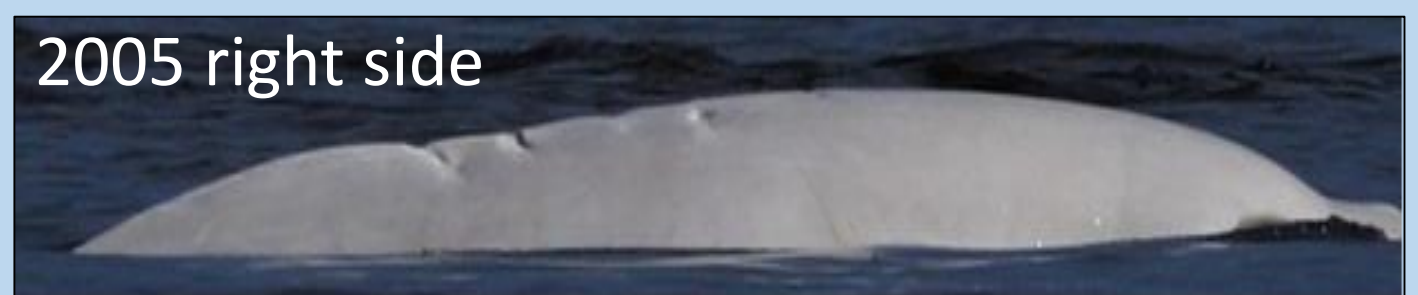
2007 left side, note flipper band embedded in damaged left pectoral fin. Photo courtesy of Chris Garner, Department of Defense.

Left-side photo of dead L2579/R115 on 2014 left side. Note damaged left pectoral fin. Photo courtesy of Bill Streever.

Flipper Banding

Remote Biopsy

NMFS tagging #	CI-01-06
sex	female
Photo-Id catalog #	D103
Date tagged	2001
Years photographed	Yearly 2005-2017
Comments	Seen with calves



NMFS tagging #	CI-02-05
sex	male
Photo-Id catalog #	D2303
Date tagged	2002
Years photographed	Yearly 2005-2015
Comments	Infection first seen 2007 Dead 2015



2015 necropsy photo, left side



Satellite Tagging

All photo-id vessel surveys conducted under NMFS MMPA/ESA Scientific Research Permit # 18016 and #14210. Tagging photo courtesy of NMFS; permits # 957 and 782-1438 (Amendment 3). Stranding photos courtesy of Alaska Marine Mammal Stranding Network, permit #932-1905/MA-009526.

