

Report #6: Photo-Identification of Beluga Whales in Cook Inlet, Alaska:

Summary of annual survey effort and group size, location, and age-class composition in 2022

Prepared by:

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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 sixth in the series, is entitled *Summary of annual survey effort and group information (e.g., size, location, and group composition) in 2022*. Detailed background information and methods for this long-term project are included in previous annual reports, available at www.cookinletbelugas.com.

Results

Annual Survey Effort

Between March 12 and December 10 of 2022, the CIBW Photo-ID Project conducted 196 vessel- and land-based surveys in Cook Inlet, Alaska for the 18th consecutive field season (Table 1, Table 2, Figure 1), bringing the project total to 804 photo-ID surveys. The Cook Inlet study area is divided into five survey sub-areas: Susitna River Delta, Knik Arm, Turnagain Arm, Chickaloon Bay/Fire Island, and Kenai River Delta. A Kenai-based field photographer was added in 2022, which increased effort and the number of groups encountered in this sub-area (Table 1, Table 2).

Table 1. Annual number of CIBW Photo-ID Project surveys conducted in Cook Inlet, Alaska, from 2005 through 2022 according to survey sub-area.

Sub-Area	Year																		Total Number of Surveys
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	
Susitna River Delta	16	17	5	8	13	14	11	13	8	9	10	11	9	11	12	9	11	9	196
Knik Arm	32	13	5	9	10	9	16	12	3	7	4	8	1	5	4	4	19	13	174
Turnagain Arm	0	4	5	12	12	15	16	15	12	8	8	7	3	9	12	24	26	24	212
Chickaloon Bay/ Fire Island	4	1	1	2	1	0	2	5	2	2	1	0	0	1	1	0	1	0	24
Kenai River Delta	0	0	0	0	0	0	4	14	6	0	0	0	3	6	3	3	9	150	198
Annual Number of Surveys	52	35	16	31	36	38	49	59	31	26	23	26	16	32	32	40	66	196	804

Table 2. Photo-ID survey effort and beluga whale groups encountered in Cook Inlet, Alaska in 2022.

	2022			
	Susitna River Delta	Knik Arm	Turnagain Arm	Kenai River Delta
Range of Survey Dates	May-25 to Aug-28	Aug-10 to Sep-06	Apr-13 to Apr-29 & Aug-13 to Oct-16	Mar-12 to May-14 & Aug-15 to Dec-10
Number of Surveys	9	13	24	150
Number of Groups Encountered	14	22	24	70
Number of Beluga Sightings	277	222	221	637
Mean Number of Groups per Survey	1.6	1.7	1.0	0.5
Mean Number of Belugas per Survey	30.8	17.1	9.2	4.2
Mean Group Size	19.8	10.1	9.2	9.1
Maximum Group Size	50	35	35	38
Group Size Range	1-50	1-35	2-35	1-38

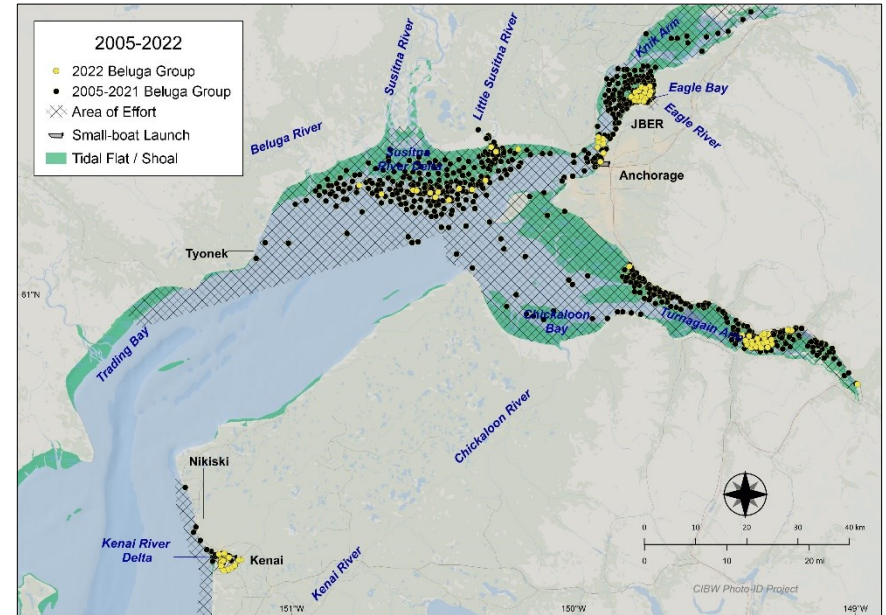
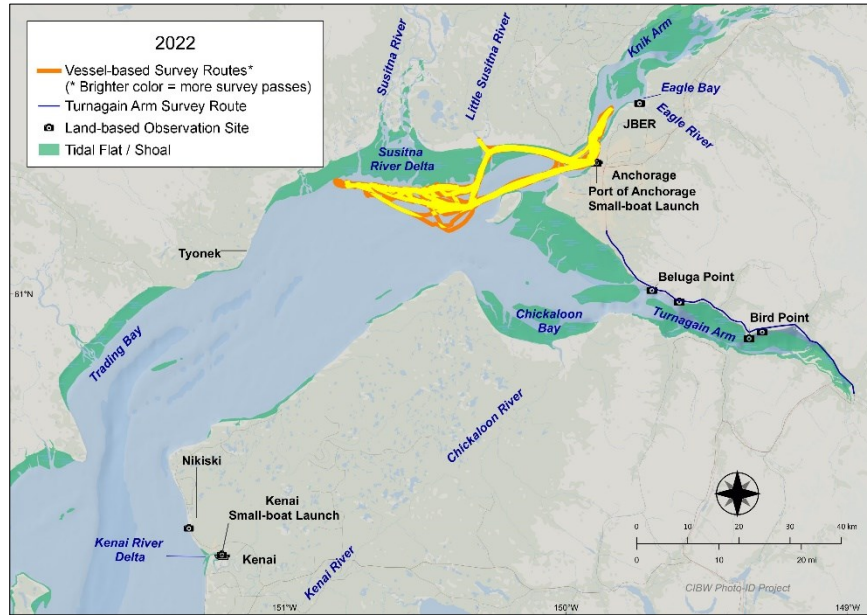


Figure 1. Vessel routes (from daily GPS track lines) with land-based stations and survey routes for all photo-ID surveys conducted in 2022. The level of effort of the vessel-based surveys is indicated by the intensity of the colors of the track lines. See Table 1 for the exact number of surveys.

Figure 2. Beluga whale groups encountered during all photo-ID surveys conducted in 2005–2022 combined.

Group Size and Location

There were 130 groups encountered during photo-ID surveys in 2022 (Table 2; Figure 2). Mean group size and mean number of belugas per survey (Table 2) in 2022 was greatest in the Susitna River Delta and smallest in the Kenai River Delta; these patterns are similar to previous years of the study (Figure 3) although maximum group size in 2022 was smaller than in previous years of the study (Table 3).

Table 3. Summary of date and location of the maximum annual group size for each field season of beluga photo-ID surveys in Cook Inlet, Alaska during the 2005–2022 study period.

Year	Field Season	Location of Largest Observed Group of Year	Date of Largest Group of Year	Maximum Group Size Observed
2005	Apr 14 – Oct 21	Susitna River Delta	Jul 23	152
2006	May 12 – Oct 5	Susitna River Delta	Jul 26	61
2007	Jun 28 – Oct 27	Susitna River Delta	Jul 27	74
2008	May 21 – Oct 31	Susitna River Delta	Jul 29	121
2009	Jun 19 – Oct 28	Susitna River Delta	Aug 3	152
2010	May 9 – Oct 31	Susitna River Delta	Jul 16	173
2011	Apr 16 – Oct 31	Susitna River Delta	Jul 27	136
2012	May 2 – Oct 31	Susitna River Delta	Jul 20	200
2013	Apr 20 – Oct 31	Susitna River Delta Chickaloon Bay	Jul 22 & Jul 31 Sep 16	200
2014	Jul 8 – Oct 31	Susitna River Delta	Jul 27	250
2015	May 28 – Oct 22	Susitna River Delta	Jul 20	313
2016	May 24 – Sep 30	Susitna River Delta	Jul 19	148
2017	Jul 21 – Sep 26	Susitna River Delta	Jul 27 & Aug 5	300 & 302
2018	May 2 – Oct 25	Susitna River Delta	Jul 12	222
2019	May 18 – Oct 31	Susitna River Delta	Jun 3	200
2020	Apr 9 – Nov 9	Susitna River Delta	Jul 23	200
2021	Apr 9 – Oct 31	Susitna River Delta	Jun 5	125
2022	Mar 12 – Oct 31	Susitna River Delta	Jul 27	50

Group Composition

Group composition data included the number of whales in each body-color category (white or gray) and age class (calves and neonates). Because belugas are born dark gray and lighten as they age, skin color can be used as an indicator of relative age. Groups whose composition could not be determine are not included in this summary. Group composition varied somewhat by survey sub-area. All groups encountered contained white belugas, while most also contained gray belugas and calves (Table 4). The exception was in Knik Arm, where only half of the groups contained gray belugas. More information on calves and neonates encountered in 2022 are presented in reports #1 and #3.

Table 4. Percent color/age-class composition of beluga groups sighted during surveys of Cook Inlet, Alaska in 2022 (excluding those groups for which a color/age-class could not be determined).

2022 Sub-Area	% of groups containing:			
	White-Colored Whales	Gray-Colored Whales	Calves	Neonates
Susitna River Delta	100	86	93	7
Knik Arm	100	50	76	27
Turnagain Arm	100	84	87	13
Kenai River Delta	100	82	69	29

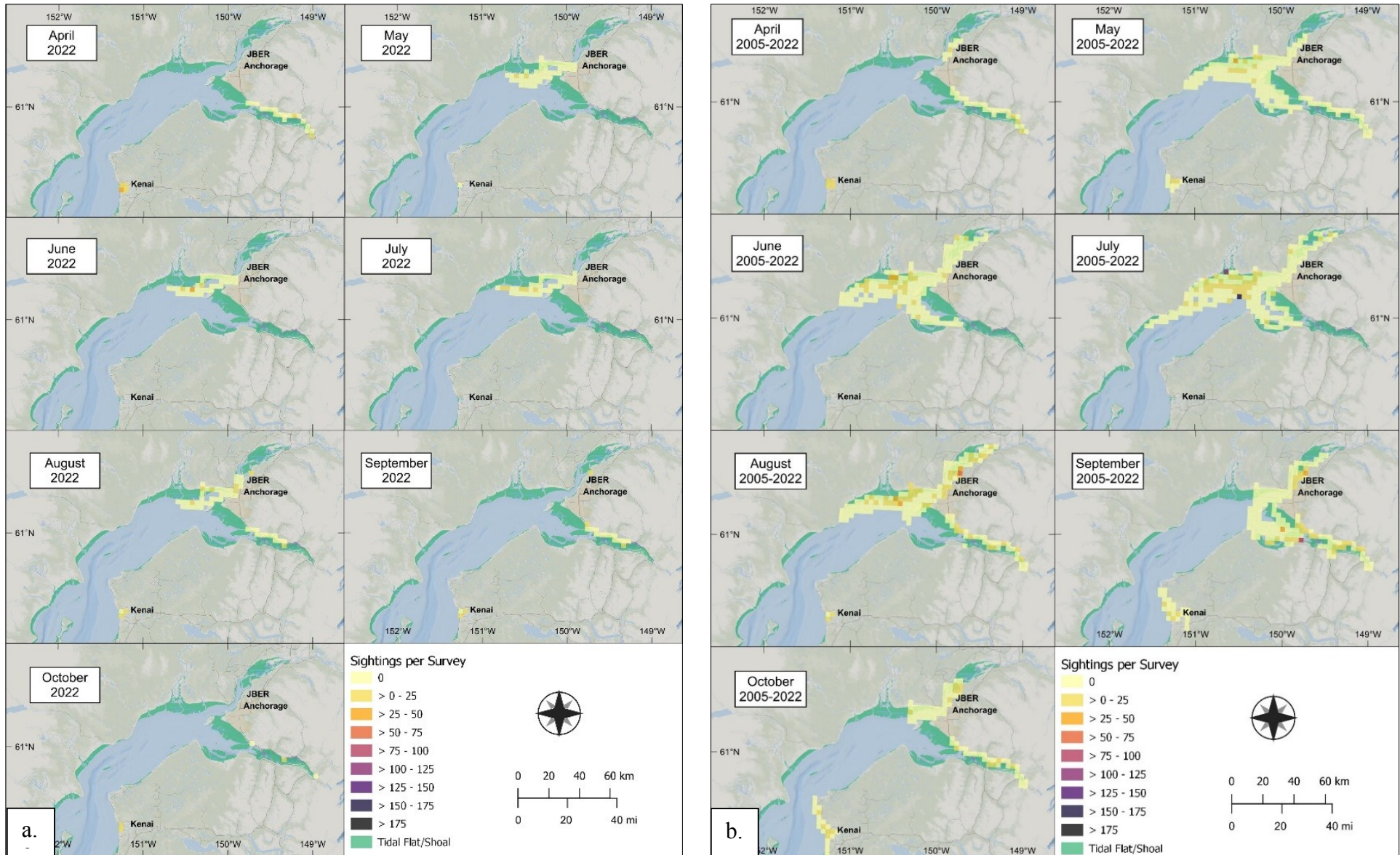


Figure 3. Average counts of belugas per survey by month for surveys conducted in 2022 (a) and in 2005–2022 combined (b). Values were obtained by partitioning the study area into grid cells 3 km by 3 km and calculating the average number of belugas detected per survey for each cell. March, November, and December are not included as they were surveyed only in 2022. JBER denotes Joint Base Elmendorf Richardson in Knik Arm.