

**Report #1: Photo-Identification of Beluga Whales in Cook Inlet, Alaska:**

**Spatial and temporal patterns of habitat use by groups and individuals in 2022, with emphasis on feeding and reproduction**

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(2022 field season/cataloging)

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*2022 field team: Debbie Boyle, Brian McGurgan, Kyoko Hada, Andrew Tafelski, Tamara McGuire, Eric Carlson, Amber Stephens. Thanks to JBER, ADF&G, NMFS, AKBMP, BWA, and the public for sharing sightings and photos.*

## Background

The Cook Inlet Beluga Whale (CIBW) Photo-Identification (ID) Project was contracted by National Marine Fisheries Service (NMFS) to use non-invasive photo-ID techniques to help fill data gaps regarding individual and population characteristics of this endangered beluga population, with the goal of providing information to aid NMFS in conservation and management actions. The contract specified that the CIBW Photo-ID Project would conduct a minimum of 25 photo-ID surveys in 2022, identify individual whales from photographs, and summarize results in a series of six reports. This report, the first in the series, is entitled, *Spatial and temporal patterns of habitat use by groups and individuals in 2022, with emphasis on feeding and reproduction*. Detailed background information and methods for this long-term project are included in previous annual reports, available at [www.cookinletbelugas.com](http://www.cookinletbelugas.com).

## Results

### Feeding Behavior

Any feeding behavior of belugas observed during surveys was noted as *feeding suspected* (i.e., chasing prey as evidenced by bursts of speed, lunges, and/or focused diving in a specific location, or by fish jumping out of the water near belugas), or *feeding confirmed* (i.e., beluga was seen with a prey item in its mouth), *no feeding behavior observed*, or *unknown*. Feeding behavior (suspected and confirmed) during the 2022 field season was observed March through October (Table 1), and in all the survey areas in which beluga groups were encountered (Table 1, Figure 1a), consistent with patterns from previous years of the study (Figure 1b).

Table 1. CIBW Photo-ID Project observations of feeding behavior by survey area and month. x = no effort, yes = feeding confirmed or suspected, no = no feeding behavior observed, unk = unknown, 0 = no belugas. Surveys were conducted March through December 2022.

Survey Area	March	April	May	June	July	August	September	October	November	December
Susitna River Delta	x	x	yes	yes	yes	no	x	x	x	x
Knik Arm	x	x	x	x	x	yes	yes	x	x	x
Turnagain Arm	x	no	x	x	x	yes	yes	no	x	x
Kenai River Delta	yes	yes	0	x	x	yes	yes	yes	no	unk

### Groups with Calves

Observers noted if calves were present in groups. Calves were usually dark gray, usually <3/4 the total length of adult belugas, and usually swimming within one body length of an adult-sized beluga. Calves were seen March through October of the 2022 field season (Table 2). Groups with calves occurred in the same general locations as groups without calves, both in 2022 and for all 2005–2022 surveys combined (Figure 2).

Table 2. CIBW Photo-ID Project observations of beluga calves by survey area and month. x = no effort, yes = calves observed, no = no calves observed, unk = unknown, 0 = no belugas. Surveys were conducted March through December 2022.

Survey Area	March	April	May	June	July	August	September	October	November	December
Susitna River Delta	x	x	yes	yes	yes	yes	x	x	x	x
Knik Arm	x	x	x	x	x	yes	unk	x	x	x
Turnagain Arm	x	yes	x	x	x	yes	yes	yes	x	x
Kenai River Delta	yes	yes	0	x	x	yes	yes	yes	no	no

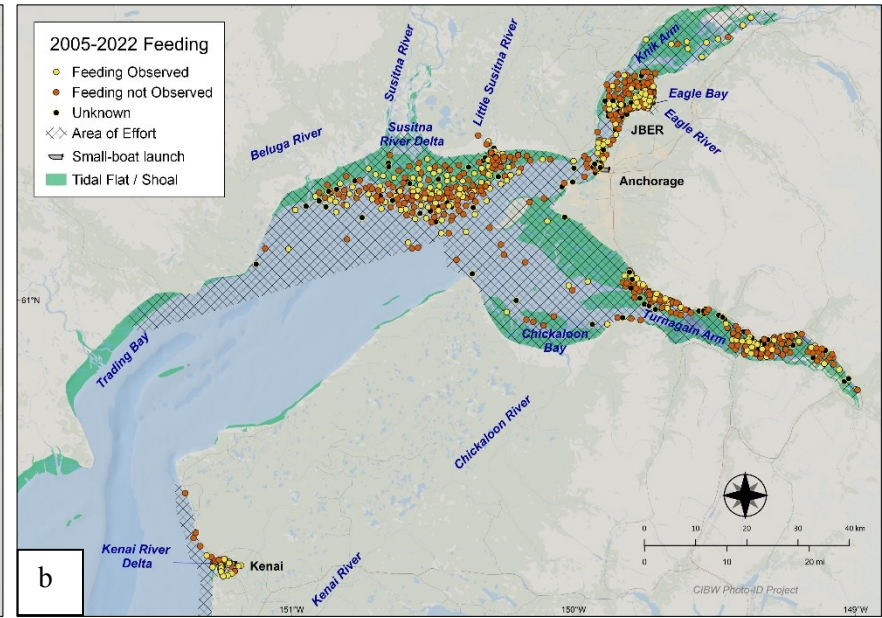
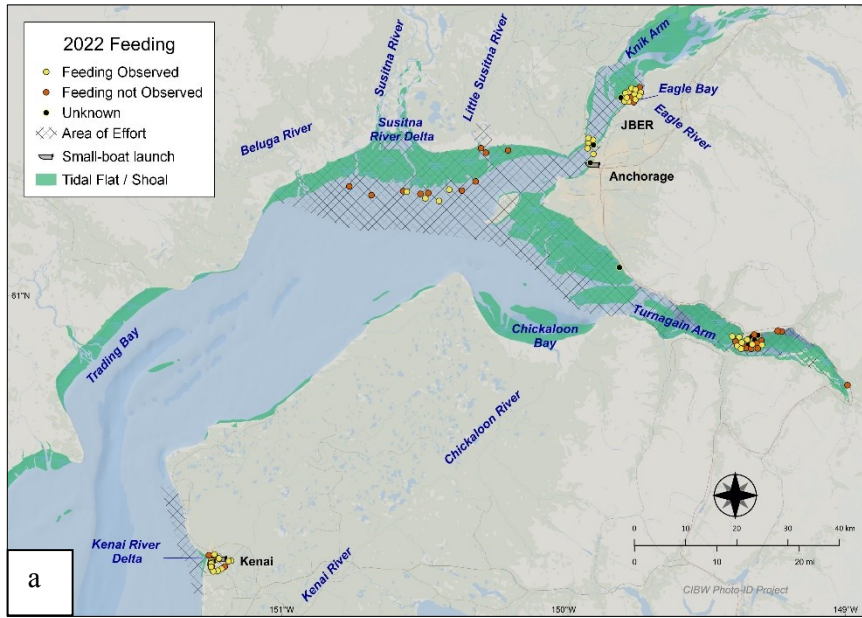


Figure 1. Location of beluga groups with and without observations of feeding behavior (suspected or confirmed) during photo-ID surveys conducted in 2022 (a) and 2005–2022 combined (b).

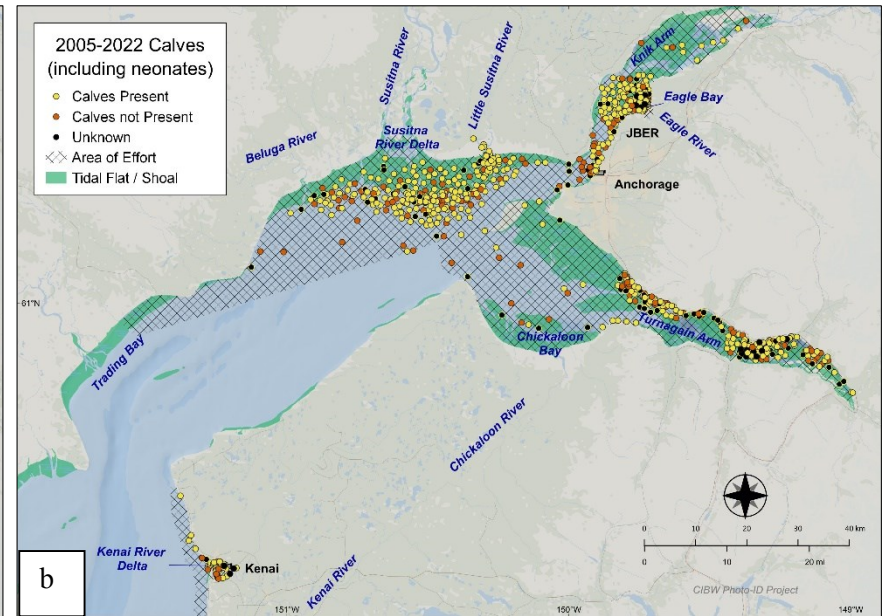
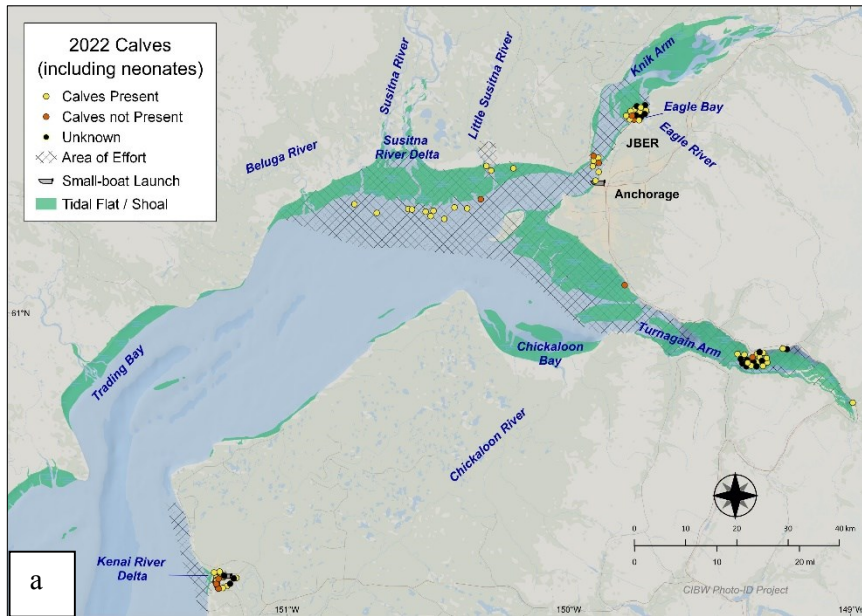


Figure 2. Location of beluga groups with and without calves and/or neonates encountered during photo-ID surveys conducted in (a) 2022 and from (b) 2005–2022.

## Groups with Neonates

Observers noted if any calves were neonates (i.e., newborns, estimated to be hours to weeks old) based on extremely small size (1.5 m [5 ft]), a wrinkled appearance because of the presence of fetal folds, and uncoordinated swimming and surfacing patterns. In 2022, neonates were photographed August through October (Table 3). The first neonates were first seen on August 10 in the Susitna River Delta and in Knik Arm and last were seen on October 14 in the Kenai River Delta. Groups with neonates occurred in the same general locations as groups without neonates, both in 2022 and for all 2008–2022 surveys combined (Figure 3). A possible birth was observed on July 29, 2022, in the Susitna River Delta, but it was seen at too great a distance to confirm. A small beluga that looked bigger than a neonate but smaller than a calf born in 2021 was photographed on May 28, 2022, and appeared similar to a small, sickly calf that was found dead in Kenai in 2012 and judged by veterinarians to have been born the previous year.

Table 3. CIBW Photo-ID Project observations of neonates by survey area and month. x = no effort, yes = neonates observed, no = neonates not observed, unk = unknown, 0=no belugas. Surveys were conducted March through December 2022.

Survey Area	March	April	May	June	July	August	September	October	November	December
Susitna River Delta	x	x	unk	no	unk	yes	x	x	x	x
Knik Arm	x	x	x	x	x	yes	unk	x	x	x
Turnagain Arm	x	unk	x	x	x	unk	yes	unk	x	x
Kenai River Delta	unk	unk	0	x	x	yes	yes	yes	no	no

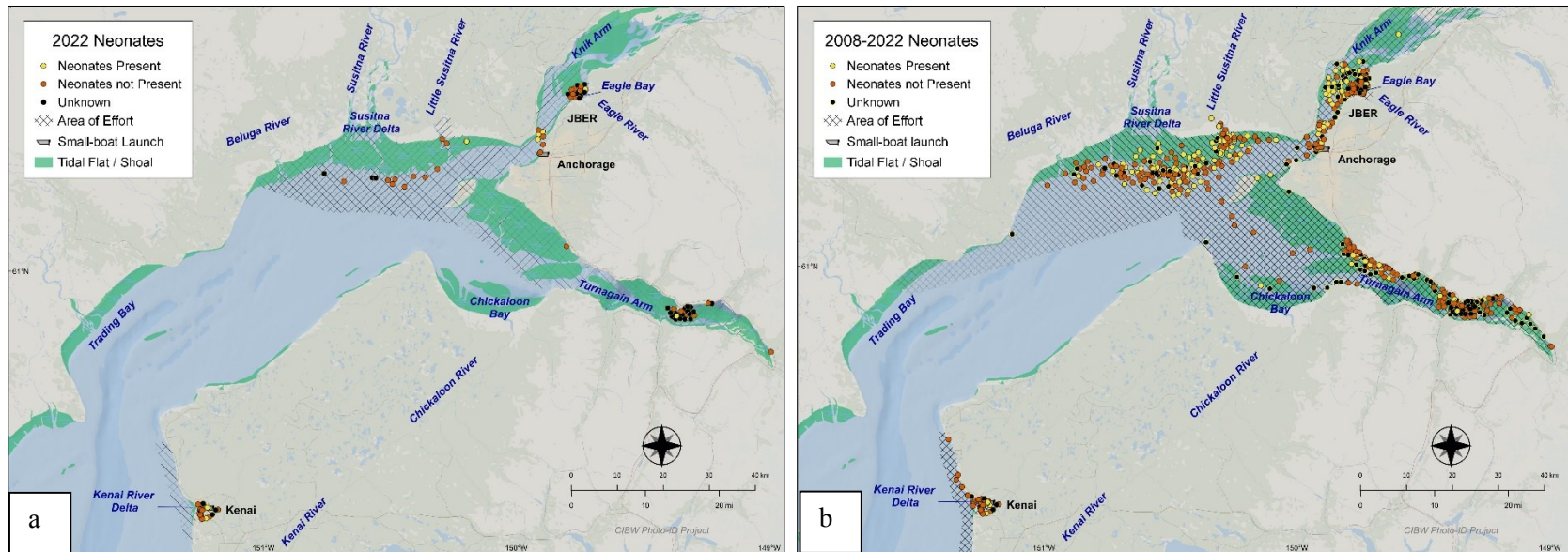


Figure 3. Location of beluga groups with and without neonates encountered during photo-ID surveys in 2022 (a) and 2005–2022 combined (b).

## Habitat Use by Individuals

Individual belugas do not display site fidelity; instead, they move among all the areas of Cook Inlet. Belugas may return to an area season after season or remain in an area several days in a row, but they still move throughout the survey area. The following belugas have been photographically followed over several years and exemplify the general habitat use patterns that we are observing.



Figure 3. Photograph of beluga D111's left side.



Figure 4. Photograph of beluga D107's right side.

- Female D111 was captured and tagged by NMFS in 2000 and her records span 22 years. Her tagging records from 2000 and her photo-ID records (2005–2017) show her using Knik Arm and the Susitna River Delta, but not Turnagain Arm. Then, in 2018, she was photographed in the Susitna River Delta, Chickaloon Bay, and Turnagain Arm. In 2019, she was photographed in the Susitna River Delta, Knik Arm, and Chickaloon Bay, but not in Turnagain Arm. In 2020, she was photographed in the Susitna River Delta and in Turnagain Arm, and in 2021 she was photographed only in Turnagain Arm. In 2022, she was photographed in Knik Arm on August 22 and 24, then in Turnagain Arm on September 2 and 17.
- Beluga D107's sighting records span 18 years (2005–2022) and has been photographed in all survey areas including Kenai in recent years (Table 4). Its sex is unknown, but this individual is presumed to be a male due to lack of photographs of a calf swimming closely alongside. It is often by itself but has also been photographed in groups of various sizes.

Table 4. Years and locations in which beluga D107 was photographed.

Year	Location	Year	Location	Year	Location
2005	Knik Arm	2011	Susitna River Delta	2017	Susitna River Delta
2006	Susitna River Delta	2012	Susitna River Delta	2018	Susitna River Delta
2007	Knik Arm	2013	Susitna River Delta	2019	Kenai River Delta and Knik Arm
2008	Knik Arm and Turnagain Arm	2014	Susitna River Delta	2020	Knik Arm
2009	Knik Arm and Susitna River Delta	2015	Susitna River Delta	2021	Kenai River Delta and Turnagain Arm
2010	Susitna River Delta	2016	Susitna River Delta and Knik Arm	2022	Kenai River Delta and Turnagain Arm