On the Horizon

- Community based monitoring will continue in 2018.
- The same monitoring program from 2017 will be used in 2018 in an effort to evaluate trends over time.
- The Beluga RAP Report for the Beaufort Sea stock assessment (January 2017) included TLK knowledge. The report will be available this year.
- New ANMPA and TNMPA Working Groups are being formed

BEAUFORT SEA PARTNERSHIP

Siglit Beluga Names

Qilaluqag: toothed whale

Nalungiait: newborn calves (grey whale)

Tunguvyuit: young whales (light grey)

Nalungialiit: adult females

Thank You

DFO Oceans would like to thank the following:

- Our partners at the FJMC who work so hard on the TNMPA
- Community members from Inuvik, Tuktoyaktuk, and Aklavik for biological data collection
- Everyone in the communities of Aklavik, Inuvik, and Tuktoyaktuk for supporting the MPA and making it a reality
- Contributors from DFO Science who collect the ecological data
- DFO C&P for supporting the MPA
- Contributors from NRCan for providing ice break up data in real time

Flying over the ISR coast for MPA surveillance.
Photo Credit: J. Brewster

WAMPA Update

The Western Arctic Marine Protected Area (WAMPA) Steering Committee coordinates the management of Western Arctic Marine Protected Areas.

Currently we are revising the ToR to create working groups for both MPAs

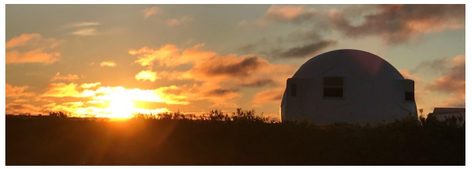
We're on the Web!

Beaufortseapartnership.ca

Marine Protected Area Coordinator

Kayla Hansen-Craik was hired as the new MPA Coordinator

KHansen-Craik@inuvialuit.com



State of the TNMPA Report

We are currently preparing an assessment of the TNMPA from 2010-2016 as part of adaptive management. This assessment will provide results of the implementation of indicators to monitor the TNMPA and incorporate indicators important to research, co-management partners and harvesters. Indictors assessed included: ecological, socioeconomic, and governance indicators; a report will be available in 2018

Questions?

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MPA Biologist, Oceans Management/DFO
Phone: 867-777-7516
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E-mail: jasmine.brewster@dfo-mpo.gc.ca

TARIUM NIRYUTAIT MPA 2017 ANNUAL REVIEW

Tarium Niryutait Marine Protected Area (TNMPA) is Canada's first Arctic MPA (Fig. 1) and provides an important summer habitat for one of the world's largest population of beluga whale.

TNMPA was established in 2010 to monitor and sustain the Beaufort Sea beluga populations and their supporting ecosystems, while preserving Inuvialuit cultural and spiritual connections to the land and ocean.

TNMPA Conservation Objective

To conserve and protect beluga whales and other marine species, their habitats, and their supporting ecosystem

http://www.beaufortseapartnership.ca/initiatives/tarium-niryutait-marine-protected-area/

Monitoring of the TNMPA is based on analyzing a set of indicators (ecological, social, economic, and governance) collected by Fisheries Joint Management Committee (FJMC) and Fisheries and Oceans Canada (DFO).

Hendrickson Island camp in July 2017.
Photo Credit: J. Brewster

TNMPA Field Season 2017

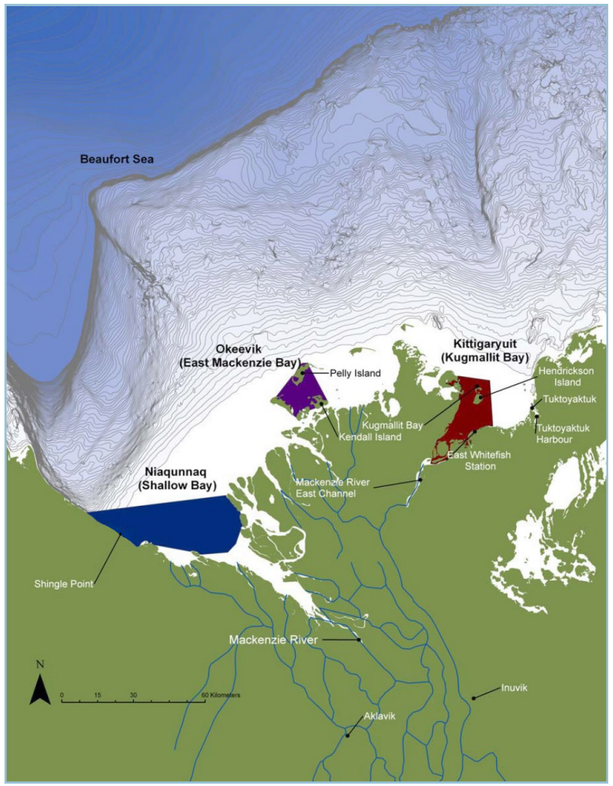

Figure 1. *The TNMPA consists of three sub-regions covering approximately 1800 km^2: Niaqunnaq, Okeevik, and Kittigaryuit*

Inside this issue:

Special points of interest:

- The Western Arctic now has two MPAs
- John Day continues as Chair of WAMPA Steering Committee
- State of the TN MPA Report
- New MPA research
- Anguniaqvia niqiqyuam MPA designation ceremony on Oceans Day

2017 TNMPA Supported Projects

Below are current and on-going research and monitoring activities that occurred in the TNMPA.

Research:

- Beluga habitat use of Kugmallit Bay defined by vocalization and Kugmallit Bay Weather and Oceanographic habitat characterization; led by DFO
- Coastal Erosion and Deposition Research—Tuktoyaktuk; led by Natural Resources Canada (NRCan)
- Pilot project of sampling for the presence of micro-plastics in Beaufort Sea beluga in the ISR; partnership between DFO, Vancouver Aquarium Ocean Pollution Research Program; led by Peter Ross, Marie Noel, Rhiannon More
- Traditional and Local Knowledge interviews on beluga harvest changes at Shingle Point

Monitoring:

- Coastal fish and beluga food web, energy and habitat characterization (using stable isotope and fatty acids) at Shingle Point under Arctic Coastal Ecosystem Studies (ACES); led by DFO (Table 1)
- Coastal harvest monitoring of Dolly Varden; led by DFO (Table 1)
- Community-based beluga harvest monitoring ; led by the FJMC in partnership with Hunters and Trappers Committees (HTCs), and DFO (Table 3)
- Implementation of the 'Beluga App'; led by DFO

Summer Tourism:

- River tours to Tuktoyaktuk with visits to camps by Tundra Tours and Only Way Outfitting

Working Together

Table 1. *Management and community-based monitoring employment in the TNMPA for 2016 .*

Positon	Shingle Point	Hendrickson Island	East Whitefish
Monitor	Jordan McLeod, Dennis Arey	Rex Noksana, Lionel Kikoak	Lawrence (Fraser) Angasuk
Youth	Jessi Pascal	Rylan Green	Andrew Gordon Jr., Jessi Pascal
Contractor's (e.g., boat drivers, cook, etc.)		James Keevik, Charles Pokiak, Jimmy Kalinek	Jimmy Kalinek, Rebecca Kaglik, Bertha Joe

2017 Hendrickson Island beluga sampling team

2017 East Whitefish beluga sampling team
Photo Credit Andrew Gordon

East Whitefish Weather and Oceanographic Observation Station

Dustin Whalen, Andrew Gordon, Kevin Scharffenberg, Shannon Macphee, Lisa Loseto

Purpose of Project

Install a weather station and oceanographic sensors to explore and understand climate driven changes to sea ice cover, air temperatures, wind patterns, wave climatology and water levels in Kugmallit Bay, and to provide community members and other travelers access to this data on a near real-time basis. This data is also being used to examine the relationship between the presence/absence of beluga whales and changing environmental factors.

Instruments in Kugmallit Bay

- 5 seabed moorings were installed. Instruments included a wave/pressure sensor, pH sensor, sediment trap and a hydrophone. Salinity and water temperature were also measured
- Live broadcast installed at one of the stations allowed for sharable scientific data, and provided real time weather conditions for safe travel

Okeevik (Beluga Bay) Erosion

- One of the most eroded coastlines in the ISR is within Beluga Bay

What We Know

- The erosion of Kendall Island is quite low (avg. 0.5 m/yr) because Pelly and Garry Island provide a natural barrier from increased wave action.

New Study

- In 2018, NRCan is planning a 10 day field excursion to Pelly Island to study the extreme erosion (up to 30 m/yr) of the island and its effect on the nearshore ecosystem.

Access Weather Station and Live stream

(http://dataservices.campbellsci.ca/nrcan/index.php).

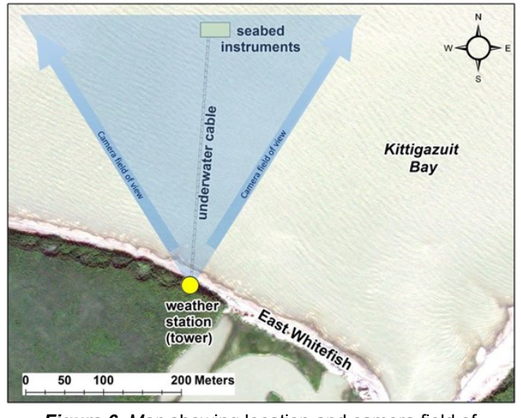

Figure 6. *Map* showing location and camera field of view towards the ocean and main navigation channel in Kittigazuit Bay

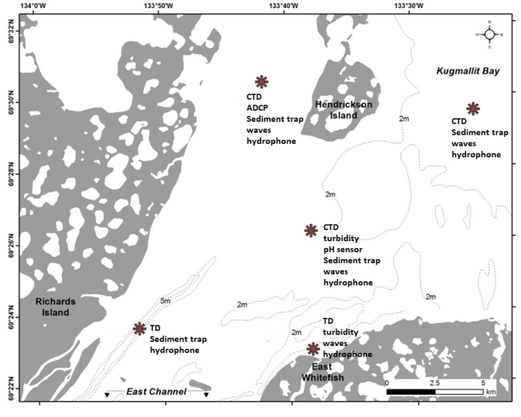

Figure 7. *Map of study area showing location of moorings as they were deployed*

Large Vessel Traffic

2017 large vessel (≥300 gross tonnage) travel in the TNMPA. This data was captured and made possible by the Automatic Identification System (AIS).

The development of small vessel tracking is ongoing

The Transport Canada Aerial Surveillance plane flew over both MPAs in 2017.
Photo Credit: J. Brewster

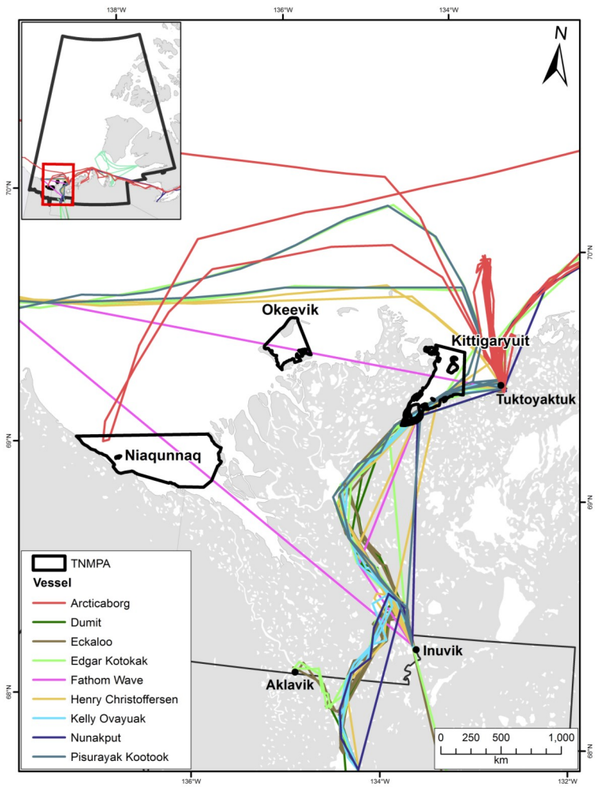

Figure 5. *Map of large vessel routes with the TNMPA in 2017*

Surveillance and Compliance

Three open water patrols and one aerial patrol by DFO Conservation and Protection officers (C&P) were done this year in Kittigaruit, Okeevik, and Niaqunnaq .

C&P work in the TNMPA in 2017 included:

- Vessel patrol to Hendrickson Island and participation at Hendrickson Island beluga monitoring camp
- Aerial Surveillance flight of both MPAs onboard Transport Canada Aerial Surveillance plane
- Shingle Point skidoo patrol and cabin clean up in the spring(March)
- Shingle Point Vessel C&P patrol (July) Patrol & site clean up
- Helicopter Patrol (using Coast Guard Helicopter) from the CCG Ship Sir Wilfrid Laurier of all 3 three areas

Shingle Point Fish Research

Lisa Loseto , Dana Neumann, Christie Morrison, Colin Gallagher, Kimberly Howland

Project Objective

ACES: To characterize the habitat and diet of coastal fish populations to develop baseline information and monitor any shifts using key monitoring species (Table 2)

Dolly Varden Char Monitoring: To collect harvest, catch-effort, and biological information of Dolly Varden to inform population assessment and life history studies, and produce science advice to co-management partners.

Fish Species Collected

Table 2. *Species of fish captured at Shingle Point , YK as part of the ACES and Dolly Varden Char monitoring programs. Sample sizes (n=20) set for all species except Dolly Varden Char .*

Common Name	Traditional Name	Sample numbers (n)	Habitat
Arctic Cisco	Herring	20	Anadromous
Broad Whitefish	Whitefish	20	Anadromous
Dolly Varden Char	Char,Trout	TBA (16 tags returned)	Anadromous
Saffron Cod	Tom cod	20	Brackish
Starry Flounder	Flatfish	20	Freshwater/marine/ brackish
Rainbow Smelt	Stink fish	20	Anadromous

Sampling Dolly Varden char at Shingle Point in 2017.
Photo Credit: C. Morrison

Sampling Arctic salmon in 2017.
Photo Credit: D. McNicholl

Arctic Salmon Study

Karen Dunmall and Darcy McNicholl

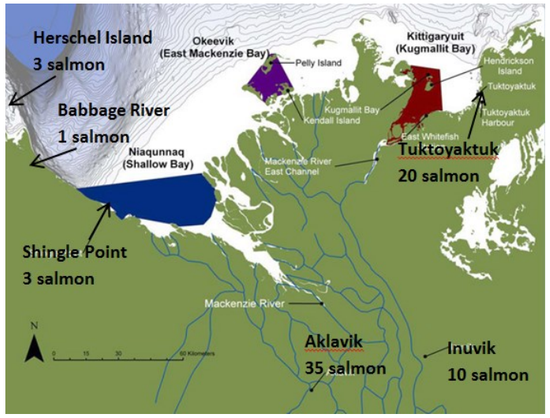

Figure 3. *Preliminary numbers of salmon captured in regions within the TNMPA, in collaboration with C. Gallagher for the Babbage River sample*

2017 Field Highlights

Approximately 27 salmon were captured from within or near the TNMPA in 2017 and provided to the Arctic salmon project. These fish will be processed at DFO in Winnipeg shortly, and samples taken for additional analysis including stomach content analysis for diet, DNA analysis to determine origin. Results will be presented to the communities in 2018

Contact for questions:
Karen.dunmall@dfo-mpo.gc.ca
www.facebook.com/arcticsalmon

Long-Term Monitoring of Beaufort Sea Beluga Whale in the ISR

FJMC, DFO

Project Objective

Changes in the Arctic ecosystem can affect the health of Beaufort Sea beluga which are important indicators of ecosystem health. The purpose of this program was to collect biological, habitat, and diet information to contribute to the long term monitoring of beluga harvested in the estuary

2017 drone footage of a beluga aggregation in Kugmallit Bay.
Photo Credit: K. Scharffenberg

2017 Beluga Harvest Data

Table 4 *Beluga harvest numbers collected through FJMC beluga monitoring program in the TNMPA areas. Each of these whales was sampled by a community monitor.*

Location	Beluga Harvested
Hendrickson Island	35
Tuktoyaktuk Harbour	10
East Whitefish	10
Kendall Island	6
Shingle Point/Aklavik	3
Total	***64***

Harvest data from the FJMC. Contact Emily Way-nee for questions: fjmc-rp@jointsec.nt.ca

Tissues Sampled

Table 3 *The science team sampled beluga from July 6th– July 19. Below are tissue types and indicators assessed.*

Tissues Sampled	What Are We Looking For?
Blubber, muscle, liver, milk	Diet indicators
muscle, liver, kidney, blubber/skin, bile	Contaminant levels and trends
Blood, blubber, liver, urine	Health indicators, hormones, vitamins
heart, diaphragm, muscle, brain, tongue, blood	Disease: Parasites (Toxoplasma and Trichinella), bacteria, worms (nematodes)
Blood, bile, urine, blowhole swab	Disease: viruses
Stomachs, intestines, feces	Micro-plastics

Micro-plastic Pilot Project

Peter Ross, Marie Noel, Rhiannon More

This year the science team collected stomachs and Intestine segments from 5 whales for micro-plastic analyses. The Vancouver Aquarium is researching micro-plastic accumulation in the Beaufort Sea Ecosystem.

Arctic Observer App

Sonja Ostertag

This summer the app was launched and allowed for researchers and monitors to record environmental and marine observations with their phones. This app works online and offline:

https://survey123.arcgis.com/share/fa672cf2088548f09f3411a0c9d24472

New Beluga Research Projects

Beluga Body Condition Indicators

Kate MacMillan, Carie Hoover, Lisa Loseto

Project Objective

Evaluate two beluga body condition metrics: 1) blubber thickness and 2) girth. These metrics are used to develop indices to study if there have been changes body condition of landed belugas across the TN MPA. Also, these indices are used to study potential changes in body condition from 2000-2015 and if environmental drivers can be correlated.

Kevin sending the drone out for a survey on Hendrickson Island.
Photo Credit Kate MacMillan

Sampling from a harvested whale at Hendrickson Island.
Photo Credit: FJMC

Monitoring Beluga Habitat Use and Oceanographic Parameters

Kevin Scharffenberg, Dustin Whalen, Shannon MacPhee, Lisa Loseto

Project Objective

Using data collected from the East Whitefish weather station and seabed moorings (page 7) this research will **1) characterize beluga habitat use by using beluga vocalisations to track presence/absence, and 2) assess the effects of environmental changes on beluga occurrence in Kugmallit Bay**. Unmanned aerial vehicles (UAVs, aka drones) were used to validate vocalisation data, and provided information on group composition and behaviour. UAVs were not flown while harvests were taking place, and were flown at an altitude (>30m) that had no impact on beluga behaviour.

Changing Human-Beluga Relations and Subsistence Hunting in Aklavik

Elizabeth Worden, Lisa Loseto

Project Objective

In collaboration with Aklavik, this research focuses on the decrease in beluga numbers in the recent years by Aklavik harvesters. A total of 32 interviews were conducted in Aklavik and Shingle Point harvesting camp. Major themes that came from the interviews were that **1) high costs of hunting and transportation** and **2) Unpredictable weather during the summer months** were factors that could limit beluga harvesting.

Photo Credit: Elizabeth Worden