

Report #5: Photo-Identification of Beluga Whales in Cook Inlet, Alaska:

Summary of human interactions: observations of human activities (non-research) during beluga surveys and signs of anthropogenic trauma (entanglement, puncture, vessel strike) in 2022

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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 fifth in the series, is entitled, *Summary of human interactions: observations of human activities (non-research) during beluga surveys and signs of anthropogenic trauma (entanglement, puncture, vessel strike) in 2022*. Details of the long-term Photo-ID Project background and methods can be found in previous project reports, available at www.cookinletbelugas.com.

Results

Observations of human activities (non-research) during beluga surveys in 2022

Human activities occurring in the vicinity of encountered groups with the potential to affect belugas were noted during photo-ID surveys (Table 1). The majority of observed human activities were incidental in the sense that most people appeared to be unaware of the presence of belugas. NMFS was notified of a few cases when small aircraft appeared to deliberately target belugas for close approach. Aircraft activity (e.g., small recreational and commercial planes and helicopters, large commercial aircraft for cargo and passengers, military fighter and transport aircraft) was the human activity most commonly noted. Observers had the subjective impression that in 2022 there was an increase in commercial aircraft flying low over the Little Susitna River approaching Ted Stevens International Airport for landing, resulting in more aircraft noise there than in previous years; NMFS affiliated acousticians with recorders in the vicinity were alerted to this possibility. Other human activities that were observed near belugas included shipping/transport, vessel-based duck hunting, vessel-based seal hunting by Alaska Natives, the train whistle along Turnagain Arm, setnetting, and dipnetting.

Table 1. Human activities observed in the vicinity of belugas during surveys in 2022, according to months and survey area. No surveys were conducted during January and February. x = no effort, 0 = no belugas, A = aircraft, V = vessel.

Month	Susitna River Delta	Knik Arm	Turnagain Arm	Kenai River Delta
March	x	x	x	A
April	x	x	None recorded	A,V, dipnetting
May	A,V	x	x	0
June	A	x	x	x
July	A,V, setnetting	x	x	x
August	A,V	A,V, ordnance	A	A,V
September	x	A	A, train whistle	A,V, duck hunters, floating dock removal
October	x	x	None recorded	A,V, seal hunters
November	x	x	x	A
December	x	x	x	A

Signs of anthropogenic trauma (entanglement, puncture, vessel strike) in 2022

All photos of identified whales photographed in 2022 were examined for signs of anthropogenic trauma. Categories of scars were developed by comparing scars and deformities seen on individuals in the CIBW Photo-ID Project catalog and stranding photos to descriptive classifications and photographs of injuries to other marine mammal species. Marks that likely came from non-anthropogenic sources such as competition, predation, disease, and the physical environment are not included in this summary. Scars from research (e.g., satellite tags and biopsy) were not included in this analysis but are summarized in report #4. Scars appearing to

be consistent with anthropogenic sources were categorized as three types: puncture, vessel strike, or entanglement. Scars were then classified as confirmed (unambiguous evidence, such as an attached rope), possible (ambiguous, the mark also could have been from another source or non-human related), or no (without any evidence of anthropogenic trauma) in each of the scar type categories.

Results from the photo review are summarized according to 78 right-side individuals (Table 2), 92 left-side individuals (Table 3), and 79 combined dual-side individuals (Table 4). Of the identified belugas photographed in 2022, 21% of right-side individuals, 24% of left-side individuals, and 38% of dual-side individuals had signs of possible anthropogenic trauma. Further investigations are needed to determine which of these scars are most consistent with anthropogenic trauma. All but one of these scars had been noted in previous years. The only fresh scar noted in 2022 was a superficial possible vessel-strike scar that was relatively fresh when first photographed June 10 and appeared healed when it was next photographed on July 11. There were no photos of confirmed anthropogenic trauma in 2022.

Table 2. Summary of 16 belugas photographed in 2022 in the right-side CIBW Photo-ID catalog with scars consistent with anthropogenic trauma from entanglement, vessel strikes, and non-research punctures (i.e., excluding biopsy and tag scars). These data are preliminary and possible scars merit further evaluation.

78 Right-side Whales Photographed in 2022	Possible	Confirmed
Whales with Puncture Scars Only	5	0
Whales with Vessel-Strike Scars Only	6	0
Whales with Entanglement Scars Only	3	0
Whales with Puncture and Vessel-Strike Scars ¹	0	0
Whales with Puncture and Entanglement Scars ¹	1	0
Whales with Puncture, Vessel-Strike, and Entanglement Scars ¹	1	0
Whales with Vessel-Strike and Entanglement Scars ¹	0	0
Total Number of Whales with Puncture Scars	7	0
Total Number of Whales with Vessel-Strike Scars	7	0
Total Number of Whales with Entanglement Scars	5	0

¹May include scars that could have originated from one source or another.

Table 3. Summary of 22 belugas photographed in 2022 in the left-side CIBW Photo-ID catalog with scars consistent with anthropogenic trauma from entanglement, vessel strikes, and non-research punctures (i.e., excluding biopsy and tag scars). These data are preliminary and possible scars merit further evaluation.

92 Left-side Whales Photographed in 2022	Possible	Confirmed
Whales with Puncture Scars Only	8	0
Whales with Vessel-Strike Scars Only	4	0
Whales with Entanglement Scars Only	7	0
Whales with Puncture and Vessel-Strike Scars ¹	0	0
Whales with Puncture and Entanglement Scars ¹	2	0
Whales with Puncture, Vessel-Strike, and Entanglement Scars ¹	0	0
Whales with Vessel Strike and Entanglement Scars ¹	1	0
Total Number of Whales with Puncture Scars	10	0
Total Number of Whales with Vessel-Strike Scars	5	0
Total Number of Whales with Entanglement Scars	10	0

¹May include scars that could have originated from one source or another.

Table 4. Summary of 30 belugas photographed in 2022 in the dual-side CIBW Photo-ID catalog with scars consistent with anthropogenic trauma from entanglement, vessel strikes, and non-research punctures (i.e., excluding biopsy and tag scars). These data are preliminary and possible scars merit further evaluation.

79 Dual-side Whales Photographed in 2022	Possible	Confirmed
Whales with Puncture Scars Only	10	0
Whales with Vessel-Strike Scars Only	6	0
Whales with Entanglement Scars Only	6	0
Whales with Puncture and Vessel-Strike Scars ¹	2	0
Whales with Puncture and Entanglement Scars ¹	3	0
Whales with Puncture, Vessel-Strike, and Entanglement Scars ¹	2	0
Whales with Vessel Strike and Entanglement Scars ¹	1	0
Total Number of Whales with Puncture Scars	17	0
Total Number of Whales with Vessel-Strike Scars	11	0
Total Number of Whales with Entanglement Scars	10	0

¹May include scars that could have originated from one source or another.

The difficulty in assigning a likely cause of a mark is illustrated by beluga R29. This adult beluga, presumed to be a female based on photos of an accompanying calf, was first photographed in 2005. In 2021, citizen scientists photographed her from shore along Turnagain Arm with a relatively fresh injury. The photos were shared with the CIBW Photo-ID Project, who in turn shared the photos with the NMFS Cook Inlet beluga whale recovery coordinator, the Alaska Marine Mammal Stranding Network, and veterinarians from Alaska’s North Slope Borough and Quebec, Canada. Experts could not reach a consensus about the possible origin and suggested various possible causes such as debris in the water, a keel-strike, or a propeller-strike. The consensus was to classify it as a laceration of unknown origin. The laceration was photographed healing later in 2021 and was completely healed in 2022. Beluga R29 is one of six whales photographed in 2022 categorized as possible vessel strike.

Injury or Disease of Unknown and/or Multiple Origins

We do not know the cause, or causes, of the dorsal concavity exhibited by several whales in the catalog. Beluga D2379 is shown as an example in Figure 4. Possibilities are human-induced injury (e.g., vessel strike, gunshot, or entanglement), or natural injury (e.g., predation attempt, disease, emaciation, scoliosis, or genetic deformity), or some combination of the above. This beluga has a concave back, but also a large scar along its flank.

One possible source of infection that we hope to learn more about is the pathogen, *Erysipelothrix rhusiopathiae*, which can result in skin lesions and arthritis. Veterinarians with the Alaska Marine Mammal Stranding Network report that this pathogen has been found in CIBWs (Dr. Kathleen Burek-Huntington, pers. comm.), and we are curious to investigate if some of the skin lesions and spinal curvature we are photo-documenting might be associated with this pathogen. We will continue to follow these whales photographically, share their photographs with veterinarians with the Alaska Marine Mammal Stranding Network, and continue to screen all whales in the catalog for these deformities. Examination of the skeletons of these whales after they die may provide insight into the cause of the deformity.

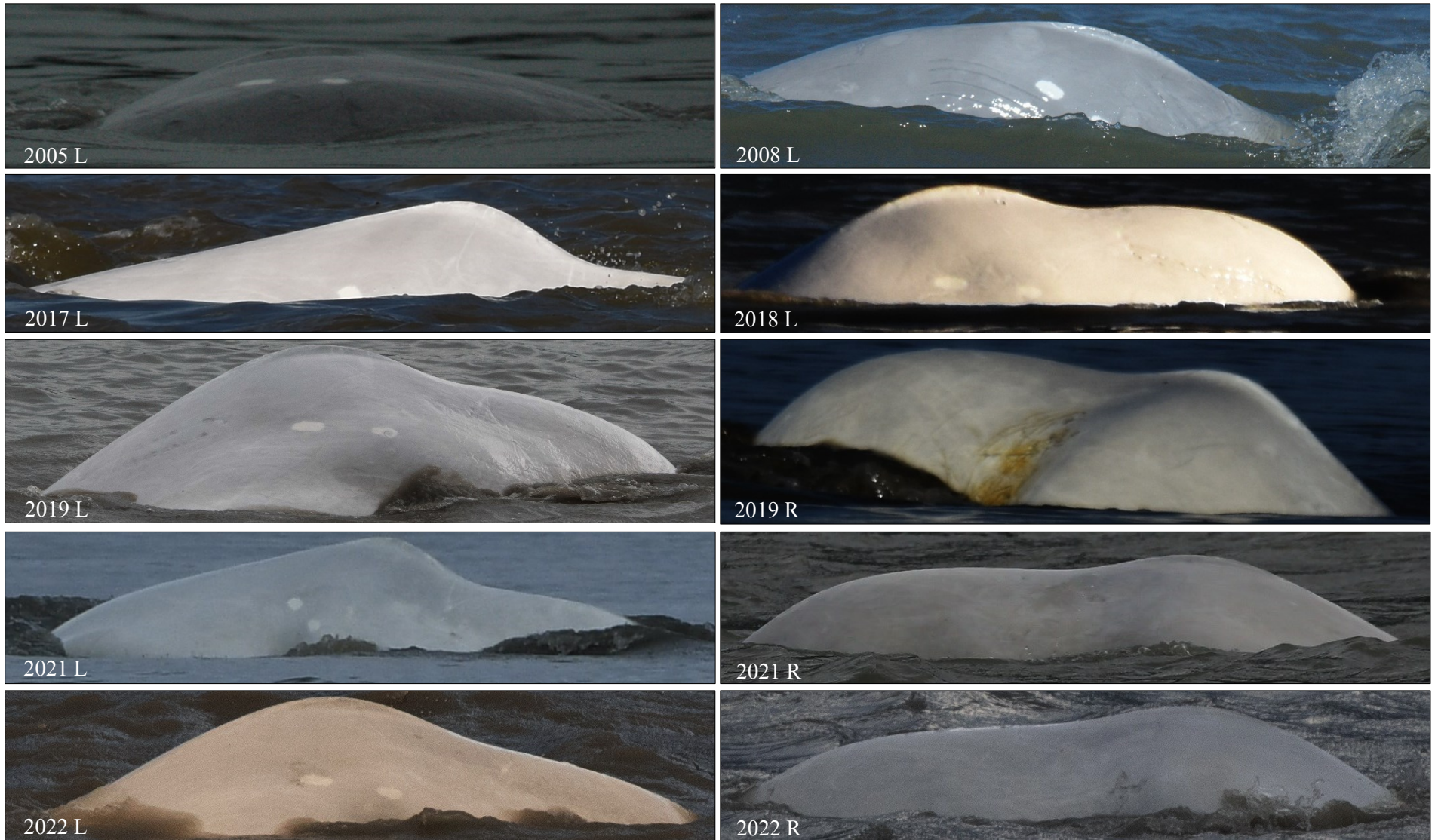


Figure 4. Beluga D2379. Note the pronounced concavity behind the dorsal crest in 2017 and following years that was not present in 2005. The concavity was detected in 2008 and appeared to worsen through 2021. In 2019, photos show discoloration on the right side which may be from a diatom infestation or an infection of unknown origin. This whale was not photographed in 2020 and the discoloration seen in 2019 was no longer visible in 2021. Both sides of the whale were photographed in 2022 and the whale appeared slightly less emaciated than the year before, resulting in a slightly less concave appearance, although this could be due to the fact that the whale was photographed in October in 2022, whereas in previous years it had been photographed May-August, earlier in the ice-free season when it would not have had as many months to feed on migratory prey.