SUBMISSION TO THE
NUNAVUT WILDLIFE MANAGEMENT BOARD
Dec 2016

FOR

Information: X **Decision:**

Issue: Department of Fisheries and Oceans Canada Research Updates.

.

Updates:

Narwhal:

1) Eclipse Sound and Admiralty Inlet Narwhal Survey:

- An aerial survey of narwhal abundance in Eclipse Sound and associated fiords (Navy Board Inlet, Milne Inlet, Tremblay Sound) and Admiralty Inlet was conducted during August 2016.
- The survey was photographic only, and local observers from Pond Inlet and Arctic Bay were hired as research assistants for all surveys.
- The Eclipse sound area was surveyed completely, with each inlet/sound surveyed 2-3 times.
- The goal was to survey both Eclipse Sound and Admiralty Inlet back to back to get a better idea of abundance in both areas. Admiralty Inlet was surveyed once, but the coverage was incomplete because poor weather forced the crew to turn back. Approximately 2/3 of the inlet was surveyed, including all of the northern and middle sections. Although planned, fiords off of Admiralty Inlet were not surveyed.
- Photos from the survey are currently being analysed. Two readers will count narwhals over 2016 and 2017, with results from the survey anticipated in Fall 2017.

2) Tremblay Sound Satellite Tagging of Narwhal:

- The field camp was set up at 72˚ 21’ 30”N, 81˚ 06’ 00”W from August 13th to 30th 2016 and included researchers from DFO, University of Windsor, University of Calgary, the Vancouver Aquarium, and World Wildlife Fund.
- Narwhals were caught using nets placed perpendicular to the shore, and satellite tags were applied to the dorsal ridge using embedded plastic pins. The entire procedure, from capture to release, lasted between 19 and 34 minutes.
- In total, 5 narwhals were tagged, and 2 tags continue to transmit location information daily.
- A pilot study evaluating the use of drones to photograph and video narwhals was completed. Aerial photographs and video are currently being analysed to assess narwhal behavior.

- Hydrophones were deployed and recorded continuously from August 16th to 29th. Data will be used to assess narwhal vocalizations during different events (feeding, normal movement cycles, hunting, tagging captures, and cruise ship presence).
- Blood and tissue samples were collected from tagged whales to assess genetics (confirm gender, assess stock identity) and health (e.g. stress hormone levels).
- Greenland Sharks were also tagged by Dr. Nigel Hussey (University of Windsor). In total 5 sharks were tagged with both acoustic and satellite tags, and an additional 3 sharks were tagged acoustically. Sharks were captured via bated line set on the bottom and checked approximately every 3hrs. All satellite tags have reported successfully to date. Acoustic tags last approximately 20 years, but only report when the shark passes a receiver placed on a mooring.

3) December 2015 Entrapment Sampling:

- Entrapped narwhal were located on Dec. 2, 2015 about 65 km west of Pond Inlet in Eclipse Sound.
- A humane harvest was conducted between Dec. 5 and Dec. 10, 2015.
- A total of 229 whales were harvested and biological samples were collected from 209 whales.
- Fisheries and Oceans Canada (DFO) communicated closely with the HTO during the entire event. DFO staff also worked closely with the harvesters and the HTO to coordinate sample collection.
- Genetics data collection completed, but further analysis of relationships of animals in the entrapment and comparison to Baffin Bay narwhals overall will be done in 2016/2017 with results anticipated in fall 2017.
- Other analyses include stable isotopes, fatty acids, embedded tusks, and brucella serology testing.
- Skin and blubber tissues are being used to look at narwhal diet through analysis of stable isotopes and fatty acids (completion by end of 2017).
- Embedded tusks are currently being cut in half to age narwhals in the entrapment by counting growth layers groups (lines in the tusk) (completion by fall 2017). These growth layer groups may also be drilled individually to look at the dietary history of individual narwhals (all the way from birth to death) (if the technique is successful, this will not be complete until 2018).

Seals:

1) Eclipse Sound Ringed Seal Survey:

- An aerial survey of ringed seals in Eclipse Sound, Milne Inlet, and Navy Board Inlet was completed between June 17th and June 22nd, 2016.
- The survey design included the use of visual observers as well as single lens reflex (SLR) cameras.
- An infrared camera was used to collect thermal and compare to the SLR colour imagery of the area below the aircraft.

- Analysis of survey data to estimate ringed seal density and abundance is currently underway.

Bowhead Whale:

1) Cumberland Sound Bowhead Tagging:

- In August 2016, satellite transmitters were deployed on 11 bowhead whales in Cumberland Sound to track their movements and dive behaviour.
- In addition, 87 bowhead biopsy samples were collected.
- These biopsy samples will contribute to the development of a population abundance estimate using genetic mark-recapture techniques (this approach has been reviewed and posted on the DFO CSAS website and a manuscript has been submitted to a scientific journal for review) and will also contribute to bowhead diet and feeding studies using biomarkers in the skin and fat.
- An unmanned aerial vehicle (UAV) was also used to collect high resolution photos of bowheads for photo identification studies.

Beluga:

1) Western Hudson Bay Beluga Survey:

- Dates: July 24-Aug 24, 2015.
- Observers were employees of DFO and Nunavut Tunngavik Incorporated (NTI).
- The survey results were reviewed at DFO's National Marine Mammal Peer Review meeting in October 2016. NWMB and NTI technical staff were invited to attend this meeting and participate in the review.

Arctic Char:

1) Pangnirtung Arctic Char:

- Field work was completed between August 1st and 16th 2016.
- 200 anadromous Arctic Char were sampled and an additional 72 juveniles were sampled from Arvituajuit (PG013).
- 209 anadromous Arctic Char and an additional 60 juveniles were sampled from Ikpit Bay (PG041).
- The juveniles were collected from freshwater for studies on growth.

2) Pond Inlet Arctic Char:

- Field work was completed between August 8th and 21st 2016.
- 199 anadromous Arctic Char were sampled from Koluktoo Bay.
- 70 anadromous Arctic Char were sampled from Saatut.

3) Qikiqtarjuaq Arctic Char:

- Project objectives are collection of biological data on Arctic Char from commercial fisheries utilizing the skills and local knowledge of the fishermen in the communities.

- Hunters and Trappers Organization meeting and fisher workshop planned for October 26th & 27th 2016 in Qikiqtarjuaq.
- Plans include the sampling of an additional one to two commercial fisheries during the winter fishing season.

4) Iqaluit Arctic Char:

- Field work was completed in July and August 2016.
- 128 Arctic Char were sampled from the Sylvia Grinnell River during summer 2016.
- A DIDSON Sonar was used to record fish for a 10-day period in mid-August during the peak part of the upstream migration. Data is currently being analyzed.
- Some limited creel survey data was collected during summer 2016. We hope to expand this program in summer 2017.

5) Rankin Inlet:

- Fish Habitat research surveys in Rankin Inlet area took place at Qamaniq and Qamanaarjuk in September and November 2015.
- Researchers met with Kaniqliniq HTO in May and (tentative) October 2016.
- Inuit Qaujimajatuqangit interviews are planned for January 2017.

6) Cambridge Bay:

- The acoustic tagging work (part of the Ocean tracking Network) is in its fourth year. This year 20 spawning (red) Arctic Char were tagged in the Ekalluk River system (specifically Spawning, Wishbone and Ferguson Lakes). The intent is to (1) identify lakes in this system where Arctic Char spawn and (2) try to understand how discrete spawning stocks of Arctic Char mix during overwintering and feeding. Genetic samples were also collected and will be run this year by a student in order to further our understanding of the genetic relationships of char in the region.
- So far, this work has provided some of the most comprehensive data on movements, timing of migrations and marine habitat use in Arctic char. This study is unprecedented with respect to spatial coverage and they are hoping to continue the work for another three to five years, which would make it the most temporally comprehensive study on Arctic Char movements ever conducted.
- DFO was also peripherally involved in assisting in the organization of the youth-elder camp that took place at Iqaluktuuq. Here, elders, youth, other community members and scientists spent several days on the land sharing knowledge amongst each other.
- DFO Science is still collaborating with Marianne Falardeau (McGill) on a food web/trophic structure study for the Cambridge Bay region. She is in the process of analyzing samples (from plankton to marine mammals) and will be looking at diet and using stable isotopes, fatty acids and mercury to assess food composition and trophic structure. This will provide a nice picture of who is eating who and when.

- DFO is also collaborating with Matt Gilbert (UBC) who is looking at temperature tolerance of migratory Arctic Char. Specifically he is aiming to (1) provide a preliminary characterization of the ability of migratory adult Arctic Char to tolerate warm temperatures and (2) relate this tolerance to current and predicted migratory conditions to help determine how char migrations will be affected by environmental change. In 2016, Matt was able to conduct preliminary tests on both hot and cold temperature tolerance using the mobile lab constructed by the Arctic Research Foundation (ARF). The plan is to move the labs to other water bodies to assess whether there are differences among stocks.

Marine Fish:

1) Cumberland Sound:
    - Fish tracking moorings were retrieved from Cumberland Sound in August 2016.
    - Data analyses on Greenland Halibut movement patterns within Cumberland Sound will be conducted during winter 2017.
    - Science advice regarding the location of the boundary of the Cumberland Sound Turbot Management Area is planned for 2017.

2) Inshore Emerging Fisheries:
    - Winter fishing was conducted by Ocean Tracking Network staff at Scott Inlet in March 2016 to tag Greenland Halibut during the ice covered season.
    - Networks of fish tracking moorings were maintained near Clyde River and Qikiqtarjuaq as part of ongoing research to assess the movements and habitat use of Greenland Halibut, Greenland Sharks and Arctic Skates. A particular goal of this program is to assess movement of fish between inshore waters (e.g. fiords and bays) and offshore waters (i.e. the shelf break and slope).
    - Greenland Halibut and Greenland Sharks were caught and tagged near Clyde River and Qikiqtarjuaq in September-October 2016 using the F.V. Kiviuq I.

3) Resource Development, Marine Shipping and Arctic Wildlife:
    - Two research projects used the Government of Nunavut's research vessel, *Nuliajuk*.
        - Trawling survey of benthic fishes and invertebrates (Kevin Hedges, DFO)
            - 10 trawls were conducted outside East Bay, Southampton Island.
            - Trawls were conducted at depths from 50 to 250 m.
            - Fishes and invertebrates were identified and tissue samples will be used for food web analyses.
            - Sponge samples are being sent to taxonomic experts for species identification.

    - Visual survey of benthic habitats inside the East Bay bird sanctuary. (Mylène Dufour, Université du Québec, Rimouski)
        - Entered East Bay using a zodiac from the *Nuliajuk*.
        - Drop camera (video camera on a light frame) lowered to sea floor.
        - Recorded short video clips of the sea bed.
        - Collected water quality data at the same time (temperature, turbidity, oxygen, salinity).
- Vessel time was limited because of a mechanical breakdown early in the season. The ship spent 3.5 days working at East Bay.

4) Offshore:

- The offshore multispecies survey is currently underway. The survey is running from October 4 to November 4, 2016.

Prepared by: Central and Arctic Region – Fisheries and Oceans Canada

Date: Nov. 3, 2016

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Updates:

Marine Mammals*:*

1) Narwhal

- DFO provided presentations to all three Regional Wildlife Organizations at their Annual General Meetings on the available information for the 2016/17 Narwhal Harvest season and discussed planning for the 2017/18 season.
- Skin and blubber tissues are being used to look at narwhal diet through analysis of stable isotopes and fatty acids (completion by end of 2017).
- Embedded tusks are currently being cut in half to age narwhals in the entrapment by counting growth layers groups (lines in the tusk) (completion by fall 2017). These growth layer groups may also be drilled individually to look at the dietary history of individual narwhals (all the way from birth to death) (if the technique is successful, this will not be complete until 2018).

2) Walrus:

- The Nunavut Wildlife Management Board (NWMB) recently approved the Walrus Integrated Fisheries Management Plan for the Nunavut Settlement Area, excluding the Areas of Equal Use and Occupancy with Nunavik.
- Over the next few months, DFO will be meeting with walrus harvesting Hunters and Trappers Organizations (HTOs) in the Qikiqtaaluk and Kivalliq regions, who have not yet had in person consultation, to review the Management Plan and discuss how HTOs can be more involved in the future.
- Having the Management Plan apply to the entire Nunavut Settlement Area will enable Canada to demonstrate the effective management of walrus both nationally and internationally.
- Coral Harbour was approved for 17 walrus sport hunts in 2016, which were allocated to three outfitters. DFO has been told of 7 successful sport hunts that took place and landed a walrus
- Hall Beach was approved for 15 walrus sport hunts in 2016. DFO has received confirmation that 6 hunts took place and landed a walrus.

3) Bowhead:

- Integrated Fisheries Management Plan – progress has been delayed owing to workload issues, we anticipate this will resume in late winter.
- Five communities were selected to host Bowhead hunts for 2016; Kugaaruk, Arviat, Coral Harbour, Igloolik and Pangnirtung. The communities of Kugaaruk and Coral Harbour did not have a hunt. Arviat did conduct a hunt, but did not harvest a whale. Igloolik and Pangnirtung successfully landed whales during their community hunts.

4) Cumberland Sound Beluga:

- DFO will be meeting with the HTO in Pangnirtung in early 2017 to discuss the results of the 2014 survey, the Canadian Science Advisory Secretariat (CSAS) Report, and the potential Species at Risk (SARA) listing.
- The purpose of the meeting will be to discuss the available information and to work on a way forward to address any information gaps which would include the collection of traditional knowledge. There will be no discussion of any management changes at this meeting.
- Revival of the Cumberland Sound Beluga Working Group and continued development of the Management Plan are essential
- The Pangnirtung HTO advised DFO that the quota of 41 Beluga for Cumberland Sound was harvested and DFO issued a closure notice for the season on September 14, 2016.

5) Hudson Bay Belugas:

- Hudson Bay Belugas – harmonized co-management between Nunavut and Nunavik. Western Hudson Bay belugas are available mainly to Kivalliq and Qikiqtaaluk Inuit. Eastern Hudson Bay Beluga (EHBB) are hunted mainly by Nunavik Inuit, however Eastern Hudson Bay beluga also occur seasonally around the Belcher Islands (Qikiqtaaluk region).
- Eastern Hudson Bay Beluga is designated Endangered. Harmonized co-management measures based upon the knowledge, experiences and traditions of local Inuit communities, and the best available scientific information, is needed to support EHBB recovery and continued harvest by Nunavik Inuit.

6) Harvest Reporting:

- Staff from DFO's Iqaluit office has been in recent contact with the HTOs, requesting mid-season harvest updates for beluga, walrus, and narwhal.
- DFO also urges continued reporting of unusual marine mammal occurrences and sightings for follow up by co-management organizations.

Arctic Char:

1) Pond Inlet Emerging Arctic Char Fishery:

- The 2016 Exploratory Arctic Char fishery in Pond Inlet began in late July, later than expected due to ice conditions, and was completed in August. DFO has received the 2016 samples and is in the process of reviewing what was collected.

Greenland Halibut:

1) Inshore Emerging Fisheries:

- In July and August 2016 (14 at-sea days), the Arctic Fishery Alliance (AFA) carried out exploratory fishing efforts for Greenland Halibut (Turbot), Shrimp and Whelks using longlines, shrimp traps and whelk pots in the Grise Fiord area.

2) Offshore:

- As of Oct. 25, 2016 the total harvest for Nunavut sub-allocations in NAFO Division 0B and 0A were 2530.132mt and 6390.996mt, respectively.
- The Arctic Fishery Alliance conducted fishing with turbot pots in NAFO Division 0A in 2016, to test whether this gear can efficiently capture Greenland Halibut while avoiding bycatch of Greenland Shark.
- The Nunavut Offshore Allocations Holders Association (NOAHA) used the fixed gear vessel *Kiviuq 1* as a platform in 2016 to investigate potential for a Porcupine Crab fishery in NAFO Division 0B.

Northern Shrimp:

- Fishing in Shrimp Fishing Area (SFA) Davis Strait and SFA Nunavut started in mid-September 2016.
- As of October 25, 2016 the total harvest for Nunavut sub-allocations in Davis Strait was 551.96mt and the total for SFA Nunavut was 918.136mt.

Prepared by: Central and Arctic Region – Fisheries and Oceans Canada

Date: Oct. 31, 2016