

SUBMISSION TO THE NUNAVUT WILDLIFE MANAGEMENT BOARD February 2022

FOR

Information: X

Decision:

Issue: Fisheries and Oceans Canada (DFO) Response to the Qikiqtaaluk Wildlife Board's (QWB) Request for Decision titled "Establishment of an Inuit System of Narwhal Management in the Waters of Northern and Eastern Baffin Island, 2022".

Background

On February 4, 2022, the QWB submitted a Request for Decision (RFD) for consideration at the Nunavut Wildlife Management Board (NWMB or Board) Regular Meeting on March 9, 2022. NWMB staff requested DFO's written response to the QWB submission to inform discussion at the Regular Meeting and for the Board's consideration.

Previously, in 2020, the NWMB requested DFO provide a response regarding a similar QWB-Hunters and Trappers Organization (HTO) joint proposal in advance of the June 2020 Regular Meeting. In DFO's view, the QWB's current submission does not differ substantially from its 2020 RFD to the NWMB. Further, the new RFD fails to address concerns that were previously raised in DFO's June 1, 2020 response to the NWMB regarding the QWB's initial proposal and RFD (TAB 1).

Unfortunately, since 2020 DFO has not been engaged in a meaningful way by the QWB to be in a position to provide substantively new information for the NWMB to use in the current decision-making process. It is DFO's initial view that the changes being proposed by the QWB have the potential to impact narwhal sustainability, the access and allocation system for a number of Nunavut communities, and could have implications to the international trade of narwhal products from Nunavut. DFO continues to advocate for a collaborative co-management forum to review the current Integrated Fisheries Management Plan (IFMP) for Narwhal in the Nunavut Settlement Area, which would include a more thorough review and analysis of the QWB's recommended modifications.

Information

The narwhal fishery in Nunavut is managed collaboratively by the NWMB, each of the Regional Wildlife Organizations (RWO), affected HTOs and DFO in accordance with the *Nunavut Agreement*, the *Fisheries Act* and the *Marine Mammal Regulations*. The narwhal IFMP reflects RWO and HTO authority to allocate and enforce regional and community basic needs levels and adjusted basic needs levels (in the form of Community Harvest Limits) pursuant to *Nunavut Agreement* s.5.7.6(b) and s.5.7.3(b) respectively. In DFO's view, feedback and discussion from all the co-management organizations should inform any proposed changes to the co-management regime for Baffin Bay narwhal

Engagement of all Nunavut narwhal co-management organizations including consideration of all Baffin Bay narwhal harvesting RWOs

DFO considers that QWB's request that the NWMB complete its decision-making process and implement the proposal by April 1, 2022 (the opening of the 2022-23 harvest season) is unreasonable and premature given that community consultations have not been completed. The current proposal appears to have been drafted with input solely from the QWB and their constituent HTOs. Other communities, other potentially affected RWOs, including Kitikmeot Regional Wildlife Board (KRWB) and the Kivalliq Wildlife Board (KWB), were not consulted as part of the development nor proposed implementation of this proposal. This suggests, to DFO that the proposal has been drafted in isolation, not respecting the co-management process as identified in the *Nunavut Agreement*. Although the input provided from the QWB HTOs have been mentioned in the proposal, DFO input has not been included. DFO previously noted this concern with regards to procedural fairness in its June 2020 response to the NWMB.

As identified in the QWB's 2020 submission to the Board, there were no formal discussions with DFO or other Nunavut co-management organizations on the development of the QWB-HTO proposal (e.g. KRWB, Nunavut Tunngavik Inc., NWMB). Although DFO received the QWB-HTO proposal from the NWMB in June 2020 and was able to provide preliminary comments, all subsequent attempts by DFO to reconvene the Nunavut Narwhal Working Group to collaboratively review the narwhal management regime were postponed, specifically at the request of the QWB, until the initial meeting on November 30, 2021. It wasn't until a second and most recent meeting on January 27, 2022, coordinated by DFO, that co-management organizations were able to hear additional details about the revised QWB-HTO proposal. There was no mention of consultations or engagement with other RWOs in the 2020 or the 2022 QWB submissions. At this time, it is unclear to DFO whether the KRWB and their constituent HTOs as well as the KWB have been formally engaged or consulted on the QWB-HTO proposal and possible implications for management of the Somerset Island stock. The KRWB did provide a statement to the NWMB on February 11, 2022 that they do not support the proposal and the current narwhal management system should remain status quo.

In the current proposal, the QWB states that "In 2018, the QWB Executive and the Hunters and Trappers Organizations (HTOs) learned that DFO did not plan to review and revise the 2013 Integrated Fisheries Management Plan for Narwhal in the near future." However, QWB actively participated in an October 2018 meeting in Iqaluit where narwhal co-management organizations (including the QWB) agreed that the NWMB's review of the narwhal IFMP would be postponed until the publication of DFO Science advice regarding the connectivity of the Admiralty Inlet and Eclipse Sound narwhal stocks. Consensus was reached to postpone the narwhal IFMP review to allow for the resulting community consultations and implementation of the new science information. As previously mentioned, the QWB has not made itself available to meet with DFO and other co-management organizations to discuss this new Science advice, and further review and update the established narwhal IFMP.

Implications to the international trade of narwhal tusks

In its consideration of the narwhal IFMP, the NWMB noted, that "[a]ll narwhal-hunting Nunavut communities wish to meet the requirements under the *Convention on the International Trade of Endangered Species of Fauna and Flora* (CITES) for the export of narwhal products internationally." It is unclear to DFO if the QWB has consulted with affected HTOs and communities on possible changes to the current CITES Non-detriment Finding (NDF) that may result from the proposal.

The QWB's current proposal does not address the potential implications of its proposal on the international trade in narwhal products. DFO has requested the DFO CITES Scientific Authority provide a preliminary assessment of how the QWB's proposal may affect the current CITES NDF. The QWB does not appear to have formally requested an opinion about whether its proposed changes to the management of Baffin Bay narwhal will impact the current CITES NDF for narwhal stocks in Canada.

Consideration of implications to tag system modifications

The 2022/23 narwhal hunting season commences on April 1, 2022. The QWB's RFD to the NWMB with respect to their narwhal management proposal (e.g. establishing, modifying or removing a Total Allowable Harvest (TAH) and/or Non-Quota Limitations (NQL) for narwhal). In DFO's view, the April 1, 2022 date would seem unattainable owing to:

- a) The timeline associated with the decision-making process (*Nunavut Agreements* 5.3.16 – 5.3.23),
- b) The timelines associated with NWMB possibly establishing and completing public hearings,
- c) The changes required by the QWB-HTO proposal to the Marine Mammal Tag system and the Tusk Certification system, which will require further consideration.

The QWB-HTO proposal does not clarify which of the existing management measures [TAH/Basic Needs Level (BNL) or NQLs] would require removal or modification through the decision-making process (NA 5.3.16- 5.3.23). Further, the QWB-HTO proposal lacks analysis of potential impact to sustainable narwhal management of Baffin Bay narwhal that may occur as a result of these changes. There does not seem to be any consideration in the proposal for changes to the narwhal management system on the potential implications to the Narwhal Flexible Quota System (TAB 2) and if this has been discussed with communities, or other co-management organizations.

The current Science Advisory Report on the sustainability of a flexible system of total allowable annual catches of narwhal published in 2015 concluded that the implementation of a flexible Total Allowable Landed Catch (TALC) system posed little risk to narwhal stocks, if the five-year total landed catch did not exceed five times the annual TALC for each stock (TAB 3). This was based on the evidence that was available at the time of the report and examined the TALCs for each of the five recognized narwhal summering stocks in the Canadian Arctic: Somerset Island, Admiralty Inlet, Eclipse Sound, East Baffin Island, and Northern Hudson Bay. This science advice based, on five separate TALCs for each of the management units, was then used for the subsequent approvals by the NWMB and DFO in 2017 for the full implementation of the Narwhal Flexible Quota System and Tag Transfer Policy Phase II of the Narwhal Integrated Fisheries Management Plan. The QWB's proposal to amalgamate the current TALC's for Admiralty Inlet, Eclipse Sound and East Baffin Island into a single annual TALC for the waters of Northern and Eastern Baffin Island by April 1, 2022 and therefore, in DFO's view this would require further discussion with co-managers to determine if new science advice and subsequent decisions would be required on the sustainability of the flex quota system under an amalgamated TALC.

Implications to stocks/preventing local depletions

The current narwhal management system is based on narwhal seasonal distribution. It takes into account narwhals summer aggregations and migrations in the fall and spring. The goal of

this management framework is to avoid local depletion (e.g. Hobbs et al 2019). Although DFO recognizes that there is some level of movement of narwhals between the summering aggregations, data from contaminant (de March et al 2004), stable isotope (Watt et al 2012) and preliminary genetic (work in preparation) support the summering aggregations.

The QWB-HTO proposal seeks to discontinue the stock-management approach and associated season harvest measures for the Admiralty Inlet, Eclipse Sound, and East Baffin Island management units. The proposal would also combine the TAH levels for these three summering stocks: Admiralty Inlet, Eclipse Sound and East Baffin Island, which results in significant change to the current system.

DFO considers this to be a significant change to the current system because the seasonal harvesting approach is designed to reduce the risk of exceeding the TAH for a given stock that may result when mixed stock groups pass by remote communities during spring and fall migration. DFO has concerns that this type of management change could deplete local concentrations of narwhal in their summering areas. It is unclear if QWB has asked the potentially affected communities if they have concerns about the possibility of local declines in narwhal abundance if the separate TAH levels were to be combined.

The current narwhal management regime was co-developed by the Nunavut Inuit wildlife co-management organizations and included extensive consultations with all Nunavut narwhal-harvesting communities (TAB 4, TAB 5). Narwhal management decisions were made in accordance with the *Nunavut Agreement* including NQLs, TAH/BNLs, and the additional harvest decision rules and conditions. Taken collectively, these collaborative decisions have created the framework for narwhal management that provides for the conservation and sustainability of the fishery.

In summary and of particular concern, it is DFO's opinion that the QWB proposal:

- a) lacks balanced analysis (IQ, Science) of how these changes may potentially impacts sustainable management of Baffin Bay narwhal, nor does it attempt to present the possibility of a middle ground.
- b) does not clarify which of the existing management measures (TAH/BNL or NQLs) would require removal or modification through the decision-making process (NA 5.3.16-5.3.23).
- c) does not address the necessary time delay that will result during revision of the Marine Mammal Tag format and the Tusk Certification system
- d) overlooks the possibility that Inuit narwhal harvesting opportunities maybe restricted during the time needed to make potential necessary changes (items a-c above).

DFO remains committed to working with all Nunavut co-management organizations to make resource management decisions that respect the *Nunavut Agreement* and include the best available knowledge sources and systems.

DFO representatives (Resource Management and Science Sectors) remain available to assist the NWMB upon request.

Prepared by: DFO Resource Management & DFO Science

Date: February 25, 2022

References:

de March, B.G.E., Stern, G., and Innes, S. 2004. The combined use of organochlorine contaminant profiles and molecular genetics for stock discrimination of white whales (*Delphinapterus leucas*) hunted in three communities on southeast Baffin Island. *Journal of Cetacean Research and Management* 6: 241–250.

Hobbs, R.C., Reeves, R.R., Prewitt, J.S., Desportes, G., Breton-Honeyman, K., Christensen, T., Citta, J.J., Ferguson, S.H., Frost, K.J., Garde, E., and others. 2019. Global review of the conservation status of monodontid stocks. *Marine Fisheries Review* 81(3–4): 1–62. Superintendent of Documents.

Watt, C.A., Ferguson, S.H., Fisk, A.T., and Heide-Jørgensen, M.P. 2012. Using stable isotope analysis as a tool for narwhal (*Monodon monoceros*) stock delineation. Canadian Science Advisory Secretariat Research Document 2012/057.

SUBMISSION TO THE
NUNAVUT WILDLIFE MANAGEMENT BOARD
June 2020

FOR

Information: X

Decision:

Issue: Fisheries and Oceans Canada (DFO) Initial Response to the Qikiqtaaluk Wildlife Board's (QWB) Request for Decision titled "Amendment of Narwhal Summer-Stock Harvest Management for Baffin Island, 2020"

Background

The QWB has submitted a Request for Decision for consideration by the Nunavut Wildlife Management Board (NWMB or Board) at its Regular Meeting 002-2020 on June 10, 2020.

NWMB staff requested DFO's written response to the QWB submission to inform discussion at the Regular Meeting. DFO was not aware of the QWB's planned submission in advance of the submission deadline. It is also unclear whether other co-management organizations were provided advance notice of this submission or were advised thereafter. DFO would like to thank the NWMB for the opportunity to provide this information note summarizing some initial observations to assist the Board's consideration of the QWB's proposal.

In DFO's view, the QWB's Request for Decision was submitted in a manner that is inconsistent with the NWMB's Governance Manual. Section 4.3 (Procedural Fairness) notes that the NWMB is subject to administrative law and its decisions are made using procedures that are fair to the affected parties. These include that the parties be provided timely notice, reasonable disclosure, and adequate opportunity to respond before a decision is made affecting their interests or rights. Section 4.4 (Proposal for Decision) lists five specific elements that are to be included in Requests for NWMB Decision, three of which do not appear in the QWB submission. The QWB did not include the relevant western scientific information [some of which includes available Inuit Qaujimaqatuqangit (IQ)] related to its proposal, did not consult with DFO as a key co-management organization prior to proposal submission, and requests prompt attention by the NWMB without addressing the NWMB's planned review of the Integrated Fisheries Management Plan (IFMP) for narwhal in the Nunavut Settlement Area.

Information

In 2013, the NWMB and DFO approved the narwhal IFMP that resulted from significant public consultations and included, where available, the input of IQ. It includes information about the fishery and the allocation system that accounts for harvests from migratory herds of mixed stocks of Baffin Bay narwhal. In 2017, the NWMB modified the Total Allowable Harvest (TAH) for Somerset Island, East Baffin Island, Jones Sound, and Smith Sound stocks. The community allocations following this modification were agreed to by co-management partners at a 2018 allocation workshop held in Rankin Inlet. The decision-making process for Admiralty Inlet and Eclipse Sound stocks is currently adjourned until additional science advice is published on the connectivity of those two stocks.

As noted by the QWB, the IFMP states that the NWMB would review the narwhal management system after the 2017 harvesting season. From the 2013 Narwhal IFMP: “In addition to the annual post season reviews, the NWMB will conduct a formal review of the levels of TAH, the narwhal management system based on summering stocks, and the overall Integrated Fisheries Management Plan in five years (following the 2017 harvesting season)”. However, at a 2018 meeting in Iqaluit, the narwhal co-management organizations (including the QWB) agreed that the NWMB’s review of the IFMP would occur when DFO Science advice was available regarding the connectivity of the Admiralty Inlet and Eclipse Sound management units. Science advice regarding the connectivity of those two stocks is expected in 2020. It would be premature to amend the narwhal management system ahead of this planned IFMP review and the publication of DFO Science advice for Admiralty Inlet and Eclipse Sound.

DFO Recommendation

The NWMB may wish to consider deferring the QWB’s Request for Decision until the DFO Science advice is available to inform the NWMB’s formal review of the IFMP as outlined in the 2013 Narwhal IFMP and subsequent amendments approved by the Board. This recommendation is based on the following:

1. Sufficient lead time for the narwhal co-management organizations to prepare formal positions for discussion, consistent with the Nunavut Agreement decision-making process. This approach ensures that potential revisions to the narwhal management regime are discussed in a collaborative and inclusive manner.
2. The 2020/21 narwhal hunting season is currently underway and any changes to the current management system would not be possible without significant delays, which may restrict harvesting opportunities for communities.
3. The timelines anticipated to schedule and conduct a public hearing, and to complete the Nunavut Agreement decision-making process on the matter, will also determine when potential changes in narwhal management can be implemented.
4. Lack of evidence that the QWB has discussed its proposal with the Kitikmeot Regional Wildlife Board, Kivalliq Wildlife Board, and their constituent communities.
5. The QWB does not address the potential implications of its proposal to international trade in narwhal products, which is regulated by the Committee on International Trade in Endangered Species (CITES). If the current management system is changed, then international trade in narwhal products will depend on positive assessment from Canada’s CITES Scientific Authority.

DFO representatives (Resource Management and Science Sectors) remain available to assist the NWMB upon request.

Prepared by: DFO Resource Management & DFO Science

Date: June 01, 2020

Marine mammal tag transfer policy and five-point narwhal quota carry-over rule

Phase One¹: Marine Mammal Tag transfers for narwhal harvesting when stocks are not mixed².

The purpose of Marine Mammal Tag transfers is to assist Regional Wildlife Organizations (RWOs) to:

1. Cover off over-harvest of a Community Harvest Limit (CHL) by allowing the exchange of unused Marine Mammal Tags between communities within the management unit, during the current narwhal harvesting year
2. Plan for, and allow, transfers of Marine Mammal Tags between communities within a management unit, during the current narwhal harvesting year, to maximize harvests in response to year to year variance in narwhal availability.
3. When there are not enough unused Marine Mammal Tags available for exchange, reconcile over-harvests within the management unit by reducing the following year's allocation and harvest from the community that over-harvested

General provisions of Phase One:

1. Following the establishment of a Total Allowable Harvest Level (TAH) and Basic Needs Level (BNL) for each narwhal stock/population and the establishment of corresponding management units based on known summering areas, the BNL for each stock/population will be allocated annually, by the RWO to the Hunter and Trappers Organizations (HTO), in each management unit. The allocation will be in the form of Community Harvest Limits. Depending on whether or not a community harvests from mixed migratory stocks, each community will receive either an All-Season Community Harvest Limit, or a Summer-Season and Migratory-Season Community Harvest Limit. The number of Marine Mammal Tags a community receives will correspond to its Community Harvest Limit(s) (All- Season, Summer-Season and Migratory-Season).
2. A valid Marine Mammal Tag is required to hunt a narwhal.
3. Individual Marine Mammal Tags may only be used to land one narwhal.
4. Marine Mammal Tags may only be used in the harvest season for which they were issued. At the end of the season, any unused tags expire and cannot be used in subsequent years.
5. The transfer of Marine Mammal Tags is not permitted between management units.

¹ These basic transfer provisions will be amended/expanded as required to reflect DFO Science advice on incorporation of mixed stock transfer in phase two and to reflect DFO Science advice on incorporation of a flexible quota system to the tag transfer policy in phase three (see figure 1).

² In the four Baffin Bay management units, stocks are not mixed when whales are in their summering areas. In the Northern Hudson Bay management unit, the stock is not mixed throughout the entire year

6. Transfers of Marine Mammal Tags are subject to RWO(s) pre-approval.
7. Marine Mammal Tag transfers between communities in a management unit are allowed for harvesting when stocks are not mixed, for the purposes identified above (i.e. to cover off an individual community's over-harvest, to maximize harvests or to reconcile over-harvests within the management unit) subject to pre-approval by the RWO(s).
8. Marine Mammal Tag transfers cannot occur once the sum of the Community Harvest Limit(s) (All-Season, Summer-Season) for that management unit in any given harvest season is reached.
9. Marine Mammal Tag transfers cannot occur during the Migratory-Season in any management unit.
10. In the event that insufficient Marine Mammal Tags are available within a management unit for harvest reconciliation, community over-harvests will be reconciled with a compensatory reduction in that HTO's annual Community Harvest Limit (All-Season, Summer-Season) by the RWO for the next narwhal harvest season.
11. Requests for Marine Mammal Tag transfers for any other purposes (e.g. cross-species tag transfers or barter for wildlife products) will be forwarded to the NWMB by the RWO for the management unit for decision on a case-by-case basis as per their authority under NLCA s.5.2.33 (k). Such requests can only be considered if the transfer does not jeopardize the conservation status of the stocks or populations of wildlife in question and does not violate the terms of the management regimes governing the specific wildlife species in question.

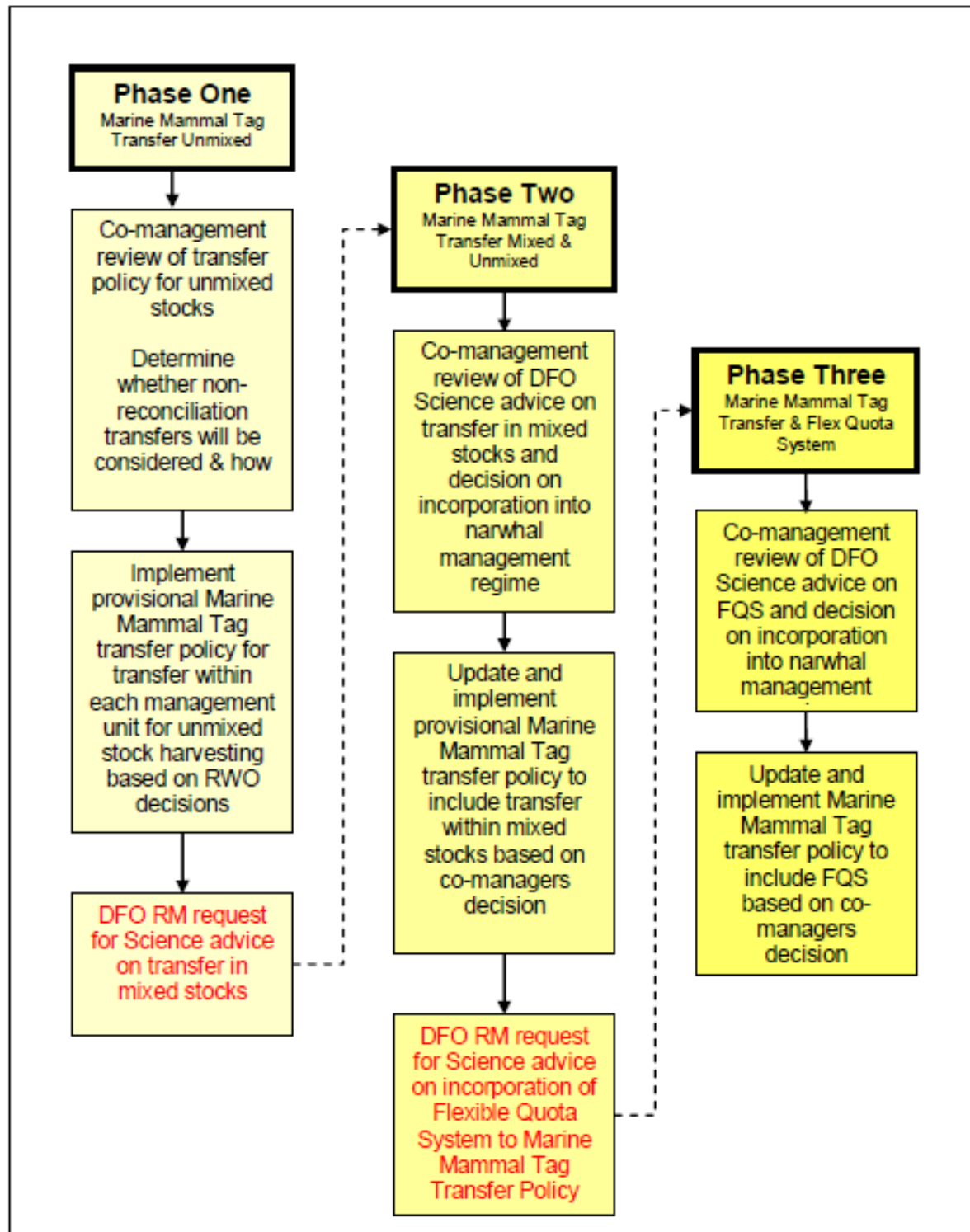


Figure 1. Flow chart depicting steps in progressive, evidence based approach to development and implementation of a Marine Mammal Tag transfer policy for the 2013 narwhal fishery in the Nunavut Settlement Area. The chart delineates the steps rather than the time sequence for the process.

Five-point narwhal quota carry-over rule

1. All unused quota for a given harvest season within MU is carried-over for use in the subsequent harvest season. (i.e. summer to summer; migratory to migratory; all season to all season)
2. Carried-over quota (MMT) is applied first to any narwhal harvests in the subsequent harvest season before current season quota (MMT) is applied to harvest.
3. Carried-over quota expires at the end of the harvest season for which it was carried-over into.
4. The system resets to zero whenever the TAH for a MU is modified by the NWMB (i.e. unused quota in a MU prior to the TAH modification cannot be carried-over into the subsequent harvest season under the “new” TAH)
5. All other rules of tag transfer Phase I still apply. No transfer of MMT between MUs. No transfer of summer MMT with migratory MMT within a MU.



SUSTAINABILITY OF A FLEXIBLE SYSTEM OF TOTAL ALLOWABLE ANNUAL CATCHES OF NARWHALS (*Monodon monoceros*)



Narwhal (*Monodon monoceros*) by R. Phillips.



Figure 1. Approximate areas where Canadian summering aggregations of narwhals occur: A - Somerset Island, B - Admiralty Inlet, C - Eclipse Sound, D - East Baffin Island, E - Northern Hudson Bay. Other areas where narwhals are known to occur in summer: F - Parry Islands, G - Jones Sound, H - Smith Sound) [adapted from DFO 2011].

Context

There are presently five recognized narwhal summering stocks in the Canadian Arctic: Somerset Island, Admiralty Inlet, Eclipse Sound, East Baffin Island, and Northern Hudson Bay (Fig.1 A-D). Hunts on these narwhal stocks are managed by setting an annual Total Allowable Landed Catch (TALC) for each stock for a five-year period. The TALC is based on a Potential Biological Removal (PBR) estimate calculated for each stock, minus estimated hunting losses (i.e., struck and lost). The present analysis is in response to requests by Resource Management (RM) for peer reviewed science to address the questions of sustainability of a flexible TALC system for narwhals. There are also narwhals summering in Jones Sound, Smith Sound and the Parry Islands water (Fig. 1 F-H). Their stock definition and status is uncertain but advice given here would apply once assessments allow the setting of total allowable land catch limits.

SUMMARY

- There is a desire on the part of Inuit to have a "flexible quota system" management provision implemented in narwhal hunts, similar to what was employed under Community Based Management (CBM) of narwhal in Nunavut, i.e., to carry-over (credit) unused Total Allowable Landed Catch (TALC) for use in the subsequent hunting season or to borrow (debit) from the following years' TALC for use in the current hunting season
- Results of a deterministic model to investigate the robustness of a flexible TALC system clearly indicate that, for the scenarios investigated, such a management approach is sustainable, as long as the total hunting mortality over the five year period does not exceed five times the annual PBR.
- Key assumptions of the deterministic model are:
 - a. birth and death rates are constant,
 - b. PBR is updated every ten years with new abundance estimates,
 - c. Hunting loss is a constant fraction of TALC, and
 - d. flexible hunting limits are adhered to by all and landed catches are reported exactly (i.e., no implementation errors).
- Process error model results, which account for some variability of birth and death rates, showed a greater risk of the population becoming depleted under certain credit or debit scenarios but the risk was similar to the base scenario run for comparison where no debit or credit was applied.
- Better estimates of hunting loss rates would increase confidence in model results. These model results do not account for impacts of large ice entrapment mortality. These are rare events and have been the subject of previous science advice. A more detailed assessment of population trend would be warranted were there evidence of deterministic environmental effects on narwhal birth and death processes.

INTRODUCTION

There are presently five recognized narwhal summering stocks in the Canadian Arctic: Somerset Island, Admiralty Inlet, Eclipse Sound, East Baffin Island, and Northern Hudson Bay. Hunts on these narwhal stocks are managed by setting an annual Total Allowable Landed Catch (TALC) for each stock that remains constant for a five-year period. The TALC is based on a Potential Biological Removal (PBR) estimate calculated for each stock, minus estimated hunting losses. The present analysis is in response to requests by Resource Management (RM) for peer reviewed science to address the questions of sustainability of a flexible TALC system for narwhals.

Question 1: Is it sustainable if Arctic Bay and Pond Inlet exchange their unused spring and fall Marine Mammal Tags for use by either community during their migratory (spring/fall) narwhal hunts? The same question was also posed for Clyde River and Qikiqtarjuaq.

Question 2: Harvest credit (or carry-over) in a five year period:

- a. Is 100% carry-over for one year sustainable?
- b. What % carry-over for one year is sustainable?
- c. What % cumulative carry-over is sustainable over consecutive years (up to five years)?

Question 3: Harvest debit (or borrow-back) in a five year period:

- a. Is 100% borrowing from the following year sustainable once in a five year period?
- b. What % borrowing from the following year is sustainable?
- c. Can the total five consecutive years' total allowable catch be allocated to each year, in a five year period, any way the hunters choose as long as the sum of the five-years of catch does not exceed that total?

Question 4: How sustainable would a hunting mortality of five times the total allowable catch if applied to any one year of a five year period?

ASSESSMENT

Question 1: This question was addressed by previous science advice (Richard 2011). In short, the two communities in question,

- a. Arctic Bay and Pond Inlet, or
- b. Clyde River and Qikiqtarjuaq, are hunting from the mixed stocks in spring and fall and therefore are taking from the same stocks' TALCs.

Consequently, the harvest credits are transferable between Arctic Bay and Pond Inlet, or between Clyde River and Qikiqtarjuaq without invalidating previous advice on the sustainability of the affected stocks.

The remaining four questions required new analyses. They were performed using a variant of the Wade (1998) PBR robustness trial method, where a proportion of the PBR for a stock was either carried over (credited) to the subsequent year to make-up for a low catch year or borrowed (debited) from the next year if a given year's catch was higher than the annual PBR. Several scenarios were modelled in deterministic projections for 100 years, as in Wade (1998), varying start populations from 5,000 to 15,000 and recovery factors from 0.5 to 1. The details of the simulations are given in Richard and Young (2015).

In all cases, more than 95% of projected populations reached sizes in excess of the Maximum Net Productivity Level. The results of these simulations of flexible catch limits did not depart much from the base models, where no credits or debits were exercised.

The same simulations were done with an added parameter for process error, i.e., a parameter simulating variation in population dynamics (Richard and Young 2015). This process error, arbitrarily set at 0.05, to reflect our belief that narwhals do not have highly variable population dynamics, resulted in more variable results for debit or credit scenarios than the deterministic runs, but none of scenario results were significantly worse than the results of base models without debits or credits.

These results indicate that a system of flexible Total Allowable Landed Catches is sustainable, as long as the total hunting mortality over each five-year period does not exceed five times the PBR for that period. The modelling results also show that the choice of a fixed recovery factor of 1 does not significantly increase the risk to sustainability of credit or debit scenarios.

Sources of Uncertainty

The above conclusions are based on models with some important assumptions. The first is that TALCs are a constant fraction of total hunting mortality, i.e., that hunting losses are constant and very similar to what was used to provide TALC advice for narwhal stocks (0.28 from Richard 2008). Hunting losses may in fact vary from area to area, from season to season and with different hunting methods. Unfortunately, we have insufficient data at present to determine

those variations and apply them in modelling. Nevertheless, the PBR method has been shown to be robust to under-estimates of actual hunt mortality (Wade 1998).

Second, we assume that sources of human-induced narwhal mortality other than total hunting mortality (landed catch and hunting loss) are negligible. We have no reason to believe otherwise at present.

Third, we assume that flexible hunting limits are adhered to by all and that landed catches are reported exactly, that there are no implementation errors. Presently, we know of no reason to believe that narwhal landed catches are not reported accurately, but there have been no independent studies to verify this assumption. Perhaps this concern is moot as the latest records of narwhal catches (DFO) indicate that landed catches are, in many cases, lower than TALCs.

The models do not take into account the impact of rare ice-entrapment mortality, nor do they include environmental effects that might negatively impact birth and death processes in narwhal populations. Large ice entrapments are rare but can have a significant short-term impact on population trend. Science advice on one such entrapment event can be found in DFO (2012). Environmental impacts on birth and death processes in narwhal populations are unknown at present but, should there be evidence of long-term negative effects, more detailed narwhal population assessments would be needed.

CONCLUSIONS

These results are encouraging for the implementation of flexible TALCs, as they show little additional risk to the narwhal stocks from implementation of flexible TALCs. If a flexible TALC system is implemented, the five-year total landed catch should not exceed five times the annual TALC for each stock.

SOURCES OF INFORMATION

This Science Advisory Report is from the October 20-24, 2014 Annual Meeting of the National Marine Mammal Peer Review Committee (NMMPRC). Additional publications from this meeting will be posted on the [Fisheries and Oceans Canada \(DFO\) Science Advisory Schedule](#) as they become available.

DFO. 2011. [Advice regarding the genetic structure of Canadian narwhal \(*Monodon monoceros*\)](#). DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2011/021.

DFO. 2012. [Effect of 2008 ice entrapment on the Eclipse Sound narwhal total allowable landed catch](#). DFO Can. Sci. Advis. Sec. Sci. Resp. 2012/020.

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TAB 4: History of the Development of the 2013 *Integrated Fisheries Management Plan for Narwhal in the Nunavut Settlement Area*

The following summarizes the consultation process by Nunavut co-management organizations between January 2011 and July 2012 that led to the Nunavut Wildlife Management Board's (NWMB) approval of the "*Proposed Integrated Fisheries Management Plan for Narwhal in the Nunavut Settlement Area, including the establishment of total allowable harvests, basic needs levels and non-quota limitations (July 24th-26th)*". The complete record of documents pertaining to this request is available at <https://www.nwmb.com/en/public-hearings-a-meetings/public-hearings-1/2012-1>.

January 2011: Nunavut Tunngavik Inc. (NTI) filed an Application for Judicial Review with the Federal Court in response to the DFO Committee on International Trade in Endangered Species (CITES) Scientific Authority's decision not to issue Non-detriment Findings (NDF) for all narwhal stocks and populations in the Nunavut Settlement Area.

May 2011: DFO conducted community consultations to discuss the collective understanding of narwhal populations, using both Inuit and scientific information, and the process related to DFO's responsibilities under CITES with respect to issuing export permits for narwhal products. The delegation included observers from the NWMB, NTI and the Government of Nunavut – Department of Environment (GN-DoE). Meetings were held in Clyde River, Pond Inlet, Arctic Bay, Resolute, Igloolik, and Qikiqtarjuaq. Hall Beach and Pangnirtung Hunters and Trappers Organization (HTO) members attended meetings in Igloolik and Qikiqtarjuaq, respectively. Due to inclement weather, the meeting planned for Grise Fiord did not take place. A synthesis of Inuit Qaujimajatuqangit (IQ) and expertise shared by community members is published in Canadian Science Advisory Secretariat Research Document 2012/001.

June 2011: agreement was reached on an alternative resolution of NTI's Application for Judicial Review. Under this agreement DFO and NTI, in collaboration with the Nunavut co-management organizations, would address outstanding narwhal fishery management issues including, but not limited to the development of an Integrated Fisheries Management Plan (IFMP) for narwhal. The initial step in this process was a management workshop attended by the narwhal co-management partners in August 2011.

August 2011: DFO hosted a workshop on narwhal management workshop in Iqaluit. Participants included representatives from NTI, NWMB, Qikiqtaaluk Wildlife Board, Kivalliq Wildlife Board, Kitikmeot Regional Wildlife Board, Nunavut Inuit Wildlife Secretariat and GN-DoE. The workshop agenda included a review of the current management regime for narwhal in Nunavut, information about management issues within the fishery, discussion of options to address these issues. Participants agreed to proceed with developing an IFMP based on the stock management approach, and created three working groups focused on: harvest reporting and tusk tracking; struck/loss reduction; and approaches to incorporate IQ into Science. DFO wrote the first draft of the IFMP for subsequent review and revision by co-management organizations.

December 2011: DFO hosted a second workshop in Iqaluit attended by the same co-management representatives present in August. NTI's comments, provided as a revised second draft, were reviewed and discussed by the parties. DFO presented an approach to incorporate IQ/Traditional Ecological Knowledge into scientific surveys, and conducted a tutorial to demonstrate the narwhal Harvest Allocation Model, developed to assist the Regional Wildlife Organizations (RWO) with allocating the Basic Needs Level for narwhal among their constituent HTOs. DFO was tasked to incorporate comments into a third IFMP draft for future review.

February 2012: DFO hosted a third workshop in Ottawa with representatives of NTI and NWMB. They reviewed the third IFMP draft and achieved agreement on substantial issues within the proposed management regime, understanding that the IFMP is an initial step in continuing to harmonize narwhal management with provisions of the Nunavut Agreement. DFO and NTI agreed in principle to a continued collaboration with the co-management partners to evaluate alternative management measures, consistent with the Nunavut Agreement, to address management issues in the narwhal fishery.

March 2012: DFO conducted community consultations with representatives from each of the 23 narwhal-harvesting communities and the three RWOs. The delegation spent two days in each of nine centrally located communities and held three separate consultation meetings. The delegation met with the local HTO on the first day; followed by public consultations on the second day. At each meeting, the delegation requested feedback on the proposed changes to the narwhal management regime and the contents of the draft IFMP. These community consultations were conducted in two simultaneous tours. The first included the Hudson Bay communities and Grise Fiord; the second included the Baffin Island communities. DFO then prepared a consultation summary for consideration by the NWMB.

April 2012: DFO submitted the *“Proposed Integrated Fisheries Management Plan for Narwhal in the Nunavut Settlement Area, including the establishment of total allowable harvests, basic needs levels and non-quota limitations (July 24th-26th)”*. The IFMP reflects RWO and HTO authority to allocate and enforce regional and community basic needs levels and adjusted basic needs levels (in the form of Community Harvest Limits) pursuant to Nunavut Agreement s.5.7.6(b) and s.5.7.3(b) respectively.

June 2012: DFO attended the NWMB's Regular Meeting and presented its Request for Decision to the NWMB for decision, consistent with the Nunavut Agreement decision-making process.