

# **Harvest Data and Sample Collection Metadata from the 2020 Beluga (*Delphinapterus leucas*) Subsistence Harvest Monitoring Program in the Inuvialuit Settlement Region**

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**Canada-Inuvialuit  
Fisheries Joint Management Committee  
Technical Report Series**

**HARVEST DATA AND SAMPLE COLLECTION METADATA FROM  
THE 2020 BELUGA (*DELPHINAPTERUS LEUCAS*) SUBSISTENCE  
HARVEST MONITORING PROGRAM IN THE INUVIALUIT  
SETTLEMENT REGION**

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2024-01: vi + 41 p.**

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## ABSTRACT

Every spring the Eastern Beaufort Sea (EBS) beluga (*Delphinapterus leucas*) stock migrates along the open ice leads from the Bering Sea to their summering grounds in Canada's Western Arctic. During the summer months, beluga from this stock are harvested for subsistence by local hunters from all Inuvialuit Settlement Region (ISR) communities (Tuktoyaktuk, Inuvik, Paulatuk, Aklavik, Ulukhaktok, and Sachs Harbour). As part of the established long-term ISR Beluga Subsistence Harvest Monitoring Program initiated in 1973, Beluga Monitors (hired by local Hunters and Trappers Committees) travel to traditional whaling camps during the summer to record data and information (including observational) about the harvest, as well as to collect beluga tissue samples for scientific analyses. This report summarizes harvest and biological data collected in 2020 from the ISR Beluga Subsistence Harvest Monitoring Program. Data includes harvest metrics (e.g., hunt timing and location), observations on color and condition of individual belugas, observations on environmental conditions, and morphometric measurements. In 2020, a total of 88 belugas were reported harvested in the ISR and 70 of those were sampled by Beluga Monitors. Of the harvested belugas, 53 were male, 12 were female, and the sex of the remaining 23 belugas was unidentified. Beluga from all hunt locations varied in colour from white, grey, and yellow. The standard length of all sampled belugas ranged from 327.7 to 467.4 cm for males and 315.0 to 439.4 cm for females.

The DFO Beluga Health Research and Monitoring expansion of the program, which began in 2000 supports sampling for contaminants and other areas of concern throughout the ISR, and includes an intensive health sampling program based out of Hendrickson Island. However, in 2020 the DFO Science team was not able to conduct this health sampling at Hendrickson Island due to the global COVID-19 pandemic, and in their place a local Research Monitor was hired to collect a reduced suite of samples from 16 harvested whales. Other changes due to COVID-19 included all Monitors following appropriate safety protocols (social distancing, masking, wearing gloves), increased efforts in communication to deal with planning and logistical challenges, and a new Research Support Services community position being created to fill in gaps created by no DFO Science staff being in the region and the DFO Area office being closed.

The present report is the first of a series of annual reports that provide a summary and record of beluga harvest monitoring activities and data collected in the ISR each year. The publication of the annual report ensures a long-term standardized record of harvest and basic morphometric data, accessible for use by the co-management partners working under the Inuvialuit Final Agreement (i.e., FJMC, IGC, ISR HTCs, and DFO) for monitoring, research, and future decision-making.

## INTRODUCTION

Beluga whales (*Delphinapterus leucas*) are an important component of Inuvialuit diet, tradition, and culture (McGhee 1988; Day 2002; Usher 2002; Hoover *et al.* 2016). Each spring, beluga from the Eastern Beaufort Sea (EBS) stock migrate along open ice leads to their summering grounds in the marine waters of the Inuvialuit Settlement Region (ISR) (Fraker and Fraker 1979; Storrie *et al.* 2022; Figure 1). Belugas that enter the Mackenzie River Estuary are traditionally harvested for subsistence by hunters from the communities of Inuvik, Aklavik, and Tuktoyaktuk (Figure 2). Beluga are also widely distributed throughout the offshore Canadian Beaufort Sea and Amundsen Gulf, and are harvested by the communities of Paulatuk, Ulukhaktok and Sachs Harbour for subsistence (Harwood *et al.* 2020; Figures 1 and 3).

The management of the population is based on the best available scientific and Indigenous Knowledge obtained through hunter observations, continued annual harvest-based monitoring of the stock, and the Beaufort Sea Beluga Management Plan (FJMC 2013). Additionally, within the ISR, two Marine Protected Areas (MPA) have been designated under Canada's *Oceans Act* for the protection and conservation of a number of components of the ecosystem, including beluga whales (Figure 1). Both the [Tarium Niryutait Marine Protected Area \(TNMPA\)](#) (2010) and the [Anguniaqvia niqiqyuam Marine Protected Area \(ANMPA\)](#) (2016) require regular monitoring and reporting to ensure conservation objectives are being met (DFO and FJMC, 2013 TNMPA Management Plan).

A formal harvest monitoring program was started on the Mackenzie Estuary beluga harvest from 1973–1975 by the Fisheries and Marine Service of the Government of Canada (Hunt 1979). An oil and gas industry-sponsored program followed this from 1977 through 1982 (Fraker 1977, 1978, Fraker and Fraker 1979, 1981, Norton Fraker 1983). DFO assumed the role of coordinating from 1981 through 1986 and implemented standardized data collection protocols (Strong 1990, Weaver 1991). Finally, with the implementation of the Inuvialuit Final Agreement (IFA) in 1984, the FJMC assumed responsibility for the program in 1987 and has continued in that role to present (Harwood *et al.* 2002).



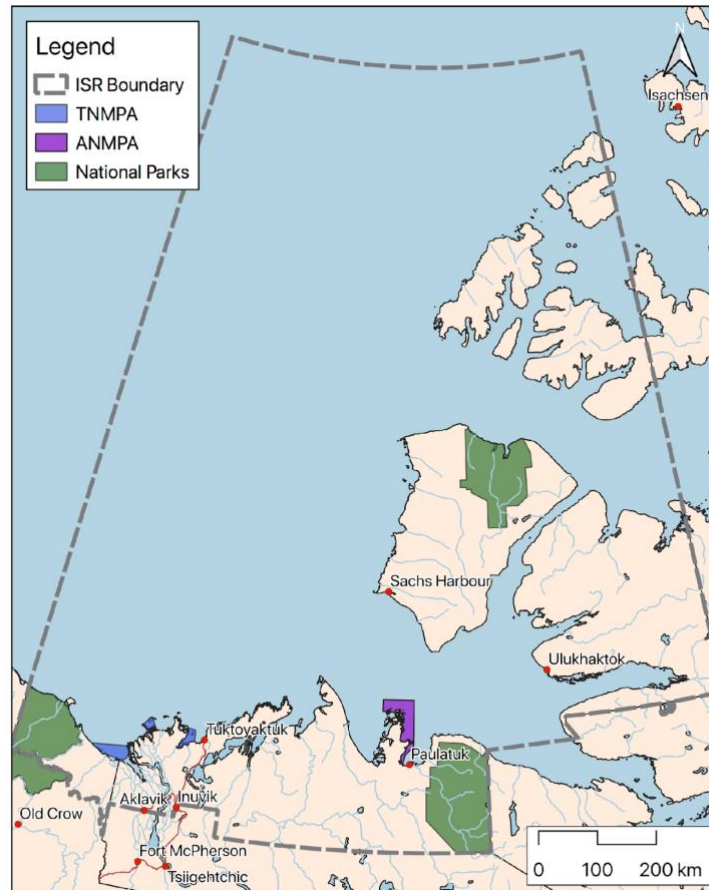


Figure 1. Map of the Inuvialuit Settlement Region (gray dashed line), as outlined in the Inuvialuit Final Agreement (1984), and communities of the western Canadian Arctic. The Tarnum Nirvutait Marine Protected Area (TNMPA) and the Anguniaqvia niqiqyuam Marine Protected Area (ANMPA) are shown in blue and purple, respectively.

The program is conducted jointly with the HTC of the six Inuvialuit communities as part of the Fish and Marine Mammal Community Monitoring Program (FJMC 2013), with ongoing support and collaboration from DFO. The objective of the beluga monitoring program is to collect annual beluga harvest data to support the management and conservation of the EBS beluga stock, and to monitor and evaluate changes in the stock trend and condition of individual whales (e.g., blubber thickness measurements) (Harwood *et al.* 2015). Each summer local community members are hired as Beluga Monitors to deliver the field portion of the program. Beluga Monitors are stationed at the main subsistence whaling camps during the hunting season, and work with the Inuvialuit hunters to document the size, efficiency, location and timing of harvest and to record characteristics of the individual harvested whales (e.g., color, sex), as well as indicators of health based on Inuvialuit Knowledge (Ostertag *et al.* 2018). Beluga Monitors also collect aging

structures for stock assessment and tissues used for long-term contaminants monitoring under the Northern Contaminants Program (Government of Canada 2018).

Beginning in 2000, the ISR Beluga Subsistence Harvest Monitoring Program expanded to include enhanced scientific, health-based collections including reproductive information (Harwood *et al.* 2015), incidence of disease (e.g., Nielsen *et al.* 2018, Sharma *et al.* 2018), contaminant loads (e.g., Loseto *et al.* 2015, Noel *et al.* 2018) and hormone levels (Loseto *et al.* 2018). The program has continued to evolve and respond to community questions and resource management needs (Loseto *et al.* 2018), and has engaged innovative scientific methods to understand beluga health and responses to emerging stressors such as climate change (Choy *et al.* 2019). The expanded Health Research and Monitoring is led by DFO and sampling occurs at Hendrickson Island (Figure 2). Note that in 2020 due to COVID-19 related travel restrictions, a new model was required that involved collection of a reduced suite of samples by a community Research Monitor at Hendrickson Island as well as the hiring of a locally based Research Support Services technician.

The objective of this report series is to provide a summary of harvest and morphometric data collected (e.g., harvest, time and location, physical observations and measurements), as well as field sampling methods. The reports serve to document the extent and type of sampling that occurred at various sites across the ISR each year, and any unusual events (e.g., rare species, standing or mortality events, atypical weather) observed and shared by local harvesters. The data reports will act as the repository of raw data for applications assessing the status and trend of the EBS beluga stock, including for MPA monitoring. Results from analyses of tissues/samples collected are reported elsewhere in discipline-specific articles.

## **MATERIALS AND METHODS**

### **Study Area**

Traditional whaling camps are land-based sites where families camp and hunt in coastal waters (Figure 2). However, hunt locations can vary annually depending on access and availability of whales. Community members from Inuvik typically camp and hunt from Kendall Island and East Whitefish. Harvesters from Tuktoyaktuk typically hunt in Kugmallit Bay and land their whale at Hendrickson Island for butchering, with some hunters towing their catch to Tuktoyaktuk Harbour. Beluga harvesters from Aklavik are typically based at Shingle Point (see Worden *et al.* 2020 for more information). Beluga harvesters from Paulatuk access and use a number of harvest locations in and around Darnley Bay, including Brown's Harbour, Johnny Green Bay, Fish Lake, Argo Bay, Egg Island, and Tippitiuyak (Figure 3).

In 2020, beluga monitors were selected by the local HTC's to record, sample, and measure beluga harvested at Hendrickson Island, East Whitefish, Kendall Island, Darnley Bay (and surrounding area), Shingle Point (and surrounding area), and Ulukhaktok. Monitors in the Mackenzie Estuary area were stationed at camps for approximately one month from early to late July in an attempt to be available for the core harvest period. Specific dates vary between camps and years. Darnley Bay had two monitors that were staggered over time and traveled throughout the Bay to where harvest occurred. Ulukhaktok monitors were also staggered over time, and were stationed on-call in the community to sample any whales landed in or around Ulukhaktok. 2020 was the first-time monitors were stationed at Shingle Point in many years. A Harvester Reward Program was also in place for hunters to collect and submit samples and measurements from their harvested whales when a Beluga Monitor was not present (i.e., due to the harvest taking place at a time or in a location outside of the regular monitoring areas).

Due to COVID-19 travel restrictions there were no Science teams at Hendrickson Island or East Whitefish, and instead a Research Monitor was stationed at Hendrickson Island to collect a reduced suite of samples. Lionel Kikoak, who had experience with these sampling methods from the previous five seasons as a Youth Monitor and Monitor-in-Training, was hired as the Research Monitor and collected priority samples from approximately July 8 - July 30. Youth positions usually stationed at Hendrickson Island, East Whitefish, and Kendall Island were also not hired due to concerns related to COVID-19. Other program adjustments related to the COVID-19 pandemic included adjusted shipping protocols to account for limited access to DFO offices and reduced flight schedules, the need to purchase new equipment and adopt new sampling protocols to abide by national and territorial public health guidelines, and considerable effort for communication and planning between all program partners including virtual communication with HTC directors for program coordination and preparation, and weekly teleconferences between JS and DFO staff.

Beluga harvest data and samples were collected from the various ISR whaling camps between June 24 and August 11, 2020 (Table 1). The collection dates are not a reflection of the entire harvest period at each hunt location and while the Beluga Monitors make every effort to sample all landed whales, not all whales were sampled.

*Table 1. Periods of recorded beluga harvest in each area of the ISR, as well as names and timing of Beluga Monitors stationed in each area.*

<b>Area</b>	<b>Date Range of Recorded Harvest</b>	<b>Monitor(s)</b>	<b>Monitoring Period</b>
Mackenzie Delta (Hendrickson Island, East Whitefish, and Kendall Island)	July 10 to July 27, 2020	Hendrickson Island – Ronald “Innung” Felix (Sr. Monitor) and Pete Keevik	~July 8 to August 8, 2020
		East Whitefish – Lawrence “Fraser” Angasuk and Bertha Joe	June 28 to July 28, 2020
		Kendall Island – Rufus Tingmiak	June 29 to July 31, 2020
Darnley Bay and surrounding area	July 13 to August 11, 2020	Jody Illasiak	July 10 to July 31, 2020
		Brent Wolki	July 31 to August 22, 2020
Shingle Point	June 29 to July 19, 2020	Shauna Charlie	June 26 to July 20, 2020
Ulukhaktok	June 24 to July 13, 2020	Buddy Alikamik and Corrie Joss	July 3 to July 30, 2020

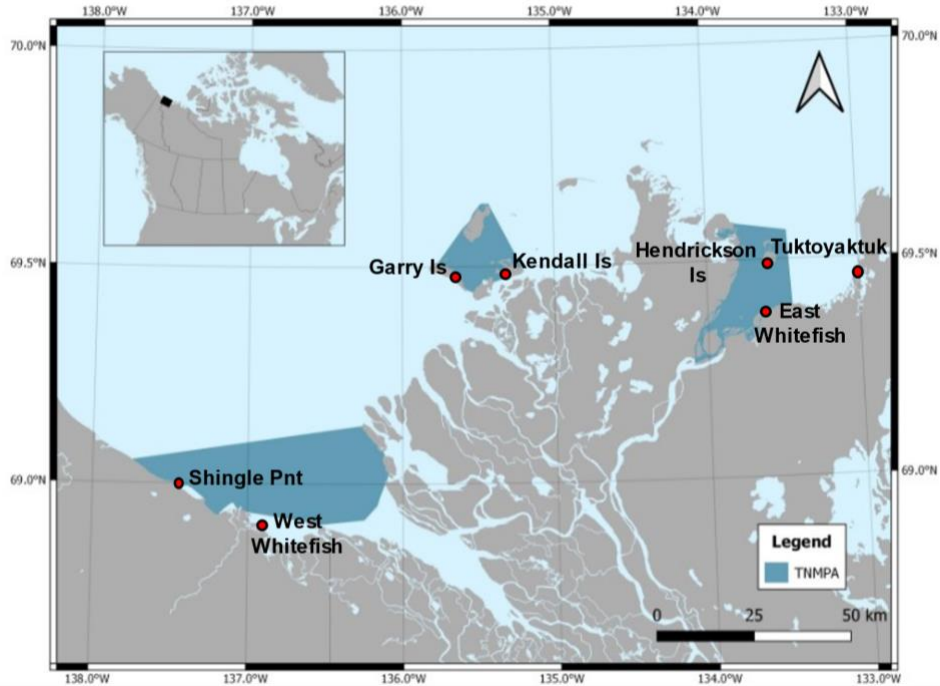


Figure 2. Traditional whaling camps and general locations of the beluga harvest in the Mackenzie Delta area of the Inuvialuit Settlement Region.

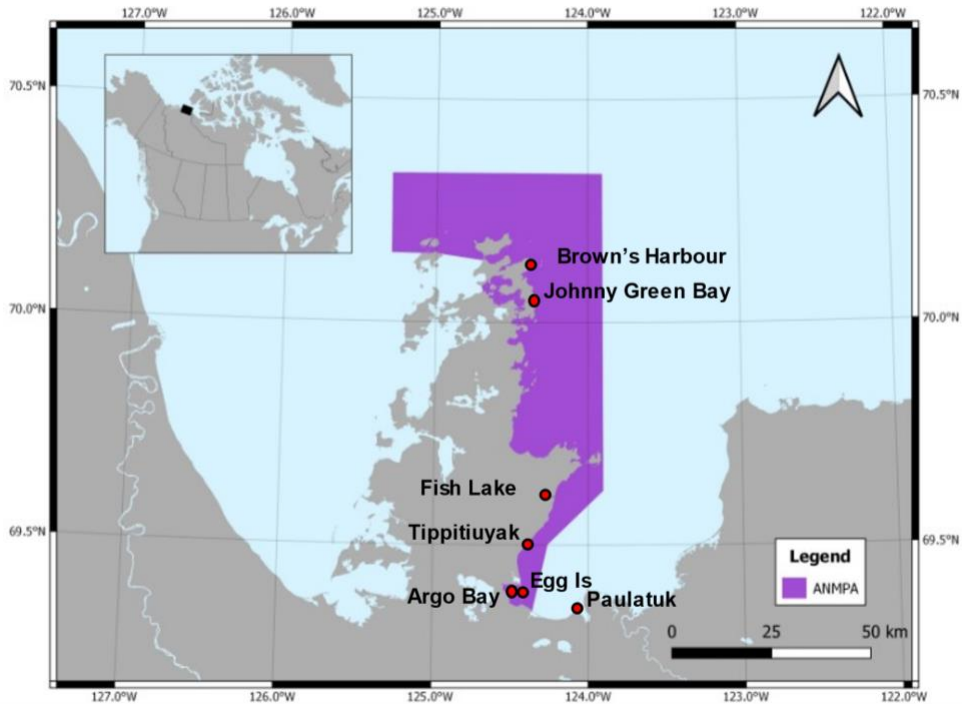


Figure 3. Traditional whaling camps and general locations of the beluga harvest in the Darnley Bay area of the Inuvialuit Settlement Region.

## **A) Field Sampling**

Materials and methods for the 2020 core sample collection were conducted similar to past field seasons (e.g., Harwood *et al.* 2002), except that blubber thickness was recorded in both imperial and metric units, the former to allow comparison to long-term data and the latter to allow for more sensitivity in the data (see MacMillan *et al.* 2019). Contents and the assembly processes for Marine Mammal Sample Kits are included in Appendix 2. Local and Traditional Ecological Knowledge (TEK) indicators (Ostertag *et al.* 2018) were recorded for each whale. Beluga Monitors also recorded daily observations of weather, marine mammals, birds, and fish in notebooks.

COVID-19 safety measures followed Government of Northwest Territories public health guidance and included social distancing between Monitors and harvesters (and wearing a mask when not possible to distance), wearing gloves, frequent hand washing and/or use of hand sanitizer, disinfection of shared sampling gear, and only collecting samples after harvesters were finished butchering their whale to minimize close contact.

## **I) ISR Beluga Subsistence Harvest Monitoring Program - Core Program**

After each hunt, Beluga Monitors interviewed each hunt captain to collect information based on Traditional Ecological Knowledge indicators (Ostertag *et al.* 2018), including the duration of the hunt, the number of whales seen, the number of calves seen, the presence of ‘love handles’ (abdominal fat deposits) on the harvested whale, if the harvested whale seemed tired, and the number of whales that were struck, landed, and lost (Figure 4 and 5). The Beluga Monitors also examined the harvested whale and recorded descriptions of any scars present and potential signs of sickness like unusual smells or signs of infection (Figure 4 and 5).

The Beluga Monitors then asked the hunt captain for permission to measure and sample each harvested whale. All data were recorded on the monitoring data sheet labeled with a unique ID for each harvested whale (Figure 4 and 5). The colour of the whale was recorded as white, yellow, grey, dark grey, or brown. Sex was determined through external examination and palpitation of the genitalia. Standard length, fluke width, maximum half girth, half girth at anus, and ventral blubber thickness at sternum and at anus) were measured using an open reel tape measurer and a ruler. Measurements were recorded in imperial units to be comparable with past data.

**2020 FISH AND MARINE MAMMAL COMMUNITY MONITORING PROGRAM DATASHEET**

DATE: \_\_\_\_\_  
 HUNT LOCATION: \_\_\_\_\_

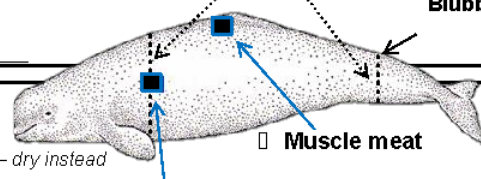
Landed Whale Number: AR\_\_ - DL - 20 - \_\_\_\_  
 MONITOR NAME: \_\_\_\_\_

**INFORMATION ABOUT THE HUNT**

Hunters Names (*Circle captain's name*): \_\_\_\_\_  
 How many hours were you hunting? \_\_\_\_\_ How many whales did you see before this whale was hunted? \_\_\_\_\_  
 Did you see other calves today?  Yes  No  Didn't Ask  Unsure  If Yes, how many calves did you see today? \_\_\_\_\_  
 Were any whales lost on this hunt?  Yes  No  If Yes, how many? \_\_\_\_\_  
 Was this whale in a group?  Yes  No  Didn't Ask  Hunter unsure  If Yes, how many in the group? \_\_\_\_\_  
 How long was the whale pursued before it was shot? \_\_\_\_\_  
 Did this whale seem tired?  Yes  No  Didn't Ask  Hunter unsure

**MEASUREMENTS**

Sex:  Male  Female  If Female, see below  
 Total length (snout to tail): Feet \_\_\_\_\_ Inches \_\_\_\_\_  
 Fluke (tail) width: Feet \_\_\_\_\_ Inches \_\_\_\_\_  
 Blubber thickness at breast bone: mm \_\_\_\_\_ Inches \_\_\_\_\_  
 1/2 Girth at widest part (half way around): Feet \_\_\_\_\_ Inches \_\_\_\_\_  
 1/2 Girth at anus (half way around): Feet \_\_\_\_\_ Inches \_\_\_\_\_  
 Blubber thickness above anus: mm \_\_\_\_\_ Inches \_\_\_\_\_



**TISSUES FOR COLLECTION**

*Freeze all as soon as possible (fist size), except jaws – dry instead*

Eyeballs  Liver  Blubber  Check for Stomach Contents  
 with skin, full depth

Blood vial – easiest at neck  Lower Jaws-attach tag, remove meat & dry before bagging.  
 Feces (if present)

Milk vial - What colour was milk? \_\_\_\_\_  
 Stomach Contents:  Empty  Some Food  Full  Didn't Check  
 If food was present, please collect sample and take photo  
 Photo taken?  Yes  No - Sample collected?  Yes  No

Genetics vial: small piece of skin vial with liquid

**FEMALE WHALES**

Was there a calf with the female?  Yes  No  Didn't Ask  Hunter unsure  
 What colour was calf?  Brown  Grey  Black  Don't Know  Other \_\_\_\_\_  
 Was female giving milk?  Yes  No  Didn't Check  
 If Yes, collect sample in milk vial provided

Was there a 4 - 5 ft fetus in womb?  Yes  No  
 If Yes, measure Fetus Length: Feet: \_\_\_\_\_ Inches: \_\_\_\_\_  
 Fetus Sex:  Male  Female  Don't Know  
 Bag, label and freeze whole fetus.

Figure 4. Data collection sheet used by monitors for the 2020 Beluga Monitoring Program, front-side.

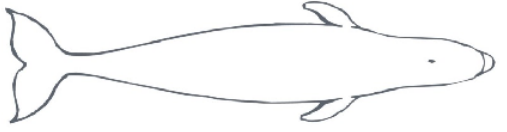

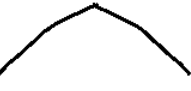




<b>WHALE INFORMATION</b>		Landed Whale Number: AR__ - DL - 20 - ____	
<b>Colour:</b> <input type="checkbox"/> Brown <input type="checkbox"/> Dark Grey <input type="checkbox"/> Grey <input type="checkbox"/> White <input type="checkbox"/> Yellow <b>Does this whale have 'love handles'?</b> <input type="checkbox"/> Yes <input type="checkbox"/> No <b>Is the backbone "sticking out"?</b> <input type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> unsure <input type="checkbox"/> Please mark on the diagram below the shape of the back that matches the whale.			
<b>SIGNS OF INFECTION, WOUNDS OR ABNORMALITIES</b>			
<b>Did you see a sign of infection (i.e. infected wound, disintegrating muktuk, lump in muktuk)?</b> <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> If Yes, take a photo and collect a sample of the infected area including uninfected area next to wound. <input type="checkbox"/> Sample collected? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Photos taken? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Location of infection marked on diagram below? <input type="checkbox"/> Yes <input type="checkbox"/> No			
<b>Were there spots on the liver?</b> <input type="checkbox"/> Yes <input type="checkbox"/> No <b>Was there a 'different' or unusual smell when whale was opened up?</b> <input type="checkbox"/> Yes <input type="checkbox"/> No <b>Did the hunter say that the whale seemed to be tired?</b> <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> If Yes, please try to take samples of the following organs. Put samples in Ziploc bags, label bags with whale ID and freeze. <input type="checkbox"/> Sample collected: liver (areas with and without spots) <input type="checkbox"/> Yes <input type="checkbox"/> No    kidney <input type="checkbox"/> Yes <input type="checkbox"/> No    spleen <input type="checkbox"/> Yes <input type="checkbox"/> No    lung <input type="checkbox"/> Yes <input type="checkbox"/> No    heart <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Photos taken of any organs that looked different than usual: <input type="checkbox"/> Yes <input type="checkbox"/> No			
<b>DRAW ABNORMALITIES ON THE DIAGRAMS BELOW</b>		<b>Which of these drawings look like the back of the whale when you look at it from the front and back?</b>	
<b>TOP VIEW:</b>	DESCRIPTION & COMMENTS	<b>FRONT VIEW:</b>	
			
<b>RIGHT VIEW:</b>	DESCRIPTION & COMMENTS	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unsure	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unsure
		<b>BACK VIEW:</b>	
<b>LEFT VIEW:</b>	DESCRIPTION & COMMENTS		
		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unsure	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unsure

Figure 5. Data collection sheet used by monitors for the 2020 Beluga Monitoring Program, back-side.



Blood was collected from skeletal muscle beneath the scapula in one scintillation tube and blubber/skin was collected (full depth) from the side of the whale in line with the breastbone (1 sample with skin frozen at -20°C, 1 sample preserved in DMSO for genetic sex determination). The lower jaw was removed by the monitor using a hacksaw, and whole eyeballs were extracted using a knife. Dorsal muscle was collected and a subsample was provided to the Research Monitor (if present). The abdominal cavity was then opened to sample liver tissue, and the stomach opened to check for contents (and collected if there were). Microplastic sampling was modified from collecting digestive tracts in past years (Moore *et al.* 2020) to only collecting fecal samples, as this was more feasible without the Science crew present while still monitoring for microplastics, which was identified as a research priority by the FJMC. If the whale was a female the monitor would check for lactation and collect a sample of milk if present, as well as the presence of a fetus, and record fetus sex and crown-rump length. If a fetus was present and first term (12-18cm), it was frozen intact and whole. If a fetus was near full-term (e.g., 1.5m), measurements and samples were taken and recorded as a separate whale.

## **II) Expanded Beluga Health Research and Monitoring**

At the Hendrickson Island Camp additional samples were collected by the Research Monitor for a subset of the harvest monitoring period (July 8 - July 30). Blood from skeletal muscle beneath the scapula was collected using serum collection tubes (BD SST™ tubes) (avoiding contamination with ocean water) and processed for the collection of serum. Fist-sized gross tissue samples of skin and blubber, heart, spleen, muscle, and brain were collected, placed in labeled Whirl-pak® bag and frozen in a standard chest freezer (~-18°C). Swab samples from the blowhole were taken using sterile Dacron swabs, placed in orange capped cryovials containing virus transport media, and then placed in a cryoshipper (-150°C). This represented a reduced suite of samples compared to what is typically collected by the DFO Science team due to the reduced capacity. However, more whales were sampled overall for these additional analyses due to the Research Monitor remaining on the Island for longer than the Science team usually would, based on a recommendation by the Tuktoyaktuk HTC (June 15, 2020).



*Figure 6. Research Monitor Lionel Kikoak with beluga (ARDL-HI-20-02) landed at Hendrickson Island, July 11, 2020. Photo Credit: DFO.*

## **B) Sample Processing**

Tissue samples taken by Beluga Monitors for the core ISR Beluga Subsistence Harvest Monitoring Program were frozen at camp in household electric chest freezers ( $0.11\text{m}^3$ ,  $\sim -18^\circ\text{C}$ ) except for the jaws, which were cleaned, split, labeled with a paper tag, and hung to air-dry.

Sample processing for the expanded Beluga Health Research and Monitoring included the collected blood in vacutainers being gently inverted 5-8 times and left to coagulate at room temperature for 20 minutes. The blood was then centrifuged for 10 minutes at  $1900g$  (VWR® Clinical 50 Centrifuge). Separated serum was pipetted into 2 mL cryovials using plastic transfer pipettes and placed in a cryoshipper ( $-150^\circ\text{C}$ ). A full depth piece of blubber was placed into a Whirl-pak® and frozen at  $\sim -18^\circ\text{C}$ . This blubber was originally supposed to go into the cryoshipper but unfortunately samples did not fit into the cryoshipper (blubber was not sub-sampled at camp in an attempt to simplify protocols for the Research Monitor, leading to larger-sized samples than usual). A new Research Support Services community position (Jimmy Kalinek - Only Way Outfitting) was also created to manage the logistics of shipping, receiving, and staging samples and equipment in Inuvik, which would usually be handled by DFO Science staff and/or Area office staff.

### C) Laboratory Processing and Analyses

Samples were subsampled and stored at -80°C once received by DFO in Winnipeg, and many different types of laboratory processing were/will be conducted on them. Table 2 summarizes the types of samples collected and the type of analysis conducted (and references for analysis methods if applicable). Because blubber samples could not be stored at -150°C in 2020, the 2020 samples were not able to be analyzed for genomics, metabolomics, or transcriptomics as in past years, but were suitable for multiple hormone analyses. In 2020 whale ages were estimated through aspartic acid racemization (Pleskach *et al.* 2016, Yasunaga *et al.* 2017), using a calibration developed from an ageing study currently being prepared for peer review (Elliott and Loseto *in prep*).

Table 2. Sampling conducted on beluga whales as part of the 2020 Beluga Monitoring Program, and type of analysis conducted with these samples.

Type of Sample Collected	Research Question or Objective
Eyeballs and Jaw (teeth)	Estimate age of whale  (e.g., Stewart <i>et al.</i> 2012, Pleskach <i>et al.</i> 2016, Elliot and Loseto <i>in prep</i> )
Blubber/skin	Fat content, quality and profile to understand diet (e.g., Loseto <i>et al.</i> 2009, Choy <i>et al.</i> 2020), stress hormones (e.g., cortisol, Loseto <i>et al.</i> 2018b), mercury stable isotopes in skin (e.g., Loseto <i>et al.</i> 2015), organic pollutants in blubber (Noel <i>et al.</i> 2018), genetics (sex determination).
Blood (whole)	<i>Archived for Brucella</i> and future requests,
Blood (serum)	Hormones, genomics metabolomics, transcriptomic (e.g., Loseto <i>et al.</i> 2018b, Simond <i>et al.</i> 2022)
Muscle	Stable isotopes, mercury, diseases ( <i>Toxoplasma gondii</i> ) (Sharma <i>et al.</i> 2018)
Liver	Contaminants, diet indicators (highly-branched isoprenoids, stable isotopes) (e.g., Loseto <i>et al.</i> 2008)
Spleen	<i>Bartonella sp.</i>

Brain, heart	<i>Toxoplasma gondii</i> (e.g., Sharma <i>et al.</i> 2018)
Feces	Presence/absence of microplastics (Moore <i>et al.</i> 2020)
Stomach contents (presence/absence)	Diet
Milk	Evidence of lactation; archive
Swab samples	Evidence of emerging viral infectious diseases (Nielsen <i>et al.</i> 2018)

## D) Data Compilation

All information recorded on the Beluga Monitoring Program field sheets in 2020 was compiled in Microsoft Excel and added to the master database maintained by the FJMC. Original (raw) data sheets, photocopies, and scanned copies are archived with the FJMC (Inuvik, NT), and with DFO (Freshwater Institute, Winnipeg, MB). Daily observations from Beluga Monitor daily logbooks were compiled by the FJMC (Inuvik, NT) and notable or consistent observations were included in the results section of this report.

## RESULTS

A total of 88 belugas were reported harvested in the ISR in 2020, between June 24 and August 11, 2020 (Table 3 and Figure 7). Overall, 70 of those whales were sampled by Beluga Monitors (Table 3), the Research Monitor sampled 16 whales for the Expanded Beluga Health Research and Monitoring Program (Table A3), and no whales were sampled by hunters as part of the FJMC's Harvester Reward Program. The four whales taken in Tuktoyaktuk Harbour as well as five whales from East Whitefish, one whale from Darnley Bay, four whales from Shingle Point, and all the whales from Ulukhaktok and Sachs Harbour were communicated for this report through community members and harvest monitor logbooks. Consequently, those whales have no data or samples associated with them. Note that whales from Ulukhaktok were not sampled as they were harvested outside of town where Monitors were not able to access. Also, one whale from the Darnley Bay area had a harvest data sheet associated but no samples were taken.

Three whales were reported struck-and-lost at Hendrickson Island and one from the Shingle Point area (Table 3). One beluga was reported as stranded near Kendall Island, on the west side of Pelly Island, and one dead neonate was observed floating half-way between Tuktoyaktuk and

Hendrickson Island on July 28, 2020. The Paulatuk monitors also reported six bowhead whales sighted off Tippitiuyak on July 10 and again off Kamakark on July 19, 2020.

*Table 3. Number of belugas struck, landed, lost, and sampled, by hunting area in 2020.*

<b>Location</b>	<b>No. Whales Landed</b>	<b>No. Whales Sampled</b>	<b>No. Whales Struck-and-Lost</b>	<b>No. Recorded Strandings</b>
Hendrickson Island	29	29	3	1
Tuktoyaktuk Harbour	4	0	0	0
East Whitefish	12	7	0	0
Kendall Island	11 (4 at Tom Elanik Point, 3 at Pelly Island, 2 behind Baby Island, 1 at Garry Island)	11	0	1
Sachs Harbour	1	0	0	0
Ulukhaktok	2	0	0	0
Darnley Bay and surrounding area	23 (20 at Johnny Green Bay, 1 at Bennett Point)	21	0	0
Shingle Point Area	6 (2 at Whitefish Station, 1 at Bird Camp, 1 at Blow River)	2	1	0
<b>Total</b>	<b>88</b>	<b>70</b>	<b>4</b>	<b>2</b>

The Beluga Monitors stationed at East Whitefish, Kendall Island, and Shingle Point all reported inclement weather in late June and the first week of July, which hampered hunting efforts, including rain, debris in the water at Shingle Point, and rising water levels paired with strong northwesterly winds. Strong winds were also reported frequently over the course of July at East

Whitefish and the monitors reported people mostly coming to their camps for short periods of time and later in the season, with fewer people overall at their camps over the monitoring period. In Paulatuk, high winds and poor travel and hunting conditions were reported in late July to mid-August.

On July 26th a whale landed and sampled at Hendrickson Island (ARHI-DL-20-19) was seen to be in good condition and later, during the food preparation back in Tuktoyaktuk was found to have the manufactured harpoon head in the blubber. The harpoon head was one created and used for remote beluga tagging in 2019. This whale was measured at 4.14m, estimated to be 25 years old and was reported to be swimming with a group of whales. There was no indication of a wound or scarring. These findings indicate wound healing and social return to the group and the area where originally tagged.

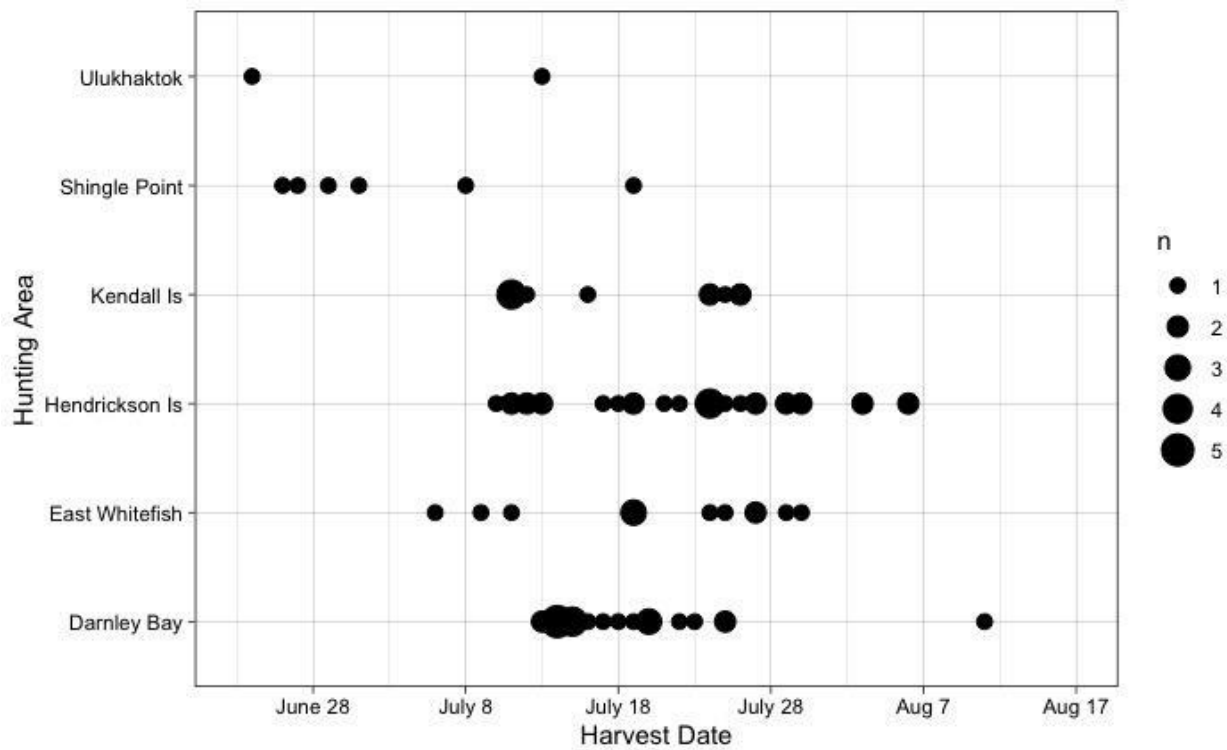


Figure 7. Number and timing of belugas landed in each hunting area. The exact date for the beluga landed in Sachs Harbour was not recorded. All belugas from the 2020 harvest were hunted between June 24 and August 11, 2020.

Of the 88 belugas harvested in 2020, 53 were male, 12 were female, and the sex of the remaining 23 belugas was unidentified (Figure 8). Beluga from all hunt locations varied in colour from white, grey, and yellow (Table A3). The standard length of all sampled belugas ranged from 327.7 to 467.4 cm for males and 315.0 to 439.4 cm for females (Table A1).

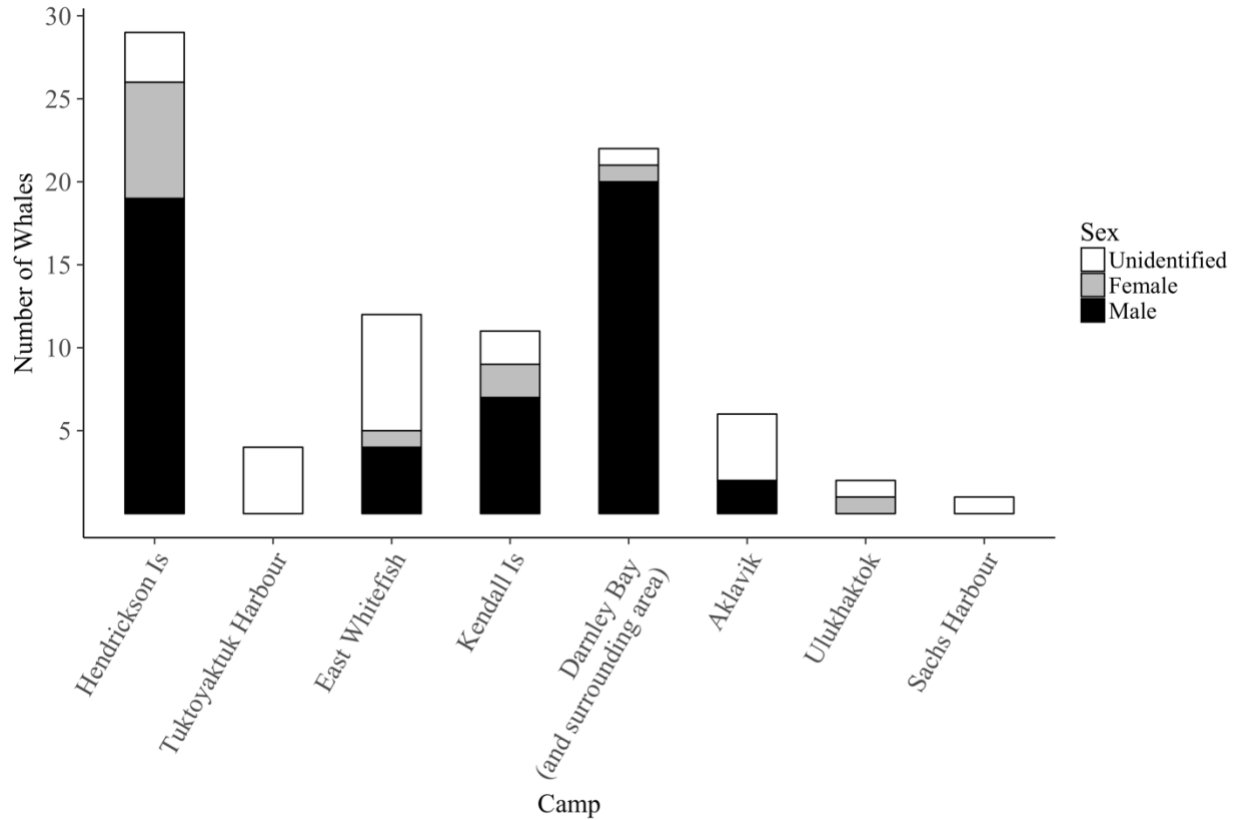


Figure 8. Number of male and female beluga harvested and recorded by beluga monitors and harvesters for each whale camp. Cases where sex was not determined are also reported.

The fluke width of all sampled belugas ranged from 49.5 to 123.2 cm for males and 76.2 to 101.6 cm for females (Table A1). The blubber thickness measured at the sternum of all sampled belugas ranged from 3 to 17.8 cm for males and 2 to 8.0 cm for females (Table A1). The blubber thickness measured at the anus of all sampled belugas ranged from 1.3 to 15.2 cm for males and 2 to 7.6 cm for females (Table 12). The maximum half girth ranged from 83.8 to 139.7 cm in males and 78.7 to 129.5 cm in females (Table A1). The half girth at anus ranged from 50.8 to 99.1 cm in males and 58.4 to 96.5 cm in females. The age of harvested whales ranged from 6.18 to 51.9 years in males and 9.11 to 98.5 years in females. The 98.5-year-old female was harvested at Kendall Island.

Of the 88 harvested whales, 34 had empty stomachs at the time they were harvested, one stomach contained some prey items, and the remaining 53 belugas were not checked for stomach contents (Table A4). Of the 12 female belugas harvested in 2020, two were carrying a first-term fetus, with HI-08 measured at 4 inches and HI-18's measurement not legible. Both fetuses were collected. Three landed females were producing milk at the time they were harvested (Table A5).

No calves were observed with the harvested females. Local and Traditional Ecological Knowledge (TEK) indicators collected from harvesters included that 26 whales were reported to have ‘love handles’ (indicator of a healthy whale), 12 had their backbone sticking out (indicator of a skinnier whale), 15 had scarring, and 1 unusual dots on the flipper (Table A6). The average number of belugas seen while hunting ranged from 6.13 (Hendrickson Is) to 45.8 (Kendall Is), by location. The average group size of the landed beluga ranged from 0 (Shingle Point) to 43.4 (Darnley Bay and surrounding area), by location. The average number of calves seen while hunting ranged from 0.7 (Darnley Bay and surrounding area) to 17.5 (Shingle Point), by location (Table A7). In general, there were low response rates for the TEK indicators.

## SUMMARY

This report provides an overview and inventory of beluga data collected in 2020 from the long-term ISR Beluga Subsistence Harvest Monitoring Program. Notable points include:

- There were 88 harvested belugas reported in the ISR in 2020, between June 24 and August 11, with 70 of those whales sampled by Beluga Monitors and 16 sampled under the Expanded Beluga Health Research and Monitoring Program.
- Sex was field-identified for 65 belugas, of which 53 were reported to be male (81.5%).
- Of the 12 females landed, none were reported to have been accompanied by calves, three were lactating, and two had a first-term fetus.
- Beluga Monitors reported frequent inclement weather conditions that made travel and hunting difficult, in July in the Mackenzie Estuary, and from late July to mid-August in the Darnley Bay area.
- Two beluga strandings were reported; one near Kendall Island on the west side of Pelly Island, and one dead neonate seen floating half-way between Tuktoyaktuk and Hendrickson Island on July 28, 2020. The stranded whales were not sampled.
- The local Research Monitor successfully collected a modified suite of science samples following virtual training and hands-on training with the DFO Science team during the previous five seasons at Hendrickson Island.
- Considerable effort was made to adapt to the ever-unfolding situation caused by COVID-19, including creating new community positions (Research Monitor, Research Support Services), increased efforts around communication, and ensuring Monitors were able to follow the appropriate safety measures in the field.

This report provides Inuvialuit community members and organizations, co-management boards, and scientists with important information on the subsistence harvest of Eastern Beaufort Sea



beluga in the Inuvialuit Settlement Region, including harvest numbers, TEK indicators, basic morphometrics, and the samples collected from harvested beluga whales in 2020. Together with other sources of information and data including scientific research, these monitoring results contribute to the management and monitoring of MPAs in the ISR (e.g., TNMPA and ANMPA). Continued monitoring is important to support resource management to conserve this ecologically and culturally important species, while ensuring continued subsistence harvesting opportunities for the Inuvialuit.

## **AUTHOR CONTRIBUTIONS**

Laura Murray wrote the original draft and supported design, implementation, and logistics for the 2020 Beluga Health Research and Monitoring Program, and managed harvest data. Kiyo Campbell supported implementation and logistics for the ISR Beluga Subsistence Harvest Monitoring Program, managed harvest data, and contributed to writing the report. Shannon MacPhee redesigned project proposals, budget and contracts for the Research Monitor and Research Support Services in response to COVID-19, and provided overall program design and coordination between DFO, Joint Secretariat staff, and the Tuktoyaktuk HTC. Ashley Elliot processed and analyzed aging data for 2020 harvested beluga. Kayla Hansen-Craik oversaw MPA funding and administered contracts with the AHTC and PHTC for their beluga monitors. Lisa Loseto is the Principal Investigator for DFO Science and acquired funding and collaborators for sample analyses, as well as for the In-training Monitor at Hendrickson Island through the National Contaminants Program. All authors reviewed and edited the manuscript.

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## APPENDIX A: DATA AND METADATA

*Table A1. Morphometric measurements, sex, and age of beluga whales landed during the 2020 Beluga Monitoring Program, by camp (NR= not recorded).*

Harvest date (2020)	Sample ID	Camp location	Sex	Age	Total length (cm)	Fluke width (cm)	Maximum half-girth (cm)	Half-girth at anus (cm)	Blubber thickness at sternum (cm)	Blubber thickness at anus (cm)
29-Jun	ARSP-DL-20-01	Shingle Point (area)	M	44.0	467.4	53.3	132.1	66.0	5.0	1.3
10-Jul	ARHI-DL-20-01	Hendrickson Is	F	27.1	439.4	101.6	127.0	94.0	8.0	6.0
11-Jul	AREW-DL-20-01	East Whitefish	NR	37.3	439.4	NR	123.2	43.2	9.0	12.0
11-Jul	ARHI-DL-20-02	Hendrickson Is	M	24.5	381.0	91.4	121.9	78.7	9.0	7.0
11-Jul	ARHI-DL-20-03	Hendrickson Is	M	39.1	416.6	101.6	139.7	99.1	3.6	5.5
11-Jul	ARKI-DL-20-01	Kendall Is	NR	36.8	431.8	101.6	137.2	NR	6.0	5.0
11-Jul	ARKI-DL-20-02	Kendall Is	M	25.6	447.0	101.6	132.1	78.7	9.0	7.0
11-Jul	ARKI-DL-20-03	Kendall Is	M	37.2	421.6	96.5	121.9	71.1	8.0	4.0
11-Jul	ARKI-DL-20-04	Kendall Is	M	27.2	436.9	91.4	111.8	68.6	8.0	5.0
12-Jul	ARHI-DL-20-04	Hendrickson Is	M	20.5	419.1	101.6	94.0	81.3	7.0	NR
12-Jul	ARHI-DL-20-05	Hendrickson Is	F	34.1	429.3	94.0	119.4	96.5	7.0	5.5
12-Jul	ARKI-DL-20-05	Kendall Is	F	21.3	414.0	99.1	116.8	78.7	8.0	6.0
13-Jul	ARPA-DL-20-01	Darnley Bay	M	18.2	365.8	83.8	106.7	58.4	10.0	5.5
13-Jul	ARPA-DL-20-02	Darnley Bay	M	25.1	464.8	109.2	106.7	57.2	7.3	6.0
13-Jul	ARHI-DL-20-06	Hendrickson Is	M	51.9	449.6	111.8	127.0	53.3	11.0	8.0
13-Jul	ARHI-DL-20-07	Hendrickson Is	NR	19.9	436.9	101.6	99.1	83.8	NR	NR
14-Jul	ARPA-DL-20-03	Darnley Bay	M	16.2	393.7	99.1	111.8	63.5	7.0	5.5
14-Jul	ARPA-DL-20-04	Darnley Bay	M	14.1	378.5	86.4	114.3	54.6	5.5	5.0

Harvest date (2020)	Sample ID	Camp location	Sex	Age	Total length (cm)	Fluke width (cm)	Maximum half-girth (cm)	Half-girth at anus (cm)	Blubber thickness at sternum (cm)	Blubber thickness at anus (cm)
14-Jul	ARPA-DL-20-05	Darnley Bay	M	13.8	387.4	96.5	132.1	66.0	6.5	6.0
14-Jul	ARPA-DL-20-06	Darnley Bay	M	12.4	375.9	88.9	114.3	50.8	5.0	6.0
14-Jul	ARPA-DL-20-07	Darnley Bay	M	13.9	419.1	94.0	111.8	58.4	6.0	3.5
15-Jul	ARPA-DL-20-08	Darnley Bay	M	6.18	327.7	73.7	83.8	55.9	5.0	3.5
15-Jul	ARPA-DL-20-09	Darnley Bay	M	28.7	436.9	96.5	129.5	58.4	5.0	3.0
15-Jul	ARPA-DL-20-10	Darnley Bay	M	23.0	429.3	91.4	109.2	66.0	8.0	5.0
16-Jul	ARPA-DL-20-11	Darnley Bay	M		434.3	104.1	106.7	58.4	6.0	5.0
16-Jul	ARKI-DL-20-06	Kendall Is	M	15.3	444.5	101.6	127.0	63.5	8.0	8.0
17-Jul	ARPA-DL-20-12	Darnley Bay	M	24.5	403.9	104.1	111.8	55.9	9.5	3.5
17-Jul	ARHI-DL-20-08	Hendrickson Is	F	30.1	370.8	81.3	101.6	66.0	6.0	3.0
18-Jul	ARHI-DL-20-10	Hendrickson Is	F	9.11	315.0	76.2	83.8	58.4	7.0	5.0
18-Jul	ARPA-DL-20-23	Darnley Bay	M	37.1	458.5	106.7	119.4	73.7	9.0	4.0
19-Jul	AREW-DL-20-02	East Whitefish	M	24.7	408.9	123.2	114.3	61.0	9.0	15.2
19-Jul	AREW-DL-20-03	East Whitefish	F	41.5	381.0	76.2	101.6	61.0	2.0	2.0
19-Jul	ARSP-DL-20-02	Shingle Point (area)	M	31.6	414.0	49.5	139.7	78.7	17.8	2.0
19-Jul	ARPA-DL-20-14	Darnley Bay	M	46.0	388.6	119.4	91.4	66.0	6.0	3.0
19-Jul	ARHI-DL-20-09	Hendrickson Is	M	14.2	383.5	96.5	119.4	88.9	7.0	4.5
19-Jul	ARHI-DL-20-11	Hendrickson Is	M	17.9	421.6	94.0	106.7	73.7	7.0	NR
20-Jul	ARPA-DL-20-15	Darnley Bay	M	14.7	363.2	86.4	91.4	66.0	6.0	3.0
20-Jul	ARPA-DL-20-16	Darnley Bay	M	19.1	421.6	99.1	106.7	68.6	8.0	6.0
20-Jul	ARPA-DL-20-22	Darnley Bay	M	30.4	360.7	81.3	88.9	50.8	4.0	3.5
21-Jul	ARHI-DL-20-12	Hendrickson Is	M	38.2	439.4	101.6	119.4	94.0	9.5	5.5



Harvest date (2020)	Sample ID	Camp location	Sex	Age	Total length (cm)	Fluke width (cm)	Maximum half-girth (cm)	Half-girth at anus (cm)	Blubber thickness at sternum (cm)	Blubber thickness at anus (cm)
22-Jul	ARHI-DL-20-15	Hendrickson Is	M	22.6	398.8	91.4	104.1	68.6	6.0	NR
22-Jul	ARPA-DL-20-18	Darnley Bay	M	7.58	403.9	104.1	114.3	66.0	6.0	3.5
23-Jul	ARPA-DL-20-19	Darnley Bay	F	36.6	406.4	94.0	129.5	58.4	6.0	4.5
24-Jul	ARHI-DL-20-13	Hendrickson Is	M	34.1	408.9	96.5	104.1	71.1	4.5	3.5
24-Jul	ARHI-DL-20-14	Hendrickson Is	M	25.1	447.0	106.7	132.1	81.3	6.5	4.0
24-Jul	ARHI-DL-20-16	Hendrickson Is	M	17.0	406.4	96.5	111.8	78.7	6.0	NR
24-Jul	ARHI-DL-20-17	Hendrickson Is	M	16.1	393.7	94.0	111.8	76.2	6.0	4.5
24-Jul	AREW-DL-20-04	East Whitefish	M	27.8	403.9	97.8	127.0	63.5	4.5	4.2
24-Jul	ARKI-DL-20-07	Kendall Is	M	38.2	436.9	91.4	111.8	81.3	10.0	9.0
24-Jul	ARKI-DL-20-08	Kendall Is	M	9.43	365.8	91.4	101.6	73.7	7.0	3.0
25-Jul	ARHI-DL-20-18	Hendrickson Is	F	35.2	360.7	86.4	101.6	73.7	5.5	5.0
25-Jul	AREW-DL-20-05	East Whitefish	M	18.7	396.2	83.8	127.0	94.0	3.0	6.0
25-Jul	ARPA-DL-20-20	Darnley Bay	M	22.4	434.3	96.5	116.8	66.0	8.0	4.5
25-Jul	ARKI-DL-20-09	Kendall Is	NR	12.6	375.9	86.4	106.7	88.9	6.0	5.0
26-Jul	ARHI-DL-20-19	Hendrickson Is	NR	24.8	414.0	91.4	109.2	48.3	NR	NR
26-Jul	ARKI-DL-20-10	Kendall Is	F	98.5	375.9	81.3	94.0	81.3	5.0	6.0
26-Jul	ARKI-DL-20-11	Kendall Is	M	14.2	408.9	86.4	96.5	61.0	7.0	5.0
27-Jul	ARHI-DL-20-20	Hendrickson Is	F	36.5	355.6	76.2	78.7	61.0	5.0	7.6
27-Jul	ARHI-DL-20-21	Hendrickson Is	M	26.8	431.8	106.7	101.6	68.6	NR	NR
27-Jul	AREW-DL-20-06	East Whitefish	M	23.6	431.8	101.6	104.1	NR	5.0	3.0
27-Jul	AREW-DL-20-07	East Whitefish	M	23.8	416.6	88.9	111.8	81.3	3.0	3.8
29-Jul	ARHI-DL-20-22	Hendrickson Is	M	31.0	421.6	91.4	114.3	88.9	7.5	5.5

Harvest date (2020)	Sample ID	Camp location	Sex	Age	Total length (cm)	Fluke width (cm)	Maximum half-girth (cm)	Half-girth at anus (cm)	Blubber thickness at sternum (cm)	Blubber thickness at anus (cm)
29-Jul	ARHI-DL-20-23	Hendrickson Is	M	21.2	398.8	91.4	109.2	73.7	3.0	2.0
30-Jul	ARHI-DL-20-24	Hendrickson Is	NR	16.4	408.9	96.5	NR	NR	6.5	6.3
30-Jul	ARHI-DL-20-25	Hendrickson Is	M	14.3	426.7	94.0	94.0	78.7	7.0	6.0
03-Aug	ARHI-DL-20-26	Hendrickson Is	F	36.6	360.7	81.3	NR	NR	NR	NR
03-Aug	ARHI-DL-20-27	Hendrickson Is	M	24.8	414.0	106.7	127	94.0	9.0	7.0
06-Aug	ARHI-DL-20-28	Hendrickson Is	M	14.8	370.8	81.3	96.5	71.1	NR	NR
06-Aug	ARHI-DL-20-29	Hendrickson Is	M	25.0	406.4	96.5	109.2	78.7	NR	NR
11-Aug	ARPA-DL-20-24	Darnley Bay	M	37.4	428.0	99.1	127.0	61.0	7.0	10.0

Table A2. Tissue samples taken from belugas harvested as part of the Beluga Monitoring Program in 2020 by camp. No samples were collected from whales landed in Tuktoyaktuk Harbour, Ulukhaktok, or Sachs Harbour.

Camp	Samples taken									
	Eyeballs	Blood Vial	Milk Vial	Genetics Vial	Blubber	Lower Jaws	Muscle Meat	Liver	Kidney	Feces
Hendrickson Is	27	27	2	22	27	27	27	27	-	14
Tuktoyaktuk Harbour	-	-	-	-	-	-	-	-	-	-
East Whitefish	6	6	-	6	6	6	6	6	-	1
Kendall Is	11	11	-	10	11	10	7	6	-	-
Darnley Bay (and surrounding area)	20	20	1	20	20	20	20	20	-	8
Ulukhaktok	-	-	-	-	-	-	-	-	-	-
Shingle Point (and surrounding area)	2	2	-	2	2	2	2	2	-	1
Sachs Harbour	-	-	-	-	-	-	-	-	-	-

Table A3. Tissue samples taken from the 16 belugas sampled by the Research Monitor at Hendrickson Island, for the Expanded Beluga Health Research and Monitoring Program in 2020.

Sample type	Number of whales sampled
Blood (serum)	14
Blubber	15
Muscle	15
Heart	15
Spleen	14
Brain	15
Viral swab	11

Table A4. Color of harvested beluga whales recorded during the 2020 Beluga Monitoring Program, by camp.

Camp (number of whales sampled)	Colour				
	Yellow	White	Grey	Brown	Not reported
Hendrickson Is (29)	1	24	2	0	2
Tuktoyaktuk Harbour (0)	0	0	0	0	4
East Whitefish (7)	0	0	0	0	12
Kendall Is (11)	0	11	0	0	0
Darnley Bay (and surrounding area) (21)	1	2	0	0	20
Ulukhaktok (0)	0	0	0	0	2
Shingle Point (and surrounding area) (2)	0	2 (both white/yellow)	0	0	4
Sachs Harbour (0)	0	0	0	0	1

Table A5. Presence/absence of beluga stomach contents for whales harvested during the 2020 Beluga Monitoring Program, by camp. Any details on contents are included as comments.

Camp (number of whales sampled)	Stomach Contents			Comments
	Yes	No	Not reported	
Hendrickson Is (29)	0	1	28	NA
Tuktoyaktuk Harbour (0)	0	0	4	NA
East Whitefish (7)	0	6	6	NA
Kendall Is (11)	0	5	6	NA
Darnley Bay (and surrounding area) (21)	1	19	3	NA
Ulukhaktok (0)	0	1	1	NA
Shingle Point (and surrounding area) (2)	0	2	4	NA
Sachs Harbour (0)	0	0	1	NA

*Table A6. Reproductive information collected on harvested female belugas in 2020. Presence of calves was communicated to Beluga Monitors by harvesters. Information was not able to be collected for all female belugas and asterisks have been used to identify where the recorded values may not be representative of the actual values due to low response numbers.*

<b>Camp (number of female beluga)</b>	<b>First-term Fetus</b>	<b>Calf Seen with Female</b>	<b>Lactating Female</b>
Hendrickson Is (7)	2*	0*	2**
Tuktoyaktuk Harbour (not reported)	-	-	-
East Whitefish (1)	not recorded	0	0
Kendall Is (2)	0***	0	0
Darnley Bay (and surrounding area) (1)	not recorded	0	1
Ulukhaktok (1)	not recorded	not recorded	not recorded
Shingle Point (and surrounding area) (0)	-	-	-
Sachs Harbour (not reported)	-	-	-

*\*Information not recorded for 3 of the female belugas.*

*\*\*Information not recorded for 4 of the female belugas.*

*\*\*\*Information not recorded on 1 of the female belugas.*

*Table A7. Other information collected on landed belugas in 2020, based on local and TEK indicators (Ostertag et al. 2018), as communicated to Beluga Monitors by harvesters. Asterisks have been used to provide more information on the scarring or other signs of infection.*

<b>Camp (number of whales sampled)</b>	<b>Love handles</b>	<b>Backbone sticking out</b>	<b>Scarring</b>	<b>Signs of infection and other observations</b>
Hendrickson Is (29)	14	2	3	1 **
Tuktoyaktuk Harbour (0)	not recorded	not recorded	not recorded	not recorded
East Whitefish (7)	not recorded	not recorded	not recorded	not recorded
Kendall Is (11)	9	9	11*	0
Darnley Bay (and surrounding area) (21)	1	0	1	0
Ulukhaktok (0)	not recorded	not recorded	not recorded	not recorded
Shingle Point (and surrounding area) (2)	2	1	0	0
Sachs Harbour (0)	not recorded	not recorded	not recorded	not recorded

*\*Of the scarring reported at Kendall Island, ice scars on the back and sides was reported for 10 of the landed belugas and bear scars on the back and sides was reported for 1 of the landed belugas.*

*\*\*Unusual dots observed on the flipper.*

*Table A8. Other information related to observations made while harvesters were conducting beluga hunts in 2020, as communicated to Beluga Monitors by harvesters. Information was not able to be collected for all beluga hunts and asterisks have been used to identify where the recorded values may not be representative of the actual values due to low response numbers.*

<b>Camp</b>	<b>Average number of other belugas seen while hunting</b>	<b>Landed beluga average group size</b>	<b>Average number of beluga calves seen while hunting</b>
Hendrickson Is	6.13	3.12	0.90
Tuktoyaktuk Harbour	not recorded	not recorded	not recorded
East Whitefish	40*	0	3.33***
Kendall Is	45.8	4.6	10
Darnley Bay (and surrounding area)	44.0	43.3	0.714
Ulukhaktok	not recorded	not recorded	not recorded
Shingle Point (and surrounding area)	30**	0**	17.5**
Sachs Harbour	not recorded	not recorded	not recorded

\*Average based on 1 response.

\*\*Average based on 2 responses.

\*\*\*Average based on 3 responses.



## **APPENDIX B: MARINE MAMMAL SAMPLE KIT CONTENTS**

### **ISR Beluga Subsistence Harvest Monitoring Program - Core FJMC Program**

Marine Mammal Sample Kits were assembled by DFO Science staff at the Freshwater Institute (FWI). All sample containers were labelled externally (with a label taped on with packing tape) with Animal ID and tissue type. Beluga Monitor kits included:

- Whirl-pak® for: eyeballs (2), blubber sample, muscle, liver
- Scintillation vials (HDPE) for: milk, whole blood
- Wide mouth Nalgene vial (30 mL) with DMSO for: skin
- Labelled tag for: lower jaw

Harvesting kits were then sent to Inuvik where the FJMC added equipment needed to collect samples before sending kits out to the communities. This equipment included:

- Nitrile gloves (1 - 2 boxes)
- Open reel measuring tape (inches and cm)
- Ruler (cut to 0 cm)
- Hacksaw, extra hacksaw blades
- Waterproof/shockproof camera
- Binder with datasheets for each harvested whale
- Knives (2 or more)
- Pencils, pens, erasers
- Cooler(s) for storage
- Freezer
- Generator
- Marine radio
- 1<sup>st</sup> aid kit
- Face masks
- Hand sanitizer

### **Expanded Beluga Health Research and Monitoring - DFO Program**

Marine Mammal Harvest Kits, supplementary lab kits, sampling equipment, and general equipment for the Research Monitor was assembled by DFO at the FWI for use at Hendrickson Is. These included:

Harvesting kits:

- Whirl-pak® for tissues (brain, heart, skeletal muscle, spleen, lung)
- Serum collection tubes (x 6) (BD SST™ tubes 8.5 mL with silica clot activator, polymer gel, silicone-coated interior)
- Viral swab (sterile Dacron swab in 2mL capacity Corning cryovial containing virus transport media)

- Latex gloves
- Cotton swab

Lab kits:

- Transfer pipettes (6 x 3 mL)
- Blubber vials (5 x 5 mL)
- Cryovial skin vials (1 x 5 g)
- Cryovial serum (12 x 1.2 mL)
- Scalpels and sharps disposal bin

Sampling equipment ('Go' Kits – 2 kits provided):

- Whale ID and beluga anatomy sheets
- Paper plates
- Butcher knives (2 x 8")
- Boning knife (2 x 6")
- Pens, pencils, white board markers, sharpies
- Camera with SD card

General equipment:

- Centrifuge (Hettich EBA 200) with associated equipment (manual, hex head wrench, fuses, power cord)
- Lab camera
- GoPro (camera, charger, head strap, chest strap, SD card, battery, case)
- Forceps/tweezers
- Lab coats
- Scissors
- Tape (dry erase, packing, scotch)
- Kim wipes
- Aluminum foil
- Face masks
- Hand sanitizer