January 8, 2021

Hon. Shane Thompson, Minister
Environment and Natural Resources
Government of the Northwest Territories
Box 1320
Yellowknife, NT  X1A 2L9
Email: Shane_Thompson@gov.nt.ca

Grand Chief George Mackenzie
Tłı̨chǫ Government
Box 412
Behchokǫ, NT  X1A 1Y0
Email: georgemackenzie@tlicho.com


Dear Minister Thompson & Grand Chief Mackenzie:


If you have any questions, please contact our office at (867) 873-5740 or jpellissey@wrrb.ca.

Sincerely,

Joseph Judas
Chair

Attachment

Cc    Dr. Erin Kelly, Deputy Minister ENR-GNWT
      Brett Elkin, A/Assistant Deputy Minister, Operations, ENR-GNWT
      Heather Sayine-Crawford, A/Director, Wildlife Division, ENR, GNWT
      Bruno Croft, Superintendent, North Slave Region, ENR-GNWT
      Laura Duncan, Tłı̨chǫ Executive Officer, TG
      Tammy Steinwand-Deschambeault, Director, Culture and Lands Protection, TG
      Michael Birlea, Manager, Culture and Lands Protection, TG

Via Email
Shane_Thompson@gov.nt.ca
georgemackenzie@tlicho.com
Reasons for Decisions Related to a Joint Proposal for Dìga (Wolf) Management in Wek’èezhìì

Submitted to Tłı̨chǫ Government and Department of Environment & Natural Resources, Government of the Northwest Territories

January 8, 2021
# TABLE OF CONTENTS

LIST OF FIGURES .......................................................................................................... 5  
LIST OF TABLES ............................................................................................................ 5  
LIST OF ACRONYMS ..................................................................................................... 6  
LIST OF TŁỊCHǪ TERMS ............................................................................................... 7  
1.0. Executive Summary ................................................................................................. 8  
2.0. Introduction ............................................................................................................ 10  
3.0. The Board and Its Authorities ................................................................................. 12  
   3.1. Rule for Management Proposals ........................................................................ 14  
4.0. Previous WRRB Dìga Recommendations .............................................................. 16  
   4.1. 2010 Proceeding ................................................................................................. 16  
   4.2. 2016 Proceedings ............................................................................................... 18  
   4.3. 2019 Ɂekwǫ Proceedings ................................................................................... 19  
   4.4. 2019 Predator Management Recommendations ................................................ 21  
   5.1. Receipt of 2020 Joint Proposal ........................................................................... 22  
   5.2. Receipt of 2020 Revised Joint Proposal ............................................................. 23  
   5.3. Registered Participants ....................................................................................... 24  
   5.4. Public Comment Period ...................................................................................... 24  
   5.5. Information Requests .......................................................................................... 24  
   5.6. Technical Sessions ............................................................................................. 25  
      5.6.1 Science Technical Session ........................................................................... 25  
      5.6.2 Traditional Knowledge Technical Session ..................................................... 26  
6.0. Why is the Board Considering Dìga Management?................................................ 26  
   6.1. Ɂekwǫ Decline .................................................................................................... 26  
   6.2. Dìga Status and Tlı̨chǫ Knowledge ................................................................... 30  
   6.3. Conclusion .......................................................................................................... 34  
7.0. Evidence, Analysis, and Recommendations .......................................................... 34  
   7.1. Introduction ......................................................................................................... 34  
   7.2 Goal and Objectives of the Revised Joint Proposal ............................................. 35  
      7.2.1. Introduction .................................................................................................. 35  
      7.2.2 Proponent’s Evidence ................................................................................... 35  
      7.2.3 Other Participant’s and Public Evidence ....................................................... 36  
      7.2.4 Analysis and Recommendations ................................................................... 36
7.3. Estimating Dìga Populations ........................................................................................................ 38
  7.3.1. Introduction ................................................................................................................................ 38
  7.3.2. Proponent’s Evidence .................................................................................................................. 39
  7.3.3. Other Participants and Public Evidence ...................................................................................... 40
  7.3.4. Analysis and recommendations .................................................................................................. 40

7.4. Ground-Based Harvest .................................................................................................................. 44
  7.4.1. Introduction ................................................................................................................................... 44
  7.4.2. Proponent’s Evidence .................................................................................................................. 45
  7.4.3. Other Participants and Public Evidence ...................................................................................... 47
  7.4.4. Analysis and Recommendations ................................................................................................ 47

7.5. Aerial Removals ............................................................................................................................. 50
  7.5.1. Introduction ................................................................................................................................... 50
  7.5.2. Proponents Evidence .................................................................................................................. 50
  7.5.3. Other Participant’s and Public Evidence ...................................................................................... 52
  7.5.4. Analysis and Recommendations ................................................................................................ 54

7.6. Overall Analysis of Ground-based Harvest and Aerial Removals .............................................. 54

7.7. Research & Monitoring .................................................................................................................. 59
  7.7.1. Introduction ................................................................................................................................... 59
  7.7.2. Monitoring Dìga ........................................................................................................................... 60
      7.7.2.1. Introduction ............................................................................................................................ 60
      7.7.2.2. Proponents Evidence ............................................................................................................. 60
      7.7.2.3. Other Participant’s and Public Evidence ................................................................................ 61
      7.7.2.4. Analysis and Recommendations .......................................................................................... 62
  7.7.3. Collaring ....................................................................................................................................... 63
      7.7.3.1. Introduction ............................................................................................................................ 63
      7.7.3.2. Proponents Evidence ............................................................................................................. 63
      7.7.3.3. Other Participant’s and Public Evidence ................................................................................ 64
      7.7.3.4. Analysis and Recommendations .......................................................................................... 64
  7.7.4. Monitoring Ɂekwǫ̀ Response ......................................................................................................... 65
      7.7.4.1. Introduction ............................................................................................................................ 65
      7.7.4.2. Proponents Evidence ............................................................................................................. 65
      7.7.4.3. Other Participant’s and Public Evidence ................................................................................ 65
      7.7.4.4. Analysis and Recommendations .......................................................................................... 66
  7.7.5. Modelling Ɂekwǫ̀ Response .......................................................................................................... 68
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.7.5.1. Proponents Evidence</td>
<td>68</td>
</tr>
<tr>
<td>7.7.5.2. Other Participant's and Public Evidence</td>
<td>69</td>
</tr>
<tr>
<td>7.7.5.3. Analysis and Recommendations</td>
<td>69</td>
</tr>
<tr>
<td>7.7.6 Adaptive Co-Management</td>
<td>70</td>
</tr>
<tr>
<td>7.7.6.1. Introduction</td>
<td>70</td>
</tr>
<tr>
<td>7.7.6.2. Proponents Evidence</td>
<td>70</td>
</tr>
<tr>
<td>7.7.6.3. Other Parties and Public Evidence</td>
<td>71</td>
</tr>
<tr>
<td>7.7.6.4. Analysis and Recommendations</td>
<td>71</td>
</tr>
<tr>
<td>8.0. Conclusion</td>
<td>74</td>
</tr>
<tr>
<td>APPENDIX A 2020 Revised Joint Management Proposal</td>
<td>75</td>
</tr>
<tr>
<td>APPENDIX B WRRB Technical Response to Summary of Wolf Incidental Sightings from Bathurst and Bluenose-East Barren-ground Caribou Surveys, GNWT ENR, August 13, 2020</td>
<td>102</td>
</tr>
</tbody>
</table>
LIST OF FIGURES

Figure 1. Wek’èezhìı Management Area ................................................................. 13
Figure 2. Seasonal survival rate estimates for the Kǫ̀k’èeti ekwǫ̀ herd (note that they are on the annual scale for comparison purposes). The mean number of collars available each month is shown beside each estimate. ................................................................. 28
Figure 3. Seasonal survival rates for the Sahti ekwǫ̀ herd. Note that rates are expressed on the annual scale. The mean number of collars available each month is shown beside each estimate ................................................................. 29
Figure 4. Incidental sightings of dìga during ḋekwǫ̀ sex and age composition surveys in late winter on the ranges of the Kǫ̀k’èeti ekwǫ̀ and Sahti ekwǫ̀ herds, 2009-2020. NS means Not Surveyed (from Appendix B) ................................................................. 43
Figure 5. Enhanced North Slave Wolf Harvest Incentive Area in 2019/20. Mapped from Kǫ̀k’èeti and Sahti ekwǫ̀ collared ḋekwǫ̀ locations from early January 2020 ................ 45
Figure 6. Stomach content analysis of North Slave dìga compiled from GNWT’s information. ................................................................................................................... 48
Figure 7. Flight paths of aerial crews and support helicopter on Bathurst winter range area. April-May 2020 ................................................................. 57
Figure 8. Trends in overlap between the Bathurst and Bluenose East and Bathurst and Beverly/Ahiak herds based on the Volume Index (Gurarie et al. In Prep). ................................. 58

LIST OF TABLES

Table 1. Dìga numbers from Ungulate Biomass Index ................................................. 41
Table 2. North Slave and Kugluktuk Ground Harvesters – Catch per Unit Effort (CPUE) ................................................................. 46
Table 3. Summary of dìga numbers, target levels, removal and dìga left compiled from the Pilot Project ................................................................. 55
Table 4. Vital rates used as input to the demographic model, Russell 2020 ................. 68
## LIST OF ACRONYMS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>COSEWIC</td>
<td>Committee on the Status of Endangered Wildlife in Canada</td>
</tr>
<tr>
<td>ENR</td>
<td>Environment &amp; Natural Resources</td>
</tr>
<tr>
<td>GNWT</td>
<td>Government of the Northwest Territories</td>
</tr>
<tr>
<td>IR</td>
<td>Information Request</td>
</tr>
<tr>
<td>LKDFN</td>
<td>Łutsel K’e Dene First Nation</td>
</tr>
<tr>
<td>NSMA</td>
<td>North Slave Métis Alliance</td>
</tr>
<tr>
<td>NT</td>
<td>Northwest Territories</td>
</tr>
<tr>
<td>SARC</td>
<td>Species at Risk Committee</td>
</tr>
<tr>
<td>TAH</td>
<td>Total Allowable Harvest</td>
</tr>
<tr>
<td>TG</td>
<td>Tłı̨chǫ Government</td>
</tr>
<tr>
<td>TK</td>
<td>Tłı̨chǫ Knowledge; traditional knowledge</td>
</tr>
<tr>
<td>WRRB</td>
<td>Wek’èezhìi Renewable Resources Board</td>
</tr>
</tbody>
</table>
LIST OF TŁICHQ TERMS

<table>
<thead>
<tr>
<th>Tłíchq Term</th>
<th>English Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dedii</td>
<td>moose</td>
</tr>
<tr>
<td>Diga</td>
<td>wolf</td>
</tr>
<tr>
<td>Digati</td>
<td>wolf-lake</td>
</tr>
<tr>
<td>?ekwò</td>
<td>barren-ground caribou</td>
</tr>
<tr>
<td>K’àowo</td>
<td>leaders</td>
</tr>
<tr>
<td>K’áowodeé</td>
<td>important leader who knows everything</td>
</tr>
<tr>
<td>Kòk’èeti</td>
<td>Contwoyto Lake</td>
</tr>
<tr>
<td>Kòk’èeti Ekwò</td>
<td>Bathurst caribou</td>
</tr>
<tr>
<td>Nògha</td>
<td>Wolverine</td>
</tr>
<tr>
<td>Sahtì Ekwò</td>
<td>Bluenose-East caribou</td>
</tr>
<tr>
<td>Tatsò</td>
<td>raven</td>
</tr>
<tr>
<td>Tòdzì</td>
<td>boreal caribou</td>
</tr>
<tr>
<td>Wek’èezhìi</td>
<td>Management area; within the boundaries of</td>
</tr>
</tbody>
</table>
1.0. Executive Summary

The Wek’èezhìı Renewable Resources Board (WRRB or the Board) is responsible for wildlife management in Wek’èezhìı and shares responsibility for managing and monitoring the Kǫk’èetı̀ and Sahtì Ekwǫ̀ (Bathurst and Bluenose-East caribou) herds. Since 2006, the Department of Environment and Natural Resources (ENR), Government of the Northwest Territories (GNWT) has reported on the significant declines in the Kǫk’èetı̀ and Sahtì ekwǫ̀ herds and identified the requirement for management actions. In Board proceedings during 2010, 2016, and 2019, the WRRB made decisions about harvest, including total allowable harvests (TAH) for both herds, and recommendations to urge government actions to halt both the Kǫk’èetı̀ and Sahtì ekwǫ̀ herds’ declines.

However, restrictions on harvest have not been enough despite the hardships borne by harvesters. As such, the WRRB has also made recommendations to increase ᐃekwǫ̀ (barren-ground caribou) survival and offset natural hardships for ᐃekwǫ̀ by increasing Diga (wolf) harvesting, conducting a feasibility assessment for diga management, proposing diga control, and supporting habitat conservation and monitoring.

On January 31, 2020, GNWT and the Tłı̨chǫ Government (TG) submitted the “Joint Proposal on Management Actions for Wolves (diga) on the Bathurst and Bluenose-East Barren-ground Caribou (ɂekwǫ̀) Herd Winter Ranges: 2020 – 2025”. Following initial assessment, the Board undertook a Level 2 management proposal review. However, to address concerns identified by GNWT and TG, following internal Board discussions in March 2020, the WRRB made the decision to amend its procedure for the review of the 2020 diga management actions as proposed in the diga joint management proposal to a Level 1 review and to treat the 2020 diga management actions as a pilot project only. Further, the Board requested that TG and GNWT resubmit the diga management actions proposed for 2021-2025 in the Proposal for a Level 2 review with the inclusion of lessons learned from the implementation of the 2020 management actions in August 2020.

On August 25, 2020, GNWT and TG submitted a revised joint management proposal, entitled “Revised Joint Proposal on Management Actions for Wolves (diga) on the Bathurst and Bluenose-East Barren-ground Caribou (ɂekwǫ̀) Herd Winter Ranges: 2021 – 2024” (hereafter called the Revised Joint Proposal), as well as a technical report with lessons learned from the implementation of the 2020 Pilot Project and a plain-language summary. Following an initial assessment of the Revised Joint Proposal, the Board determined that a Level 2 review was appropriate, as per its Rule for Management Proposals.
The WRRB concluded, based on current evidence, that a serious conservation concern for both the K'òk'èetì and Sahtì ekwò herds exists and, as such, increased management and monitoring actions are warranted. In addition to harvest limitations and reducing disturbance to the ᐄekwò herds and their habitat, additional management and monitoring actions that focus on reducing predation, specifically diga, are required to support the recovery of the K'òk'èetì and Sahtì ekwò herds.

The WRRB recommended that GNWT and TG update the objectives, or their measures of success, for the diga management and monitoring program to ensure that the results of the program are measurable and are related to ᐄekwò recovery.

To ensure the most accurate and precise population estimates are available, the Board recommended that GNWT and TG identify and implement alternate methods to measure and index diga abundance. These methods should be calibrated with the Ungulate Biomass Index. The Board further recommended that the diga sighting rate indicator be assessed to determine if and how it contributes to the understanding of seasonal trends in diga abundance on the ᐄekwò herd ranges.

The WRRB urged GNWT and TG to proceed with the ground-based harvest as proposed with the addition of harvesters supports, including ᐄekwò and diga distribution information, gas caching, and/or bait stations as per the Wolf Technical Feasibility Assessment: Options for Managing Diga on the Range of the Bathurst Barren-ground Caribou Herd (2017). Additionally, it was recommended to put financial resources toward improving the harvest questionnaires used for the harvest reporting program as well as incorporating learnings from Nunavut’s high success rate with their harvest reporting techniques.

The WRRB recommended that GNWT and TG should not continue aerial removals of diga on the K'òk'èetì and Sahtì ekwò herd ranges; instead, more resources should be put towards ground-based harvest. The Board also recommended that GNWT and TG explore alternative methods of assigning harvested diga to an ᐄekwò herd and to statistically determine confidence in the allocation.

To better understand diga on the ranges of the K'òk'èetì and Sahtì ekwò herds, the WRRB recommended monitoring diga den occupancy through aerial surveys and remote cameras, conducting necropsies on all diga removed through the management program, continuing the diga collaring program using a statistically robust design to measure diga movements, completing a calf mortality study to measure the effects of diga on calf survival, conducting Tłı̨chǫ Knowledge (TK) research studies through storytelling and on-the-land collections that document observations of diga and ᐄekwò relationship as well as the changes in diga behaviours, and undertaking field studies.
and modelling to determine the cause of death of collared ɂekwǫ̀ to test the assumption that 60% of mortality is caused by diga predation.

Finally, the Board recommended implementation of the Adaptive Co-Management Framework, through the collaborative Barren-ground Caribou Technical Working Group, by establishing and integrating benchmarks for key vital rates, reporting of key vital rates of diga, Kǫk’ęeti ekwǫ̀, and Sahtì ekwǫ̀ throughout the year, and conducting an annual review of the diga management and monitoring program in November. Additionally, the WRRB recommended GNWT and TG develop annual monitoring protocols for efficiency, effectiveness, and humaneness to ensure the diga management and monitoring program is comprehensively evaluated, and to present to the Board annually on the diga program.

2.0. Introduction

The Kǫk’ęeti ekwǫ̀ herd declined from approximately 472,000 in 1986 to about 8,200 in 2018, and the Sahtì ekwǫ̀ herd declined from 103,000 in 2010 to about 19,300 in 2018.¹ Unfortunately, due to the Covid-19 global pandemic, the calving ground surveys scheduled for June 2020 were not conducted. Therefore, wildlife managers are unable to confirm whether the accelerated rates of decline for each herd has continued or the herds’ vital rates have improved. The WRRB is still uncertain of what the future holds for the Kǫk’ęeti and Sahtì ekwǫ̀ herds.

In Board proceedings during 2010, 2016, and 2019, the WRRB made decisions about harvest and then, subsequently a TAH, as well as recommendations to urge government action to halt decline of both the Kǫk’ęeti and Sahtì ekwǫ̀ herds.² Those 2010, 2016, and 2019 determinations and recommendations that were accepted by governments and implemented were focused on harvest reductions to increase survival of adult ɂekwǫ̀. Unfortunately, restrictions on harvest alone have not proved to be successful in stopping the decline of these herds despite the hardships borne by harvesters. As result, the WRRB also made recommendations to increase ɂekwǫ̀ survival and offset natural hardships for ɂekwǫ̀ by increasing diga harvesting,


WRRB Reasons for Decision – Dìga Management
January 8, 2021
conducting a feasibility assessment for diga management, proposing diga control, and supporting habitat conservation and monitoring.

Increased diga harvesting and management is reported in the 2020 Joint Proposal, entitled “Joint Proposal on Management Actions for Wolves (diga) on the Bathurst and Bluenose-East Barren-ground Caribou (ɂekwǫ̀) Herd Winter Ranges: 2020 – 2025”.3 TG and GNWT submitted the Joint Proposal on January 31, 2020. Following initial assessment, the Board undertook a Level 2 management proposal review, as per its Rule for Management Proposals.4 However, following internal Board discussions in March 2020, the Board made the decision to amend its procedure for the review of the 2020 diga management actions to a Level 1 review and to treat the 2020 diga management actions as a pilot project only. Further, the Board requested that TG and GNWT resubmit the diga management actions proposed for 2021-2025 in a Proposal for a Level 2 review with the inclusion of lessons learned from the implementation of the 2020 management actions in August 2020.

On August 25, 2020, GNWT and TG submitted a revised joint management proposal, entitled “Revised Joint Proposal on Management Actions for Wolves (diga) on the Bathurst and Bluenose-East Barren-ground Caribou (ɂekwǫ̀) Herd Winter Ranges: 2021 – 2024” (hereafter called the Revised Joint Proposal),5 as well as a technical report6 with lessons learned from the implementation of the 2020 Pilot Project and a plain-language summary.7 Following an initial assessment of the Revised Joint Proposal, the Board determined that a Level 2 review was appropriate, as per its Rule for Management Proposals. The Revised Joint Proposal can be found in Appendix A.

The goal of the Pilot Project and Revised Joint Proposal’s management actions is to present a coordinated approach to diga management actions aimed at reducing diga predation on ɂekwǫ̀. Reducing diga predation in combination with ongoing harvest management is anticipated to have a positive influence on survival rates of the Kôk’èeti and Sahtì ekwǫ̀ herds.8

This report describes the WRRB’s assessment of the evidence on the record and is the basis for the Board’s recommendations.

---

8 PR (Wolf 2020): 019 - Summary Caribou Population Modeling of Varying Levels of Wolf Removal BATH BNE
3.0. The Board and Its Authorities

The WRRB is responsible for the wildlife management functions set out in the Tłı̨chǫ Agreement in Wek’èezhìi ⁹ and shares responsibility for the management and monitoring of dìga and ᐃشهيد herds. The WRRB is a co-management tribunal established by the Tłı̨chǫ Agreement to exercise advisory and decision-making responsibilities related to wildlife, forest, plant, and protected areas management in Wek’èezhìi (Figure 1). The Board’s legal authorities came into effect at the time the Tłı̨chǫ Agreement was ratified by Parliament.¹⁰

Sections 12.1.5 and 12.1.6 of the Agreement requires the Parties¹¹ to manage wildlife based on the principles of conservation, on an ecosystemic basis, in an adaptive fashion, and acquire and use traditional knowledge.¹² The WRRB’s major authorities and responsibilities in relation to wildlife are further set out in Chapter 12 of the Tłı̨chǫ Agreement.¹³

---

¹¹ This includes the Tłı̨chǫ Government, the Government of the Northwest Territories, and the Government of Canada.
¹² See Section 12.1.5 paragraphs (a) and (d) and Section 12.1.6 of the Tłı̨chǫ Agreement.
¹³ See Section 12 of the Tłı̨chǫ Agreement.
As required by Sections 12.5.1 and 12.5.4 of the Tłı̨chǫ Agreement, any Party proposing a wildlife management action in Wek’èezhìı must submit a management proposal to the WRRB for review, including the establishment or adjustment of a TAH. Prior to making a recommendation, the WRRB must consult with any body that has authority over that wildlife species both inside and outside of Wek’èezhìı.

The WRRB acts in the public interest. It is an institution of public government, which makes its decisions on the basis of consensus. Part 12.1 of the Tłı̨chǫ Agreement requires the coordination of the functions of governments (authorities whose responsibilities include wildlife management among other functions). The WRRB works closely with Tłı̨chǫ communities, TG, and GNWT. The Board also collaborates with other territorial government departments, such as Lands and Industry, Tourism and

---

14 Department of Culture & Lands Protection, Tłı̨chǫ Government. 2014.
15 As defined in the Tłı̨chǫ Agreement, “Parties” mean the Parties to the Agreement, namely the Tłı̨chǫ as represented by the Tłı̨chǫ Government, the Government of the Northwest Territories, and the Government of Canada.
16 See Section 12.1.4 of the Tłı̨chǫ Agreement.
Investment, and federal government departments, such as Environment and Climate Change Canada, Fisheries and Oceans Canada, and Crown-Indigenous Relations and Northern Affairs Canada. In addition, the WRRB works with other wildlife management authorities, Indigenous organizations, and stakeholders.

Wildlife management is a central and vital component of the Tłı̨chǫ Agreement. The rights of Tłı̨chǫ citizens to use wildlife for sustenance, cultural, and spiritual purposes are protected by the Tłı̨chǫ Agreement and the Constitution, subject to the management framework set out in Chapter 12.

The Tłı̨chǫ Agreement defines conservation as follows:

> “conservation” means
> (a) the maintenance of the integrity of ecosystems by measures such as the protection and reclamation of wildlife habitat and, where necessary, restoration of wildlife habitat; and
> (b) the maintenance of vital, healthy wildlife populations capable of sustaining harvesting under the Agreement.

In addition to the substantive legal protection for Tłı̨chǫ citizens’ harvesting rights set out in the Tłı̨chǫ Agreement, the WRRB is also bound by the requirements of fairness. Section 12.3.10 gives the Board the authority to order a public hearing on a wildlife management proposal and makes it mandatory for the WRRB to hold a public hearing when it intends to consider establishing a TAH in respect of a species or a population.

3.1. Rule for Management Proposals

Under Section 12.3.6, the WRRB has the authority to make rules respecting the procedure for making applications to the Board. The WRRB has developed a Rule for Management Proposals as a guide for making management proposal submissions, including actions taken in the issuance of licences, permits, and other authorizations.

Section 12.5.1 of the Tłı̨chǫ Agreement is mandatory. Except in an emergency situation as set out in 12.5.14, it requires that a Party, before taking “any action for management of wildlife in Wek’eezhii submit its proposals to the WRRB for review under 12.5.4”. This section of the Agreement is intended to be broadly inclusive of wildlife management initiatives.

---

17 See Section 12.1.1 of the Tłı̨chǫ Agreement.
The WRRB, depending on the nature, content, and context of a management proposal, will undertake one of three levels of review:

- Level 1 – will require Board or Board Staff (as directed by the Board) review but no public consultation;
- Level 2 – will require Board review and Board-led public consultation (no public hearing); or,
- Level 3 – will required Board review and Board-led public consultation with a public hearing.

Except where in the Board’s view the proposal will require the establishment of a TAH as stated in Section 12.3.10 of the Tłı̨chǫ Agreement, all submissions are treated initially as a Level 1 review. Following assessment, the Board has the discretion to increase the level of review as it deems appropriate. For Level 2 management proposals, the Board may establish a proceeding and an online public registry. Notification of the proceeding and a request for comments will be made via its website, newspaper, social media, and radio advertisements with a reasonable period granted to allow affected stakeholders and the public to provide comment.

Following closure of the public comment period, the WRRB reviews and provides recommendations. Level 2 management proposals may require up to 90 days for consultation, review, and response. As per Section 12.5.8 of the Tłı̨chǫ Agreement, the Board “shall give public notice of their recommendations” by posting them on their website (www.wrrb.ca).

WRRB determinations are final but recommendations made by the Board may be accepted, rejected, or varied by the Party with the jurisdiction affected by the recommendation. However, once a recommendation is accepted, that Party doing so must implement it “to the extent of its power under legislation”. This framework and these relationships are central to effective wildlife management in Wek’èezhìì.

Following submission of its recommendations to a Party, the Board expects a response within 42 days of receipt of its recommendations for a Level 1 or Level 2 management proposal. Section 12.5.11 of the Tłı̨chǫ Agreement states that “each Party with power under its laws to implement a recommendation of the WRRB made under 12.5.5, 12.5.6, 12.5.7, 13.4.1 or 14.4.1 shall accept, reject or vary such recommendation”. A Party must tell the Board whether its recommendation has been accepted. If a recommendation is varied, the Party must provide reasons for that decision, and, in addition, provide the change in wording so that the Board and all affected persons are clear about the final outcomes of the Board proceeding and necessary implementation.

---

20 See Sections 12.5.11 and 12.5.12 of the Tłı̨chǫ Agreement.
actions. This ensures clarity with respect to the obligations under Section 12.5.12 of the Tłı̨chǫ Agreement, that “each Party shall, to the extent of its power under legislation or Tłı̨chǫ laws, establish or otherwise implement a) a determination of the WRRB under 12.5.5 or 12.5.6; and b) any recommendation of the Board as accepted or varied by it”.

If a recommendation is rejected, the Party must provide specific reasons and an explanation of why the rejection has occurred.

4.0. Previous WRRB Dìga Recommendations

The objective of Chapter 12, Wildlife Harvesting Management, of the Tłı̨chǫ Agreement is to recognize the importance of wildlife and its habitat to the Tłı̨chǫ First Nation well-being, way of life, and land-based economy.21 The WRRB takes this objective seriously while making its decisions. The Board also acknowledges the tremendous importance that ᖿेkwǫ̀ and dìga play in the language, culture, and way of life of the Tłı̨chǫ people.

The Board has kept this in mind over the last decade, since receiving the first management proposal for Kǫk’èeti and Sahtí ᖿekwǫ̀, by making determinations and recommendations using scientific and Tłı̨chǫ knowledge. While the Board’s decisions have dealt with harvest management actions, including TAH for the Kǫk’èeti and Sahtí ᖿekwǫ̀, the WRRB has also made recommendations related to predator management actions, biological and environmental monitoring, and cumulative effects.

Outlined below are the Board’s predator management and monitoring recommendations from the 2010, 2016, and 2019 proceedings to demonstrate the effort the WRRB has put in to manage and monitor predator populations in an effort to slow and/or halt the decline of Kǫk’èeti and Sahtí ᖿekwǫ̀.

4.1. 2010 Proceeding

On November 5, 2009, TG and GNWT submitted a Joint Proposal on Caribou Management Actions in Wek’èezhii, which proposed nine management actions and eleven monitoring actions, including harvest limitations, for the Kǫk’èeti, Sahtí and Beverly/Ahiak ᖿekwǫ̀ herds.

Upon review of the proposal, the WRRB ruled that it was required to hold a public hearing. Originally scheduled for January 11-13, 2010, the public hearing took place March 22-26, 2010 in Behchokǫ̀, Northwest Territories (NT). Once the evidentiary phase of the proceeding was completed, TG requested the WRRB adjourn the hearing in order to give TG and GNWT time to work collaboratively to complete the joint management proposal.

21 See Section 12.1.1 of the Tłı̨chǫ Agreement.
On May 31, 2010, TG and GNWT submitted the *Revised Joint Proposal on Caribou Management Actions in Wek’éezhii*. This revised proposal changed the original management and monitoring actions, including a targeted increase of wolf mortality through increased hunting and trapping effort and wolf removal programs, and incorporated an adaptive co-management framework and rules-based approach to harvesting. As such, the WRRB reconvened its public hearing on August 5-6, 2010 in Behchokǫ̀, NT, where final presentations, questions and closing arguments were made.

On October 8, 2010, the WRRB submitted its final recommendations and reasons for decision report to TG and GNWT. Many of the recommendations were related to the K’ök’èeti and Sahtí ekwǫ̀ herd and relevant management actions vital for herd recovery, including harvest restrictions. The Board also made harvest recommendations for the Beverly/Ahiak ekwǫ̀ herd. Additionally, the WRRB recommended the implementation of detailed scientific and Tłı̨chǫ knowledge monitoring actions and an adaptive co-management framework; the collaborative development of best practices for mitigating effects on ekwǫ̀ during calving and post-calving, including the consideration of implementing mobile ekwǫ̀ protection measures; the monitoring of landscape changes, including fires, industrial exploration, and development, to assess potential impacts to ekwǫ̀ habitat.

Specific to dìga, the WRRB recommended three scientific and TK monitoring actions related to 1) wolf abundance (den occupancy), 2) wolf condition and reproduction, and 3) wolf harvest. TG agreed to all of the Board’s TK recommendations for dìga, noting their commitment to documenting and reporting on observations and trends observed by ekwǫ̀ harvesters and elders, and indicating implementation of the Tłı̨chǫ Knowledge Research and Monitoring Program within eight months (approximately September 2011).

Though GNWT indicated that it would continue current wolf den surveys to provide an index of wolf abundance, the recommendation was varied to provide a proposal with potential options and costings that are relevant to wolf monitoring, research, and management. To monitor wolf condition and reproduction as well as wolf harvest, GNWT stated that a collection report, including all intact wolf carcasses provided by harvesters, and a harvest report would be provided to the Board by June 2011.

The Board also recommended that the harvest of dìga should be increased through incentives, but assistance for harvesters to access wolves on wintering grounds should not be provided. The WRRB also recommended that focused dìga control not be implemented; however, if TG and GNWT believed that focused dìga control was

---

necessary in the future, a management proposal would be required for WRRB consideration. TG and GNWT accepted both of these recommendations as written.

4.2. 2016 Proceedings

On December 15, 2015, TG and GNWT submitted the “Joint Proposal on Caribou Management Actions for the Bathurst Herd: 2016-2019” and the “Joint Proposal on Management Actions for Bluenose-East Caribou 2016-2019” to the Board outlining proposed management actions for the Këk’ëeti and Sahtì ekwǫ herds in Wek’eezhìi, including new restrictions on hunter harvest, predator management, and ongoing monitoring. More specifically, TG and GNWT proposed implementing a herd wide TAH for both ᐀ekwǫ herds and conducting a feasibility assessment of a full range of dìga management actions. The WRRB considered the proposed restrictions of harvest as the establishment of a TAH and, therefore, was required to hold a public hearing. The Këk’ëeti ekwǫ public hearing took place February 23-24, in Yellowknife, NT while the Sahtì ekwǫ public hearing took place April 6-8, 2016 in Behchokǫ, NT.

On May 26, 2016, the WRRB submitted its final determinations and recommendations and Part A Reasons for Decision Report for the Këk’ëeti ekwǫ herd to TG and GNWT.23

On June 10, 2016, the Board submitted its final determinations and recommendations and Part A Reasons for Decision Report for the Sahtì ekwǫ herd to TG and GNWT.24 Both reports dealt with the proposed harvest management actions for each herd as well as the proposed dìga feasibility assessment. The Board recommended that the dìga feasibility assessment set out in the proposal be led by the Board with input and support from TG and GNWT. GNWT and TG varied this recommendation noting that since ENR initiated work on a feasibility assessment in November 2015 with TG, WRRB, North Slave Métis Alliance (NSMA), Yellowknives Dene First Nation, and Łutsel K’e Dene First Nation (LKDFN), ENR would continue as lead with a completion date for a final report by October 2016. The Board continued to support the implementation of the Community-based Dìga Harvesting Project as a training program, subject to several conditions. As well, if deemed successful, the Community-based Dìga Harvesting Project would be extended in 2016-2017 to the Sahtì ekwǫ herd and incorporated into an adaptive wolf management approach. TG and GNWT accepted these two recommendations as written.

---


On September 27, 2016, the WRRB submitted its final recommendations and Part B Reasons for Decision Report for the Kôk’èti ekwǫ̀ herd to TG and GNWT. On October 3, 2016, the WRRB submitted its final recommendations and Part B Reasons for Decision Report for the Sahtì ekwǫ̀ herd to TG and GNWT. In addition to recommendations for TK research and monitoring programs focusing on diga and Sahcho (grizzly bear), the Board recommended a biological assessment of sahcho. While TG strongly agreed that TK studies are required, TG varied the Board’s recommendation by combining all TK research and monitoring programs into one comprehensive study, based on the elder’s direction, for completion by September 2018. GNWT and TG proposed that the NWT Species at Risk Committee’s Status Report for Grizzly Bears in the NWT would provide a thorough biological assessment and would be released in April 2017. Additionally, GNWT and TG would engage with the Government of Nunavut to discussion grizzly bears within the Kôk’èti and Sahtì ekwǫ̀ herd ranges.

4.3. 2019 Òekwǫ̀ Proceedings

On January 14, 2019 and January 22, 2019, respectively, the Tłı̨chǫ Government (TG) and GNWT submitted the “Joint Proposal on Management Actions for the Bluenose-East Òekwǫ̀ (Barren-ground caribou) Herd 2019-2021” and the “Joint Proposal on Management Actions for the Bathurst Òekwǫ̀ (Barren-ground caribou) Herd 2019-2021” to the Board outlining proposed management actions for the Sahtì and Kôk’èti ekwǫ̀ herds in Wek’èezhi, including restrictions on hunter harvest, predator management, and ongoing monitoring. The management actions proposed by TG and GNWT in the Joint Proposals were grouped under the five categories: harvest, predators, habitat and land use, and education as well as research and monitoring. Specifically, the Joint Proposals proposed the following management actions for diga: 1) joint diga management proposals for Kôk’èti and Sahtì ekwǫ̀ ranges; 2) continued TG program to train diga harvesters; 3) increased GNWT incentives for diga harvesters; and 4) collaboration between NWT and NU managers about predator management.

The WRRB considered the proposed new restrictions of harvest for the Sahtì ekwǫ̀ herd as the establishment of a TAH and, therefore, was required to hold a public hearing. The WRRB held a public hearing in Behchokǫ, NT on April 9-11, 2019. Since the Board was not required to consider a change in harvest restrictions for the Kôk’èti ekwǫ̀ herd, the WRRB undertook a Level 2 management proposal review, as per its Rule for

---

The Board established a proceeding, which included an open public comment period from February 4 to April 5, 2019.

On June 14, 2019, the Board submitted its final determinations and recommendations and Reasons for Decision Report for the Sahtì ekwǫ̀ herd to TG and GNWT. The WRRB recommended that GNWT provide harvest information from its Enhanced North Slave Dìga Harvest Incentive Program to allow the Board to determine the success of the program. Further, the Board recommended that GNWT and TG develop a framework to evaluate the effectiveness of the Enhanced North Slave Dìga Harvest Incentive Program in achieving ɂekwǫ̀ conservation goals. GNWT and TG accepted the recommendation to provide harvest information while varying the timeline to develop a framework to evaluate the effectiveness of the Enhanced North Slave Dìga Harvest Incentive Program. The WRRB also recommended that GNWT and TG monitor Nògha (wolverine) populations in Wek’éezhìi and work cooperatively with the Government of Nunavut (GN) to protect the calving grounds of the Sahtì ekwǫ̀ from predators. GNWT and TG varied the nògha recommendation to undertake a review of existing monitoring of nògha abundance and distribution in the NWT to be used for consideration of potential future monitoring. Further, GNWT and TG varied the recommendation to work cooperatively with GN for calving ground protection to engagement with GN to explore methods that may be used to reduce predation on the Sahtì ekwǫ̀ calving grounds.

On October 4, 2019, the WRRB submitted its final recommendations and Reasons for Decision Report for the Kôk’èeti ekwǫ̀ herd to TG and GNWT. To improve the understanding of the role of predators on the decline of the Kôk’èeti ekwǫ̀ herd, the WRRB recommended that TG and GNWT provide information on the sighting rates of predators and the criteria to be used in determining the targeted number of predators to be removed annually. TG and GNWT varied this recommendation to provide, by December 2020, annual sighting rates and criteria to determine target levels of dìga for annual removal.

The WRRB recommended that harvest information from GNWT’s Enhanced North Slave Dìga Harvest Incentive Program and TG’s Community-based Harvest Training Program be provided to determine the success of the program. The Board also recommended that GNWT and TG develop frameworks to 1) evaluate the effectiveness of the Enhanced North Slave Dìga Harvest Incentive Program in achieving ɂekwǫ̀ conservation goals and 2) evaluate how the Community-based Harvest Training
Program will contribute to future diga harvesting and management. TG and GNWT varied the timelines to provide harvest information as well as evaluate the effectiveness of both programs. Additionally, the Board recommended that TG and GNWT coordinate the Enhanced North Slave Diga Harvest Incentive Program and the Community-based Diga Harvest Training Program to determine their role in removing the targeted number of diga. TG and GNWT varied this recommendation to ensure that harvest of diga is contributing to the conservation of ᖄ(mbwi) by using both caribou-centered and wolf-centered indicators in their wolf management proposals.

The WRRB is collaboratively working with TG and GNWT on a sahcho biological and management feasibility assessment. In order to improve efficiencies, the Board recommended that n̓ōgha be included in this assessment and to work cooperatively with the Government of Nunavut to jointly manage predators across territorial borders for the K̓ók’èeti and Sahtí ekwǫ̀ herds. TG and GNWT accepted the n̓ōgha recommendation as written. The GN recommendation was varied to GNWT and GN further developing the existing Memorandum of Understanding for collaboration in the shared management responsibilities of wildlife, including ᖄ(mbwi) and their ranges.

4.4. 2019 Predator Management Recommendations

In January 2019, the WRRB received joint management proposals for the K̓ók’èeti and Sahtí ekwǫ̀ herds. However, despite WRRB recommendations for the implementation of predator control dating as far back as 2010, neither of the management proposals included a plan for predator management in either the K̓ók’èeti or Sahtí ekwǫ̀ herd ranges. Instead TG and GNWT indicated their intention to address the control of predators, more specifically diga, in a separate joint management proposal later in the spring of 2019.

The WRRB felt the situation for both of these herds was dire. During its 2016 public hearings and the 2019 TG-ENR ᖄ(mbwi) consultation tours, the Board heard from the Tłı̨ch’o community members that diga continued to put pressure on ᖄ(mbwi) populations and they would like to see action taken immediately. The 20% rate of annual decline of the K̓ók’èeti and Sahtí ekwǫ̀ herds was in the Board’s opinion so serious that waiting any longer to act would make recovery of the herds even more difficult. The Board was convinced that early action was essential. As such, the Board chose not to wait for ENR and TG to submit their predator management proposal to the Board in spring of 2019. Consequently, the WRRB put forward their predator management proposal30 to begin in May 2019 in order to promote the recovery of the K̓ók’èeti and Sahtí ekwǫ̀ herds.

The WRRB supported continuing the ENR’s Enhanced North Slave Dìga Harvest Incentive Program and the TG’s Community Based Dìga Harvesting Project as education tools. The WRRB recommended that dìga monitoring be undertaken so that population estimates, or indexes would be generated. In addition, as much information as possible, including condition, diet, and reproductive status, would be collected from each harvested dìga. In accepting this recommendation, GNWT and TG noted that they would develop and pilot a protocol for monitoring relative abundance of dìga in an adaptive manner to evaluate feasibility of sampling and robustness of results.

The WRRB recommended that dìga management be undertaken in Wek’èezhìı, using the “Wolf Technical Feasibility Assessment: Options for Managing Wolves on the Range of the Bathurst Barren-ground Caribou Herd”31 to determine the most effective, humane, and cost-efficient methods that would have the least impact and disturbance on the ᕿेkwǫ̀ herds themselves. Further, the Board recommended that dìga management should be closely monitored for effectiveness of halting or slowing the decline of the Kǫk’èetì and Sahtì ᕿe Kwǫ̀ herds in order to provide future harvesting opportunities. ENR and TG accepted these recommendation as written.

By December 2019, no management proposal had been submitted to the WRRB. As such, on December 18, 2019, the Board again requested that TG and GNWT submit a dìga management proposal on or before January 31, 2020.

5.0. Summary of 2020 Wildlife Management Proposal and Board Process

5.1. Receipt of 2020 Joint Proposal

On January 31, 2020, the WRRB received a joint management proposal, entitled “Joint Proposal on Management Actions for Wolves (dìga) on the Bathurst and Bluenose-East Barren-ground Caribou (ᕿेkwǫ̀) Herd Winter Ranges: 2020 – 2025”,32 outlining proposed management actions for dìga in Wek’èezhìı. Specifically, aerial shooting of dìga on the Kǫk’èetì and Sahtì ᕿe Kwǫ̀ herd winter ranges as part of an overall tiered approach designed to meet target dìga removal levels. Following an initial assessment of the Joint Proposal, the Board determined that a Level 2 review was appropriate, as per its Rule for Management Proposals.

The Board initiated its 2020 Wolf Management Proceeding on March 2, 2020 and established an online public registry: http://www.wrrb.ca/public-information/public-registry. Additionally, on March 2, 2020, public notice of the WRRB decision to open the

2020 Wolf Management Proceeding was provided to potentially interested organizations in and out of Wek’èezhìı via email, WRRB website and social media.

On March 9, 2020, after hearing from GNWT and TG, the WRRB held an emergency meeting and revised the procedure to be used to review the Proposal. The WRRB decided to amend its procedure for the review of the diga management actions occurring in 2020 as proposed in the Joint Proposal to a Level 1 review and to treat these 2020 diga management actions as a pilot project only. Further, the Board requested that TG and GNWT resubmit in August 2020, a revised proposal for the diga management actions for 2021-2025 for a Level 2 review. This revised proposal would include lessons learned from the implementation of the management actions occurring in 2020. Notifications of the revised proceeding schedule were made in the NWT News/North and Yellowknifer newspapers on March 18, 20, 23, 25, 27, and 30, 2020.

The proceeding was conducted in accordance with the WRRB’s *Rules of Procedures, June 14, 2017.*

5.2. Receipt of 2020 Revised Joint Proposal

On August 25, 2020, GNWT and TG submitted a revised joint management proposal, entitled “Revised Joint Proposal on Management Actions for Wolves (diga) on the Bathurst and Bluenose-East Barren-ground Caribou (ɂekwǫ̀) Herd Winter Ranges: 2021 – 2024” (hereafter called the Revised Joint Proposal), as well as a technical report with lessons learned from the implementation of the 2020 Pilot Project and a plain-language summary. Following an initial assessment of the Revised Joint Proposal, the Board determined that a Level 2 review was appropriate, as per its Rule for Management Proposals.

Public notice of the WRRB decision to continue the 2020 Wolf Management Proceeding was provided to potentially interested organizations in and out of Wek’èezhìı via email, WRRB website and social media. Notifications of the revised proceeding schedule were made in the NWT News/North, Nunavut News, and Yellowknifer newspapers on September 9, 11, 14,16, 18, and 21, 2020. The public comment period was open until October 23, 2020.

An additional technical report on pathology was not submitted with the Revised Joint Proposal in August 2020, but the Board felt that it was essential to be able to determine

---

the humaneness of the Pilot Project. As such, the WRRB requested that the GNWT provide the “Wildlife Pathologist’s Final Report on the Necropsy of Wolves Taken by Aerial Removal”37 by October 1, 2020. The report was received as requested by the deadline date.

Following the completion of the Science and Traditional Knowledge Technical Sessions, the WRRB reviewed its work plan and schedule to discuss whether a public hearing would be required to ensure sufficient consultation. On October 16, 2020, the Board provided notice that no significant public concern had been identified and, as such, would not hold a public hearing for the 2020 Wolf Management Proceeding.

The public record was closed on October 23, 2020. Final written arguments were submitted by registered participants on October 28, 2020, and by TG and ENR on October 30, 2020. The WRRB’s deliberations followed.

5.3. Registered Participants

Interested organizations or individuals were required to register as participants via the Board's website or to notify the WRRB in writing via email by September 11, 2020. Two organizations registered by the deadline date: NSMA and LKDFN. Full participant status was granted to NSMA and LKDFN on September 18, 2020. Notice of participants was made on September 25, 2020.

5.4. Public Comment Period

The public comment period was first opened on March 2, 2020. However, following the Board decision on March 9, 2020 to treat the proposed 2020 dìga management actions as a pilot project only, and to request that GNWT and TG submitted a revised joint management proposal in August 2020, the public comment period was suspended. Upon receipt and review of the revised joint management proposal in August 2020, the public comment period was reopened from September 4 to October 23, 2020.

The Board received 22 comments from 12 individuals or organizations. All public comments are available on the public registry.

5.5. Information Requests

In order to obtain the information necessary for the WRRB to consider as part of the record of this proceeding, a series of Information Requests (IRs) were issued to the TG,

---

GNWT and the registered participants. The IRs and responses are all available on the online public registry.

The first round of IRs was issued March 2, 2020, requesting that TG and GNWT provide additional Tłı̨chǫ knowledge and scientific information and rationale on the proposed management and monitoring actions. GNWT and TG provided their responses on March 13, 2020. On September 18, 2020, the Board requested consent from all Parties to post supporting documentation referenced by TG and ENR in their management proposal and IR No.1 responses to the public registry. No concerns were raised, and documents were posted after September 28, 2020.

The second round of IRs was issued October 15, 2020, requesting additional information related to modelling, mapping, and biological indicators. Additionally, the LKDFN submitted 13 IRs to TG and GNWT, and TG submitted one IR each to NSMA and LKDFN. GNWT and TG provided their responses on October 22, 2020. The NSMA and LKDFN provided their response on October 21 and October 22, 2020, respectively.

5.6. Technical Sessions

To ensure that any outstanding scientific and traditional knowledge (TK) technical aspects of the proceeding were clarified, the Board hosted a science technical session as well as a TK technical session. The information gathered during each session is available on the public record as part of the body of evidence used by the WRRB to make its final decision.

5.6.1 Science Technical Session

The WRRB notified the Parties of the science technical session on September 25, 2020 along with a list of topics for discussion, including 1) the projected effects on caribou, based on PR (Wolf 2020): 019 - Summary Caribou Population Modeling of Varying Levels of Wolf Removal, and scenarios with a higher wolf abundance; 2) estimating wolf numbers, including the Ungulate Biomass Index (UBI) and its sensitivity to wolf removals and alternate prey. Options for additional methods; 3) herd assignment of wolf removals and herd overlap, including discussion on how to reduce uncertainty and the wolf collaring program; 4) the effectiveness of ground harvesting in removing wolves assigned to Bathurst or Bluenose East herds and how to increase effectiveness; and 5) discussion of the program’s adaptive management, including the precision and accuracy of candidate indicators and how to identify benchmarks.

The science technical session was hosted online via Zoom on October 5, 2020. A summary of the technical session was produced and is available on the public registry.
5.6.2 Traditional Knowledge Technical Session

The WRRB notified the Parties of the TK technical session on October 2, 2020, along with a list of topics for discussion, including 1) maintaining a balance between diga and ᐃɂekwǫ̀ and 2) managing a balance between diga, ᐃɂekwǫ̀, and people.

It was anticipated that the list of topics would bring out Dene perspectives on diga movements, harvest of ᐃɂekwǫ̀ by diga, and predator control.

The TK technical session was hosted online via Zoom on October 13, 2020. Elders from each Tłı̨chǫ community were supported by an interpreter and a youth for technical support. A summary of the technical session was produced and is available on the public registry.

6.0. Why is the Board Considering Diga Management?

6.1. ᐃɂekwǫ̀ Decline

The Kǫ̀k’èeti and Sahtí ᐃɂekwǫ̀ herds have both declined significantly in recent years and the situation for both herds is dire. The decline of the Kǫ̀k’èeti ᐃɂekwǫ̀ herd was first documented in 1996 when the population was estimated at 349,000 animals, down from 472,000 in 1986.38 Management actions to date have included harvest restrictions and diga harvest incentives, starting in 2010; these actions have failed to halt the decline, and the herd was estimated at 8,200 animals in 2018.39 The decline of the Sahtí ᐃɂekwǫ̀ herd was first documented in 2013 when it was estimated at 68,000 animals, down from 121,000 in 2010.40 In 2018, the herd’s population was estimated at 19,300 animals.41 TG and GNWT’s closing argument stated that “the Kǫ̀k’èeti and Sahtí ᐃɂekwǫ̀ herds had reached the lowest numbers on record”.42

During the 2019 Kǫ̀k’èeti and Sahtí ᐃɂekwǫ̀ proceedings, the Board repeatedly heard from governments, communities, and members of the public of their concerns over the continued decrease of the ᐃɂekwǫ̀ herds, including recognition of the rapid rate of the decline. Vital rates associated with the herd, including the cow survival rate, calf recruitment, and pregnancy rate, all indicated that the herds would likely continue to decline.43

---

39 Ibid.
40 Ibid.
41 Ibid.
Despite the management actions taken over the past 13 years, the Kǫk’èeti and Sahti ekwǫ herds are still declining, and recovery of the herds remain uncertain. In 2016, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assessed barren-ground caribou (*Rangifer tarandus* barren-ground population) as Threatened. The status of barren-ground caribou under federal Species at Risk legislation is currently under review. Within the NWT, barren-ground caribou (*Rangifer tarandus groenlandicus*) were assessed by the Species at Risk Committee (SARC) as Threatened in 2017 and were later listed as Threatened under the *Species at Risk (NWT) Act* in 2018. A barren-ground caribou recovery strategy for the NWT was completed and released to the public on July 9, 2020. The Conference of Management Authorities has until April 9, 2021 to develop a consensus agreement on the implementation of the recovery strategy and management plan.

The Revised Joint Proposal did not describe rates of calf or adult survival for the Kǫk’èeti and Sahti ekwǫ herds but did acknowledge that the proposed diga removal actions directly impact on ɂekwǫ survival. During the Science Technical Session, GNWT updated the ɂekwǫ adult survival rates, which revealed, that for the Kǫk’èeti ekwǫ herd, an annual trend toward increased survival since 2016 has continued (Figure 2). For 2018 and 2019, the annual survival rates were 92% and 95%, respectively, with the trend toward increased survival being stronger on the summer range than the winter range. For the Sahti ekwǫ herd, adult survival stabilized at 85% in 2018-2019 (Figure 3).

---

46 Ibid.
47 Ibid.
Figure 2. Seasonal survival rate estimates for the Kël’æti ekwò herd (note that they are on the annual scale for comparison purposes). The mean number of collars available each month is shown beside each estimate.⁴⁸

The Revised Joint Proposal acknowledges that traditional and scientific knowledge describes barren-ground Ėekwǫ̀ herds as having 30-60 year cycles in abundance. The cycles may vary because of many factors (harvest, habitat, predators, climate, and disease). In the past, Tłı̨chǫ elders would say there are enough or not enough Ėekwǫ̀ to feed a camp/extended family or community, which is documented in “Caribou Migration and the State of the Habitat”. During the TK Technical Session, the Tłı̨chǫ elders referred to the bigger picture in relation to the decline of Ėekwǫ̀ numbers. They did not focus only on dìga. They referred to the ongoing reduction of Ėekwǫ̀ over time as more people using resources that were once only used by Indigenous people. They discussed the slow, consistent decline and changes associated with an alternative form

of decision-making and behaviour causing changes to the migration routes and, therefore, ɂekwǫ́ range. They also referred to resulting occurrences associated with climate change and fires that have changed the interaction between animals, and the reduction of ɂekwǫ́ habitat.52

The elders recommended there should be TK research projects over several years to really grapple with the complexity of the current situation that is impacting all animals. The elders know that TK research projects will provide them with information they would understand and allow them the time to observe and discuss how to maintain a balance between all animals and their habitats given the current scenario.

A member of the public provided a mathematical modelling paper on ɂekwǫ́ cycles. The analysis attributes the cycles to habitat productivity.53 The model fits a regular sine curve to estimated herd size, then projects the curve forward in time that mirrors previous cycles. This apparent inevitability of recovery led the paper’s senior author to suggest that dìga control is unnecessary for recovery54. However, the author also noted that the mathematical analysis does not describe whether dìga control would shorten the recovery time for the Kòk’èet and Sahtí ekwǫ́ herds. Another member of the public commented on the mathematical analysis and ɂekwǫ́ cycle but also commented55 on how technology (radios, radio-collars, ice-roads high-speed snow machines etc.) has made the current low in ɂekwǫ́ caribou numbers so different because the ɂekwǫ́ are never out of reach.

6.2. Dìga Status and Tłı̨chǫ Knowledge

Nationally, the northern grey wolf (Canis lupus occidentalis) has been assessed as Not at Risk by COSEWIC in 1999. In the NWT, the SARC has not assessed dìga. The WRRB considers dìga as part of ɂekwǫ́ ecology, i.e., the role of dìga can change and contribute to either increasing the decline or slowing the recovery of ɂekwǫ́.56 As expressed by the Tłı̨chǫ elders during the TK Technical Session, the balance between ɂekwǫ́, dìga, and people has changed.57

The Board recognizes the cultural and biological importance of dìga and their role in the ecosystem and their cultural significance. Their importance within the ecosystem was expressed by Elder Joe Suzie Mackenzie,

---

54 PR (Wolf 2020): 113 - Public Comment from E. Bonello to the WRRB; and PR (Wolf 2020): 145 - Additional Public Comment from E. Bongelli to the WRRB.
55 PR (Wolf 2020): 148 - Public Comment from D. Olesen to the WRRB.
“Wolves, [bears], fox, raven and people are supposed to eat ᖈ__[ekwǫ̀] (barren ground caribou). Raven and fox scavenge on the ᖈ__[ekwǫ̀] and wolves, grizzly and people harvest the ᖈ__[ekwǫ̀].58

Further, the ecosystem is strengthened by social relationships between diga and other animals as is explained in the Tłı̨chǫ story, told by Elder Joe Mantla, where diga, with the cooperation of others, freed the ᖈ__[ekwǫ̀] corralled by Tats̲ǫ̀ (raven) so all the animals, including humans, would benefit.

“At one time Raven, could eat anything. He could hunt animals for food. Then Raven became very greedy. Raven could fly and could see everything, so was very knowledgeable. Others depended on Raven for knowledge of where animals such as the ᖈ__[ekwǫ̀] were travelling. Raven was responsible for the survival of others who were restricted to the ground. Raven and Wolf were brothers-in-law as Wolf’s sister was married to Raven and Raven’s sister was married to Wolf. Both Raven and Wolf were k`àowo for their camps. Wolf was a good hunter, so he had many people following him. Even though he killed a lot of ᖈ__[ekwǫ̀], the meat was gone in no time because so many people followed Wolf. Raven was more powerful than Wolf because Raven was considered k`àowodeè (an important leader who knows everything because – in this case – Raven could see everything from the air). He flew and could see everything. He had the ability to provide people with information because he knew everything. There was no food, and everyone was starving. It is said that Wolf and Raven would meet and tell stories, everyone listened. Once they met at Wolf’s house. They took turns telling stories. Wolf noticed that Raven was happy. He said, ‘Raven, my brother-in-law, you are happy, yet we are starving. We will starve to death unless we find food. You, who are flying around, do you know where all the ᖈ__[ekwǫ̀] are? You are happy about something. What is it? I can hardly make it around, I am so hungry for food’. Raven denied that he knew anything. ‘My brother-in-law, there is nothing around. We are both in the same predicament; there are no ᖈ__[ekwǫ̀] around’. Wolf could not understand why Raven was so happy, so when Raven was telling a story, Wolf went out and told the kids, ‘Find Raven’s packsack, look in it and see if there is anything there. He may be carrying ᖈ__[ekwǫ̀] meat with him. So look’. The kids looked and they found dried meat. After a while Raven said, ‘My brother-in-law, it is getting dark, I’m going home. My home is very far.’ Wolf said, ‘Yes, it is time. It is late.’ Raven left. Wolf told two men with… [the intelligence] to work together. Each had the ability to see a long way, so they watched where he went. The men watched Raven travel towards the sunrise. Finally, after one put charcoal on his eyes and the other wiped it off, the one with charcoal could see further. He saw where Raven was hiding all the ᖈ__[ekwǫ̀], and he saw that they were contained behind a snow fence. Wolf sent for Fox and told

Fox, ‘Go and find the fire. Put your tail in the fire, and free the ᖇᖅwę’. Fox travelled to the ᖇᖅwę. When he arrived, he lit his tail on fire and walked among the ᖇᖅwę. The smoke bothered them, and they ran away from the smoke even though the snowbank was high, and they do not like the snow touching their bellies. That is the reason Fox now has a black tip on his tail. Raven was upset when the ᖇᖅwę ran free. He felt they were his; he had become greedy. Wolf spoke strongly to Raven, ‘We are living here together. We are here to help each other and because you are greedy, you are not helping others. I am your brother-in-law. Do you want your sister to starve? Do you want my sister, your wife, to starve?’ Wolf and the other people put Raven in a circle and talked to him. They talked and talked to him. They knew they would have to be harsh, as the people almost starved. People who deliberately hide or steal food from others should be excluded from the group. Finally, after listening to everyone, Wolf decided Raven could only eat decomposing food because he had caused so much distress by hoarding fresh meat. Wolf said, ‘When the animals die you will eat them. People will live around you and you will eat their garbage. You can no longer kill for food’. That is how Raven lives now. When water is poured outside, Raven drinks the dirty water. When garbage is put out, he will eat it and that is how he survives. Joe continued saying ‘What a thing to happen! It is pitiful for a hunter to lose his right to hunt! That is what happened to Raven. It was very ‘pitiful’, and is very degrading for a great hunter, who had also been an important k’ǹowodeè to lose the ability to hunt because he did not follow social rules.’

As is evident above, diğa is both teacher and helper, and due to diğa’s strong spirit, diğa must be treated with both respect and caution. As Elder Philip Chocolate explained,

“We elders know about wolves. When we caught diğa we do not bring the diğa into the tent. We tie and hang it on the tree. Only the person that knows and has power can skin and work on wolves. And when a person is sick, the man with diğa medicine has to do his ritual to help and heal. They always put it … where no one can touch it.”

During the 2013 Tłı̨chǫ Wildlife Research workshop, Tłı̨chǫ elders agreed the diğa is a great, spiritual animal that can cause Indigenous people to be sick if they are not respectful when being handled on the appropriate manner, such as bringing diğa into the community or a home, or when a sensitive person harvests a diğa. These actions will negatively impact members of the community, particularly children and women who

---

60 Ibid.
are likely to get sick or die so the men in their families are extremely cautious. Nevertheless, people with diga power are often called on to cure, particularly children.\textsuperscript{61}

The Tłı̨chǫ have a special connection to diga, and like many other circumpolar north Indigenous people\textsuperscript{62}, emphasize thoughtful behaviour towards diga by telling origin stories. Take for example, a public meeting held by the Wisconsin Natural Resources on diga harvest quotas. Anishinaabe Elder Joe Rose Sr, a member of the Grand Medicine society and an associate professor of Native American Studies at Northland College, told their creation story. He ended by saying, “\textit{And you, Anishinaabes, if your brother Ma’iingan [wolf] passes out of existence you will soon follow}”.\textsuperscript{63}

During 2013 Tłı̨chǫ Wildlife Research Workshop in Gamëtì, members from each of the four communities explain how diga behaved in the past and how diga behaviour has changed.\textsuperscript{64}

Tłı̨chǫ elders and harvesters are clear that there are two types of diga, which behave differently.\textsuperscript{65} One type is more commonly found year round near the communities and has a different appearance from the diga, which travel with the ŋekwǫ̀.\textsuperscript{66} In 2016, Elder Joe Rabesca emphasized the differences to the Dene when he said,

\begin{quote}
\textit{“… if you talk about the wolf, look at the map. It’s a huge country. And the wolves are different. … The wolf to the west [timber diga] … Those wolves, they’re bigger. And the wolf to the east [tundra diga] that follows the caribou are a lot smaller. A lot smaller. The wolf on this side to the west are very aggressive, I know, … — and they’re dangerous too.”}\textsuperscript{67}
\end{quote}

The Revised Joint Proposal notes that south of the ŋekwǫ̀ winter range in the boreal forest, the boreal diga tend to have dark fur and are genetically distinguishable from migratory tundra diga.\textsuperscript{68} However, the Revised Joint Proposal does not specify whether, and how, the proposed management and monitoring actions relate only to the migratory tundra diga or whether the boreal diga are also included.

\textsuperscript{61} PR (Wolf 2020): 081 - Wolf: Tłı̨chǫ Knowledge and Perspective.
\textsuperscript{63} PR (Wolf 2020): 046 - Ma’iingan is our brother. Ojibwe ways of speaking about wolves.
\textsuperscript{64} PR (Wolf 2020): 081 - Wolf: Tłı̨chǫ Knowledge and Perspectives.
\textsuperscript{65} PR (Wolf 2020): 170 - Additional Information from TG for Question #4, Round No.2 Information Requests.
\textsuperscript{67} PR (Wolf 2020): 081 - Wolf: Tłı̨chǫ Knowledge and Perspectives.
The WRRB considers evidence about the role of the boreal diga in the review of the evidence for the assessing the Revised Joint Proposal. In particular, the WRRB is concerned about whether the behavioral difference between the boreal and migratory tundra diga has implications for the effects of the proposed management actions and monitoring.

6.3. Conclusion

The Tłı̨chǫ Agreement defines conservation as “(b) the maintenance of vital, healthy wildlife populations capable of sustaining harvesting under the Agreement”. As shown, a serious conservation concern for both the Kǫ̀k’èeti and Sahtì ekwǫ̀ herds exists and, as such, increased management and monitoring actions are warranted. The WRRB believes that, in addition to harvest limitations and reducing disturbance to the ᐃekwǫ̀ herds and their habitat, additional management and monitoring actions that focus on reducing predation, specifically diga, are required to support the recovery of the Kǫ̀k’èeti and Sahtì ekwǫ̀ herds.

7.0. Evidence, Analysis, and Recommendations

7.1. Introduction

The WRRB, in reviewing the Revised Joint Proposal, has used the evidence in the Technical Pilot Project Report, a diga-በekwǫ̀ computer modeling report, information provided as responses to Information Requests, and the commitments, and their subsequent documents, from the Science and Traditional Knowledge Technical Sessions.

The WRRB was concerned with the high degree of uncertainty surrounding the Revised Joint Proposal. The WRRB notes three things that have increased the degree of uncertainty in addition to the uncertainty inherent in ecological systems. First, lapses in monitoring diga, despite the WRRB’s 2010 recommendations, mean that knowledge of diga numbers is limited. Second, delays in implementing a diga management program have increased complexity from the continued decline of both the ᐃekwǫ̀ and diga numbers on the ᐃekwǫ̀ herds’ summer range. Third, the extent that the results of the Pilot Project influenced the Revised Joint Proposal is not clear as explained in the following sections.

Consistent with the requirements of Tłı̨chǫ Agreement, the WRRB is taking a precautionary approach, while recognizing the complexity of the current diga-በekwǫ̀ relationship. While the WRRB is most concerned about the status of the ᐃkwǫ̀, the

---

69 See paragraph 12.1.5(c) of the Tłı̨chǫ Agreement.
Board also recognizes the cultural and biological importance of diga and their role in the ecosystem and in history.

7.2 Goal and Objectives of the Revised Joint Proposal

7.2.1. Introduction

Management proposals establish their purpose through describing a goal. How the goal will be implemented is then articulated through objectives. Objectives allow the success or failure of the proposal to be assessed and, thus, have measurable benchmarks. Reliable measures of success are a critical component for a robust and defendable wildlife management proposal.

7.2.2 Proponent’s Evidence

The Revised Joint Proposal’s goal is stated to be “…reduce diga numbers sufficiently to enable an increase in survival rates of both calf and adult ekwo promoting stabilization and recovery of these herds [Kòk’ètì and Sahtì ekwò]”.

The objectives to implement the goal are:

1) Increase annual ground-based harvest of diga on the winter range of the Kòk’ètì and Sahtì ekwò by increasing participation of harvesters in the traditional economy related to diga harvest and hide preparation; and,

2) Ensure sustained removal of diga, using aerial removals if required, on the winter ranges of Kòk’ètì and Sahtì ekwò to achieve a level necessary to maintain low diga densities and elicit a response in ekwò populations.

The Revised Joint Proposal states that there is an urgent need to continue enhanced actions put in place during the Pilot Project to increase ekwò cow and calf survival rates of the Kòk’ètì and Sahtì ekwò herds. Even though the goal refers to increased ekwò survival rates through the proposed diga removal actions, the Revised Joint Proposal does not describe rates of calf or adult survival for the Kòk’ètì and Sahtì ekwò herds. However, during the Science Technical Session, GNWT did update the adult survival rates. For the Kòk’ètì ekwò herd, an annual trend toward increased adult survival since 2016 has continued and, for 2018 and 2019, the annual survival is 92% and 95%, respectively. The trend toward increasing survival is stronger on the summer

---

71 Ibid.
range than the winter range. For Sahtí ekwǫ, adult survival stabilized at 85% in 2018-2019, which is close to the benchmark for herd recovery.73

7.2.3 Other Participant’s and Public Evidence

The other Parties and public did not provide any specific evidence related to the Joint Project’s goal and objectives.

7.2.4 Analysis and Recommendations

The WRRB does acknowledge that removing dìga to halt ḋekwǫ declines and to support recovery has many uncertainties and risks. In the long term, ḋekwǫ and dìga have an intricate and complex relationship. Complex systems often harbor surprises to management interventions. The WRRB is also conscious of the difficulty that dìga management causes for some of the public and wildlife managers. Hunting and trapping of dìga as well as dìga removed to safeguard their prey are controversial74 and require careful examination of underlying assumptions.75 For these reasons, the WRRB is anxious to see clearly stated goals and objectives to justify the levels of dìga removals.

The Revised Joint Proposal’s goal is to reduce dìga numbers to stabilize and support recovery of the Kôk’èti and Sahtí ekwǫ herds by increasing survival rates of both calf and adult ḋekwǫ.76 The WRRB is concerned about this goal for two reasons. First, the Revised Joint Proposal acknowledges that dìga are not the only cause of ḋekwǫ deaths and suggests relying on computer modeling to address this uncertainty in measuring the effects of dìga removal.77 The WRRB suggests that the modeling will not be sufficient, and a more robust approach based on adaptive management is needed (see Recommendations in Section 7.7.6). The Board believes that annual reviews would be more prudent than waiting for a five-year review that may be too late if the risks of removing too few or too many dìga are not anticipated.

Second, the GNWT updated the adult ḋekwǫ survival rates during the Science Technical Session but did not provide any interpretation of the higher rates in the context of the Revised Joint Proposal’s goal or objectives. The rates have increased to an upper limit for the Kôk’èti ekwǫ herd and, thus, a further increase in response to dìga removal is unlikely to be measurable.

74 PR (Wolf 2020): 133 - Questionable policy for large carnivore hunting.
77 Ibid.
In the Revised Joint Proposal, the current two objectives are focused on how to remove diga. Given the goal has two parts (removing diga and increasing adult and calf survival), the Board believes there should be two types of objectives: one type focused on ςekwǫ̀ and the other focused on diga. Technical objectives should be concrete, measurable, attainable, and phrased to be able to minimize inferring inappropriate conclusions.

The WRRB notes that specific objectives for ςekwǫ̀ will clarify the possible effects of diga removal on the Kǫ́k’ëeti and Sahti ekwǫ̀ herds. The objectives should accommodate the updated information on adult and calf survival available during the October 2020 Science Technical Session. For example, the updated high Kǫ́k’ëeti adult survival suggests that diga removal is unlikely to increase adult survival further as annual survival rates of over 90% are as high as is reasonably possible, based on ςekwǫ̀ biology. The increase preceded the diga removals undertaken during the Pilot Project, which raises questions about whether the low diga numbers on the summer range are already benefiting adult ςekwǫ̀ survival.

The revised October 2020 model runs did use the improved adult survival for a 5-year and a 3-year period. The updated survival raises questions about whether and how the causes of calf survival and adult survival may differ and how that relates to measuring effects of diga removal. (This is addressed in Section 7.7.5.)

The WRRB requested specific objectives in the first round of Information Requests for the Joint Proposal received in January 2020. TG and GNWT responded with two objectives of which the first was to maintain diga removals of 60-80% on the winter ranges and the second was [to improve] trends in ςekwǫ̀ population indicators, including adult survival. However, in the Revised Joint Proposal received in August 2020, the objective for ςekwǫ̀ was not included. This is a concern to the WRRB.

The Revised Joint Proposal states that “If annual diga removals are maintained at a meaningful level, there is a reasonable likelihood of detecting a measurable effect on improved ekwǫ̀ survival rates within a 5-year time frame”. However, the Joint Management Proposal additionally states

“Given the complexity and uncertainty regarding interaction of key factors influencing barren-ground caribou (ekwǫ̀) populations, caution is required when attempting to attribute the specific contribution of diga (diga) reduction to

---

81 Ibid.
observed changes in caribou (ekwǫ̀) productivity and/or population trends. For example, the influence of other factors such as environmental conditions, biting insect severity indices, anthropogenic disturbance, and caribou (ekwǫ̀) harvesting may also be affecting caribou (ekwǫ̀) productivity and/or survival rates. Modeling caribou (ekwǫ̀) population response with covariates for diga (dìga) removal, and environmental indices such as insect harassment and vegetation productivity will be important for overall analyses."82

The WRRB is uncertain if the above quoted statement is a rationale for not retaining the specific objective to measure rates of ɂekwǫ̀ recovery, including adult survival. The WRRB is being persistent about recommending the need for a ɂekwǫ̀ objective because the objectives are key to the measuring the effectiveness of the diga removal and, thus, its justification. The WRRB (see Section 7.7. Monitoring) suggests that TG and GNWT’s reluctance to measure the effects of diga removal on the ɂekwǫ̀ can and needs to be resolved.

The Board is concerned that there are no objectives or stopping points before the five-year review related to ekwǫ̀ indicators. The Revised Joint Proposal’s aim is to halt the decline and promote recovery of ɂekwǫ̀; yet there is no scenario in which improving ɂekwǫ̀ vital rates would cause the Revised Joint Proposal to pause or reduce operations.

**Recommendation #1-2020 (Dìga): Update Objectives**

The WRRB recommends that GNWT and TG update the objectives of the dìga management program to be measurable for effects on ekwǫ̀ and dìga in order to be able to assess the impacts of the program and provide these objectives to the WRRB by May 1,2021. Updated objectives should consider that the Kǫk’ëetti and Sahtì ekwǫ̀ herds have different vulnerabilities and vital rates and, thus, success may be measured differently.

### 7.3. Estimating Dìga Populations

#### 7.3.1. Introduction

The Revised Joint Proposal’s three actions to reduce diga predation on Kǫk’ëetti and Sahtì ekwǫ̀ are ground and aerial removals as well as annual monitoring for a minimum of five years, including the Pilot Project year.83 This approach is based on first estimating the number of diga on the ranges of the Kǫk’ëetti and Sahtì ekwǫ̀ herds, then removing a target level of 60-80% of those diga numbers. The 60-80% target is based

---

83 Ibid.
on experiences in the Yukon and Alaska\textsuperscript{84} and assumes immigration and reproduction will replace the harvested dìga, which means the levels of removal need to be annually maintained. The target levels for 2020 were 60-80\% of the estimated number of dìga on the Kòk’èeti and Sahtì ekwǫ̀ herd winter ranges (29-39 and 73-97, respectively).\textsuperscript{85}

The approach described in the Pilot Project was to establish the herd-specific target levels and then support harvesters to remove the dìga – if the target was not met, then aerial removal was undertaken. The Covid-19 pandemic added an unexpected and unpredicted complication during the pilot project year.

\textit{7.3.2. Proponent's Evidence}

TG and GNWT’s approach to establishing the number of dìga to be removed depends on estimating dìga numbers. However, in the absence of a robust survey methodology for tundra dìga on winter ranges of barren-ground ñekwǫ̀, TG and GNWT relied on an indirect index estimated from the amount of potential prey.

The UBI was calculated from densities of ñekwǫ̀ on the winter range and herd size estimates. The UBI mathematically relates the amount of prey to the number of dìga that could likely be supported. The UBI estimates in winter 2020\textsuperscript{86} were:

- Kòk’èeti ekwǫ̀ range: 55 dìga (43-66 95\% CI)
- Sahtì ekwǫ̀ range: 138 dìga (120-155 95\%CI)
- Beverly range: 1,029 dìga (956-1,102 95\% CI).

The Technical Pilot Project Report reported few dìga seen during aerial surveys in March-April 2020.\textsuperscript{87} This was attributed in the report to difficulty detecting the dìga rather than low numbers of dìga.\textsuperscript{88} Although the dìga sighting rate by Inuit hunters was higher than that of the North Slave harvesters, these sightings were tabulated over many months with possible duplication of sightings. This leaves uncertainty about estimating dìga numbers on the winter range. On the Kòk’èeti ekwǫ̀ summer range, dìga pup survival and den occupancy declined between 1996 and 2012 and modeling suggested a steep decline in dìga abundance in that area.\textsuperscript{89} Recent information on dìga on the Sahtì ekwǫ̀ herd’s summer range is lacking.

\textsuperscript{84} PR (Wolf 2020): 106 - Wolf Technical Feasibility Assessment – Options for managing wolves on the range of the Bathurst barren-ground caribou herd.
\textsuperscript{87} Ibid.
\textsuperscript{88} Ibid.
\textsuperscript{89} Ibid.
7.3.3. Other Participants and Public Evidence

The NSMA, in their final written comments, say that many NSMA harvesters have been observing diga population declines, but that since diga have not recently been well monitored, the lower population is not reflected in the Revised Joint Proposal’s diga removal targets.90 The NSMA further stated that they understand that adaptive management is planned to be used to set diga removal targets each year, but note concerns that the short project timeline does not allow for proper adaptive management.

The LKDFN write that they have observed through their participation in the review of the Revised Joint Proposal that there is a high degree of uncertainty regarding the number of diga currently within the Enhanced Incentive Area (see Figure 5), and that they are not certain when the removal targets will be met or exceeded.91

Dave Olesen, an experienced local aerial survey pilot, commented that low diga numbers during aerial surveys was not indicative of low detectability.92

“This utter absence of wolves from the core areas of the Bathurst caribou winter range was nothing short of astounding to me in that 2018 survey. It still is. In February and again in March of 2020.”

A further comment was that, as the main pilot for GNWT’s diga den occupancy survey and with knowledge of the den sites, during the course of other flying, Mr. Olesen was not seeing occupancy of the dens on the Kǫ̀k’ętı̀ ekwǫ̀ range.

7.3.4. Analysis and recommendations

The WRRB is concerned about having both precise and accurate estimates of the number of diga because it is the essential first step in the Revised Joint Proposal’s approach to diga removals. The Revised Joint Proposal acknowledged uncertainty in the estimated diga abundance on Kǫ̀k’ętı̀ and Sahtì ekwǫ̀ ranges. Counting diga is difficult but agencies such as in Alaska have well-tested methods.93 In the absence of a robust survey methodology for tundra diga on winter ranges of Ṗekwǫ̀, the UBI diga estimate method can be used to help inform management options. The UBI is the number of diga expected from Ṗekwǫ̀ aerial surveys in 2020, empirical estimates from 2018, and projected 2020 estimates. The precision of those estimates was then used to estimate the precision of the UBI estimates of diga numbers but the accuracy of the UBI is unknown.

---

92 PR (Wolf 2020): 148 - Public Comment from D. Olesen to the WRRB.
Back in 2010, GNWT and TG had accepted the WRRB recommendation to determine diga abundance and while some effort was made, it was not sustained. This has led to an uncertain baseline for diga removals. The GNWT’s earlier efforts were aerial surveys in 2006 and 2013 on the Kòk’èeti ekwǫ̀ winter range that estimated a diga number of 211 ± 66SE. From satellite collared diga and territory size, 177 diga on the Kòk’èeti ekwǫ̀ summer range were extrapolated. There had been a long-term dataset from annual monitoring of trends in litter size and den occupancy since 1996, but this was inexplicably halted in 2014. Modeling in 2013 estimated diga numbers on the Kòk’èeti ekwǫ̀ summer range declined 95% from 1996 to 2013. Based on the recent observations of an experienced wildlife pilot, this trend has continued and diga are essentially absent from the Kòk’èeti ekwǫ̀ range.

In the absence of robust diga survey methodology, the UBI was used as a proxy and calculated based on densities of ɂekwǫ̀ on the winter range and herd size estimates. The UBI mathematically relates the amount of prey to the number of diga that could likely be supported. When Dedíi (moose) are included as potential prey biomass, more diga can be supported. The 2020 Kòk’èeti and Sahtì ekwǫ̀ winter distribution overlapped 15-20% with a 2016 dedíi density survey. Including the results of this dedíi survey increased the prey biomass and added 10-13 diga (95%CI) on the Sahtì ekwǫ̀ winter range and 9-11 diga on the Kòk’èeti ekwǫ̀ winter range. For Kòk’èeti ekwǫ̀, this adds approximately 25% more diga to the UBI estimate (Table 1).

### Table 1. Diga numbers from Ungulate Biomass Index.

<table>
<thead>
<tr>
<th></th>
<th>Sahtì ekwǫ̀</th>
<th>Kòk’èeti ekwǫ̀</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low 95%CI</td>
<td>Mean</td>
</tr>
<tr>
<td>Diga estimate</td>
<td>120</td>
<td>138</td>
</tr>
<tr>
<td>60% removal</td>
<td>72</td>
<td>83</td>
</tr>
<tr>
<td>80% removal</td>
<td>96</td>
<td>110</td>
</tr>
</tbody>
</table>

The precision (95% confidence intervals) of ɂekwǫ̀ estimates was applied as a precision of the UBI diga estimates. The accuracy of the UBI diga estimates remains unknown. The accuracy of the UBI at the beginning of the Pilot Project depended on two assumptions: (1) diga numbers have had time to adjust to prey biomass in the Pilot Project area, and (2) diga numbers have not been reduced by unsustainable harvest.

---

95 PR (Diga 2020): 148 - Public Comment from D. Olesen to the WRRB.
96 Ibid.
98 Ibid.
99 Ibid.
100 Ibid.
prior to the Pilot Project.\textsuperscript{101} As well as the earlier decline in denning diga, more recently the incidental sightings of diga during \textit{ɂekwǫ̀} sex and age surveys have declined.\textsuperscript{102} This brings into question the validity of the first assumption. It is possible that diga numbers were lower than predicted by the UBI. The second assumption, that diga were being already harvested at a higher than sustainable harvest was not examined or modelled.

There is evidence that diga numbers had declined on the Kùk'ëeti \textit{ekwǫ̀} herd summer range.\textsuperscript{103} Diga pup survival and den occupancy declined between 1996 and 2012 and modeling suggested a steep decline in diga abundance.\textsuperscript{104} Recent information on diga on the Sahtì ekwǫ̀ herd’s summer range is lacking. GNWT did not address the assumption that the diga are not being sustainably harvested. Since 2010, the annual harvest in the North Slave Region averaged 53 diga ($\pm$ 6.21 SE). An incentive to increase the diga harvest is paid if the diga are harvested within an incentive area, based on the \textit{ɂekwǫ̀} winter range as mapped from the satellite-collared \textit{ɂekwǫ̀}. Nunavut hunters from Kugluktuk also take diga on the ranges of Kùk’ëeti and Sahtì ekwǫ̀.\textsuperscript{105}

The WRRB is concerned that the Revised Joint Proposal requires an annual estimate of diga numbers but is unclear which method will be used. For example, the Revised Joint Proposal states that a snow track method may be tested but other methods are not detailed.\textsuperscript{106} After the removals reported in the Pilot Project, the number of diga remaining on the winter range will be low. This introduces further difficulty into estimating diga numbers relative to the target level.

Considering that estimating a reasonably accurate number of diga on the \textit{ɂekwǫ̀} winter range remains a challenge, the WRRB would like to see other methods to monitor diga removal effectiveness. For example, the incidental sightings of diga during \textit{ɂekwǫ̀} sex and age surveys are a potential indicator for trend in diga numbers. These diga sightings may be used as an index of how many diga the \textit{ɂekwǫ̀} expect to encounter in early and late winter.\textsuperscript{107} The \textit{WRRB Technical Response to Summary of Wolf Incidental Sightings from Bathurst and Bluenose-East Barren-ground Caribou Surveys, GNWT ENR, August 13, 2020} can be found in Appendix B. While accepting the limitations of indices compared to abundance estimates, including variable detectability and possible duplicated sightings, the Board notes that trends in the diga sighting rate were stable

\textsuperscript{102} Appendix B – WRRB Technical Response to Summary of Wolf Incidental Sightings from Bathurst and Bluenose-East Barren-ground Caribou Surveys, GNWT, ENR, August 13, 2020.
\textsuperscript{103} PR (Wolf 2020): 106 - Wolf Technical Feasibility Assessment – Options for managing wolves on the range of the Bathurst barren-ground caribou herd.
\textsuperscript{104} Ibid.
\textsuperscript{106} Ibid.
\textsuperscript{107} Appendix B – WRRB Technical Response to Summary of Wolf Incidental Sightings from Bathurst and Bluenose-East Barren-ground Caribou Surveys, GNWT, ENR, August 13, 2020.
from 1986-2008 but declined from 2009 to 2019 (Figure 4). However, the lack of sex and age composition surveys in 2017 and 2018 hinders inferences.

Figure 4. Incidental sightings of diga duringɂekwǫ̀ sex and age composition surveys in late winter on the ranges of the Kוק’ęeti ekwǫ̀ and Sahtì ekwǫ̀ herds, 2009-2020. NS means Not Surveyed (from Appendix B).

Overlapping ɂekwǫ̀ winter ranges restricted inferences from efforts to estimate diga abundance on the winter ranges of the Kوك’ęeti and Sahtì ekwǫ̀ herds. However, herd overlap is infrequent on the calving and summer ranges, which would be an argument for diga denning surveys combined with diga collaring to determine diga movements between ɂekwǫ̀ summer and winter ranges (see Section 7.7).

In summary, for Kوك’ęeti ekwǫ̀, at low numbers of diga, accurately estimating the number of diga will be difficult although necessary. Assumptions about increases through breeding and emigration are questionable without monitoring. Implications of reduced diga abundance for predator-prey dynamics are unexplored in the published literature on diga and the Revised Joint Proposal does not examine any implications for the removal program over the proposed four-year program.

The Revised Joint Proposal does not address if or how a diga decline on the summer range relates to diga numbers on the winter range. Existing information is that the diga breeding on the summer range follow ɂekwǫ̀ in the fall to the winter ranges. On the Kوك’ęeti ekwǫ̀ herd’s fall ranges, the high sighting rate from 2014 – 2018 may suggest that emigration and/or pup production and survival had increased, or detection had

108 PR (Diga 2020): 126 - Head to Head - Response to Engleman: Index Values Rarely Constitute Reliable Information.
The increase in the diga sightings may be a compensatory response to a diga decline measured in 2014. It is complicated by changes for the Kǫk’èeti ekwǫ herd with shifts in summer and fall ranges. For example, this shift was a factor in the decline of diga on the summer range112 and has contributed to the recent change in diga sightings at a diamond mine. Diga sightings peaked in 2017 (93) and 2016 (95).113

The Revised Joint Proposal requires an annual estimate of diga numbers but does not specify which method will be used. Consideration should be given to how diga numbers derived from the UBI can be compared to estimates derived from other methods. Accuracy is especially important as there is evidence of low or reduced number of diga on the winter range.114

The success and evaluation of the diga management program will rely heavily on knowing the number of diga removed and whether the diga population is decreasing or stable. It is evident that there is a lack of confidence in the estimate of diga populations on the ranges of the Kǫk’èeti and Sahtī ekwǫ herds.

**Recommendation #2-2020 (Diga): Diga Abundance**

The WRRB recommends that GNWT and TG identify and implement alternative methods to measure and index diga abundance and calibrate these with the Ungulate Biomass Index to ensure the most accurate and precise population estimates are used for diga management by March 31, 2021.

**Recommendation #3-2020 (Diga): Sighting Rates**

The WRRB recommends that diga sighting rates, during ekwǫ sex and age composition surveys, be assessed by GNWT to determine if and how it contributes to understanding seasonal trends in diga abundance on the Kǫk’èeti and Sahtī ekwǫ ranges by May 1, 2021.

7.4. Ground-Based Harvest

7.4.1. Introduction

Diga removals are proposed to occur primarily through winter ground-based removals by harvesters. Enhanced support for harvesters is proposed to be achieved through

---

112 PR (Wolf 2020): 078 - Wolf–caribou dynamics within the central Canadian Arctic.
diga harvester training, Tłı̨chǫ Government diga harvest camps, enhanced incentives, participation of Nunavut harvesters, and the use of bait to support removals.

7.4.2. Proponent’s Evidence

To achieve the target number of diga removals in the Kǫk’êeti and Sahti ekwǫ̂ herd winter ranges, harvesters in the GNWT’s North Slave region were paid an additional incentive if a diga was killed in the North Slave Harvest Incentive Area (Figure 5).

![Figure 5. Enhanced North Slave Wolf Harvest Incentive Area in 2019/20. Mapped from Kǫk’êeti and Sahti ekwǫ̂ collared ᐃĸq̨e locations from early January 2020.](image)

Hunters from Kugluktuk, Nunavut were able to hunt in the northern part of the Incentive Area where it overlaps with the customary Nunavut Inuit Traditional Use Area. Hunters from Kugluktuk also harvested diga in Nunavut using a basecamp near Kǫk’êeti (Contwoyto Lake).\(^{116}\)

---


\(^{116}\) Ibid.
In the 2020, a total of 171 diga were killed during the Pilot Project. Harvesters from the NWT’s North Slave region and Nunavut took 130 diga while 36 diga were shot from a helicopter.\textsuperscript{117} A further 5 diga died during the diga collaring project.\textsuperscript{118}

The level of effort to find and kill the diga was determined using questionnaires, which asked harvesters to report the time and distances travelled to kill diga. The information was used to estimate Catch per Unit Effort (CPUE) (Table 2).

<table>
<thead>
<tr>
<th>Table 2. North Slave and Kugluktuk Ground Harvesters – Catch per Unit Effort (CPUE).\textsuperscript{119}</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total # diga (Incentive Area)</strong></td>
</tr>
<tr>
<td>North Slave</td>
</tr>
<tr>
<td>Nunavut</td>
</tr>
</tbody>
</table>

66\% of diga harvested by Nunavut harvesters were taken in the Enhanced Incentive Area and they harvested more diga per 1000 km or per 24 hours than North Slave harvesters. The North Slave harvesters harvested the most diga, but only 15\% of the diga were taken in the Enhanced Incentive Area (Table 2).

The ground harvesting from the NWT and Nunavut resulted in 38\% diga associated with the Kòk’èeti and Sahtì herds; 24\% with the Beverly herd; and 38\% were possibly Tǫdzì (boreal caribou) as they were shot south of the three ḋękwǫ̂ herd ranges outside the Enhanced Incentive Area.\textsuperscript{120} The number of diga determined to be associated with specific herds does not include the 50 diga harvested in the North Slave outside and mostly south and southwest of the Enhanced Incentive Area.\textsuperscript{121}

During the Science Technical Session, TG agreed that CPUE does index effectiveness of diga removals. The CPUE was based on North Slave harvesters in the Enhanced Incentive Area self-reporting through a questionnaire as they passed through a winter road check station. Although 29 harvesters returned the questionnaires, only one had

\begin{itemize}
\item \textsuperscript{118} Ibid.
\item \textsuperscript{119} Ibid.
\item \textsuperscript{120} Ibid.
\item \textsuperscript{121} Ibid.
\end{itemize}
harvested a dìga. The Nunavut ground harvesters took 57 dìga with 35 from the Enhanced Incentive Area and submitted 38 questionnaires.

7.4.3. Other Participant's and Public Evidence

The NSMA stated that a portion of the dìga removed during the 2019-2020 year were taken from outside the Sahtì and Kįk’ęeti ekwǫ̀ regions, and that dìga should not be shot if they are outside of a defined acceptable dìga removal area.

LKDFN did not comment on the ground-based harvest portion of the dìga management proposal.

Dave Olesen described the immense effort required by on-the-ground harvesters to kill each dìga, calculating that a harvester would have to drive four times around the circumference of the earth at 64 degrees north and only kill 5 dìga.

7.4.4. Analysis and Recommendations

The dìga ground-based removals resulted in 63% (36) and 45% (54) of the targeted levels recommended in the Pilot Project on the Kįk’ęeti and Sahtì ekwǫ̀ herds ranges, respectively. TG and GNWT considered these results indicative of low effectiveness partly because there was an absence of ᐃkelas in the vicinity of the winter road. However, a percentage of dìga were also taken outside the Enhanced Incentive Zone.

The Wolf Technical Feasibility Assessment defines ground-based shooting on the winter range as

“On the caribou winter range, bait would be used to attract the dìga, which would be shot by marksmen on the ground. Helicopters, fixed-wing, and snow machines support is necessary”.

The humaneness, efficiency, and effectiveness of ground-based removals in the Wolf Technical Feasibility Assessment were calculated based on ground-based removals occurring as they were defined. TG and GNWT cite the Wolf Technical Feasibility Assessment as the “basis for developing the current proposal”; however, no helicopter or fixed-wing support is outlined in the methods of the Revised Joint Proposal or in the Technical Pilot Project Report. The only snow machine support described is a

---

123 PR (Wolf 2020): 148 - Public Comment from D. Olesen to the WRRB.
$25 gas card given out to those who completed a questionnaire. While the Revised Joint Proposal allows harvesters to use their own bait, the only bait stations set up by GNWT were done so on the Sahtı ekwǫ̀ range to assist in aerial removals.

There is evidence that the number of diga is low after the first year of removal. Practicalities of harvesting at low numbers may become increasingly challenging. The WRRB believes the Revised Joint Proposal should include avenues to increase support for ground-based harvest to enhance efficiency and effectiveness as outlined in the Wolf Technical Feasibility Assessment and used by the proponents as the basis for the program.

The WRRB also notes that the humaneness of the ground-based harvesting was not monitored, and cultural practices may not align with the criteria for assessment in the Wolf Technical Feasibility Assessment.

The Pilot Project reported an unexpected finding: a relatively high number of boreal diga were harvested. The Revised Joint Proposal did not, despite the findings of the Pilot Project, address the inadvertent harvesting of boreal diga. The Pilot Project mapped the 50 diga harvested outside the Enhanced Incentive Area as being likely ‘boreal’ diga. The stomach contents of the diga killed outside the Enhanced Incentive Area had higher percentages of hare, other mammals, and dedıı and half as much ɂekwǫ̀ than diga killed in the Enhanced Incentive Area (Figure 6).

Figure 6. Stomach content analysis of North Slave diga compiled from GNWT’s information.

---

129 Ibid.
However, the WRRB acknowledges that avoiding boreal diga by limiting diga removal to the Enhanced Incentive Area may not be feasible. While limited information from the 2020 Dìga Collaring Program is available, comparing monthly home ranges with the initial herd assignment at capture suggests complexity. The three diga collared on the Kǒk’èeti winter range summered elsewhere. Of eight diga collared on the Sahtì ekwǫ range, five summered outside the herd ranges while three summered on the Sahtì ekwǫ summer range.\(^{130}\) The implications of removing boreal diga is additional uncertainty as their numbers will be difficult to estimate and their lower use of ekwǫ means their removal has a lower effect on ekwǫ recovery.

**Recommendation #4-2020 (Dìga): Ground-Based Harvest**

The WRRB recommends that the ground-based harvest proceed as proposed with the addition of harvester supports provided by TG and GNWT. This should include ekwǫ and diga distribution information, gas caching, and/or bait stations, starting in the 2020/2021 harvest season. These supports are necessary for ground-based harvest removals as per the *Wolf Technical Feasibility Assessment: Options for Managing Dìga on the Range of the Bathurst Barren-ground Caribou Herd* (2017).

The WRRB agrees with TG and GNWT in that there is a high value in the results of the harvester questionnaires. The Board, however, is not impressed with the lack of meaningful improvements described for the harvester questionnaire after the Pilot Project’s unsuccessful performance.

**Recommendation #5-2020 (Dìga): Questionnaire Improvements**

The WRRB recommends that GNWT and TG improve the harvest reporting program to ensure that appropriate information is being collected through questionnaires, starting 2020/2021 harvest season. This could be accomplished by using a contractor with expertise in this area.

The WRRB noted the higher success rate in both harvester questionnaire returns and ground-based diga removal from Nunavut harvesters compared to NWT harvesters.

**Recommendation #6-2020 (Dìga): Nunavut Learnings**

The WRRB recommends that GNWT and TG incorporate lessons learned from Nunavut’s high success rate with their harvester’s questionnaire responses and ensure Nunavut harvesters attend Harvester Training Workshops, starting 2020/2021 harvest season.

\(^{130}\) PR (Wolf 2020): 166 - Commitments #4 to #8 - WRRB’s Science Technical Session, October 5, 2020.
7.5. Aerial Removals

7.5.1. Introduction

In the Revised Joint Proposal, GNWT and TG describe that jurisdictions such as Alaska, British Columbia, Alberta, and Yukon have demonstrated the effectiveness of aerial shooting of diga.\textsuperscript{131} Recent efforts to remove a targeted number of diga in northern British Columbia have successfully resulted in reductions to œdžı mortality, increased calf recruitment, and increased herd size.\textsuperscript{132}

GNWT and TG propose that aerial removals of diga should occur if ground-based harvesting does not meet targets by March 15 each year.\textsuperscript{133} If Kǫ̓k’ëeti and Sahtì ekwǫ̓ herds overlap, targets will be combined and applied across the combined winter ranges of the two herds such that removal effort can be allocated to areas of the highest diga density. If there is overlap with the Beverly ekwǫ̓ herd, removal targets will be assessed based on the amount of overlap and estimated number of diga associated with the Beverly ekwǫ̓ herd.

Aerial removals will be continued until the target is met or until the operation period has ended. Diga collar locations will be used to orient removal crews to the general vicinity of diga. Every effort will be made to avoid the removal of the collared diga or its pack mates. Aerial removal crews will attempt to remove all un-collared diga encountered, removing entire packs, where possible to reduce the possibility of splitting diga packs, which may result in dispersal and/or establishment of additional packs. Every effort will be made to recover diga carcasses and transport them for subsequent skinning and necropsy.

7.5.2. Proponents Evidence

The Technical Pilot Project Report reported that the ground-based harvesters did not achieve the targets set based on 60-80% of the estimated diga numbers, and so GNWT undertook aerial shooting between 22 April and 17 May 2020.\textsuperscript{134} For aerial shooting, all 36 diga were assigned to the Kǫ̓k’ëeti and Sahtì ekwǫ̓ herds.

The distribution of collared Kǫ̓k’ëeti and Sahtì ekwǫ̓ in March 2020 was used to define aerial survey areas, which were surveyed twice in March and April 2020. The results had been intended to direct aerial shooting but few diga were seen. Further support for

\textsuperscript{131} PR (Wolf 2020): 106 - Wolf Technical Feasibility Assessment – Options for managing wolves on the range of the Bathurst barrenground caribou herd.
\textsuperscript{132} PR (Wolf 2020): 036 - South Peace caribou recovery following five years of experimental wolf reduction.
low diga numbers is apparent when, in mid-May 2020, four days were spent checking approximately 50 dens on the Kôk’ëti ekwó range and no diga were found at the dens. However, three diga were killed on 10 May 2020 close to a den.135

The aerial removals were completed using a fixed wing aircraft, and two helicopters. The fixed-wing aircraft flew a survey grid to identify groups of diga. A helicopter crew, consisting of the pilot, marksman, and navigator, then flew to these locations, shot the diga, and placed the carcasses together. A crew in a second helicopter then tagged the diga, took samples and photographs, and prepared the diga for transport.136 Out of an available 31 days for the aerial removal program, 19.5 were lost to weather, one day was lost to mechanical issues, for a total of 10 aerial removal flying days. 137

All diga shot during the aerial removal were necropsied as reported in the “Veterinary Assessment of Aerial Removal Procedures” report submitted to the WRRB 138. All diga were shot using 00 buckshot, except one diga was shot with a high-powered rifle. Mostly, the total pursuit time ranged from 0-2 minutes, with one pack attempt that resulted in the removal of three diga where the total pursuit time was 51 minutes. The Veterinary Assessment of Aerial Removal Procedures139 included carcass examination to assess humaneness for all diga removed during aerial shooting. Data and field sheets were not included in the Pilot Project or Veterinary Assessment. The assessment noted that seven diga escaped and that all diga shot at were recovered suggesting none of the diga that escaped were injured.

The number and type of wounds was summarized and the time to unconsciousness was gauged from the wound determined to be the fatal one. Based on the injuries, 97% of diga would have been unconscious within 180-300 seconds (2-5 minutes) which meets criteria to be considered humane death. For the 30 chase times where the “time to death” classification was ranked, the helicopter crew selected “Immediate” 22 times. The vet’s recommendations for video monitoring, oversight of the Animal Care Committee, and an external audit may suggest doubts about, for example, the wounding rate, and the accuracy of timing to unconsciousness.

Most diga were in good condition (86%) and 9 of 15 females were pregnant. One female was near-term and with evidence of lactation (the aerial diga removals extended 22 April to 15 May 2020).140 Almost half the diga had tooth damage consistent with

---

136 Ibid.
137 Ibid.
139 Ibid.
140 Ibid.
exposure to the canine distemper virus while teeth are growing, which is an observation which may relate to the likelihood of pup recruitment if the disease is prevalent.141

As dìga are a social carnivore, fragmentation of packs during removal is a concern.142 Pack fragmentation was only reported for the aerial removals: the 14 packs had an average pack size of 2.6 ± 0.41 SE (range 1-6) and packs were removed in their entirety except one dìga from a pack of six and two dìga from a pack of five escaped.143 The Revised Joint Proposal does not describe welfare aspects such as inadvertent increases in harvesting144 of other carnivores during the dìga removals such as nògha (wolverine). The Technical Pilot Project Report does list nògha harvested during the ground-based dìga removals and sightings, including nògha caught on camera at the bait sites, but does not provide any views on the implications of the information.

Regarding the cost of the program, GNWT and TG have stated that approximately $500,000 has been budgeted annually for all dìga management related activities and that the final costs for the Pilot Project to be within this range.145 A significant portion of the Pilot Project’s costs supported aerial surveillance and removal. 146

7.5.3. Other Participant’s and Public Evidence

Of the public comments received, eleven of twelve individuals or organizations heavily criticized and did not support the aerial removal program. The Sahtú Renewable Resources Board, neither supported nor criticized the aerial removal program.147 Multiple public and participant comments criticized the Revised Joint Proposal’s ineffectiveness and inhumaneness. LKDFN opposed the proposal as a whole, stating:

“Dìga hold a sacred place for many people of our community. They are respected co-dependents of caribou, and while some of our people harvest dìga, no one attacks them. The Dene have lived with dìga since time immemorial. Dìga are skillful adversaries and the means by which they are being killed is contrary to respecting animals.”148

146 Ibid.
147 PR (Wolf 2020): 167 - Public Comment from Sahtu Renewable Resources Board to the WRRB.
Regarding the management actions proposed, LKDFN stated in their closing arguments that “Such and enhanced measures would be expected for consideration only if all other strategies for improving caribou survival rates were in force”.149

NSMA did not specifically comment on aerial removals in any of their submissions.

Dave Olesen wrote: “I have real concerns about the wisdom, the efficiency, and what I predict will ultimately be the fruitless outcome of this program”.150 Garth Wallbridge noted “the easiest purported solutions, in this case a cull, are often done to appease people by offering some solution without knowing that it is the best solution”.151

The Délı̨nę Renewable Resources Council stated that they “…do not believe that aerial shooting is respectful of the diga and is concerned that this approach will not protect ᒥekwę́”.152 The Délı̨nę Renewable Resources Council did not support the program as a whole153, stating

“Elders from all 5 Sahtú communities described the important relationship between diga and ᒥekwę́ (caribou). The Elders explained that the diga keep the ᒥekwę́ populations healthy, that killing all the diga might actually wipe out the ᒥekwę́, and that diga must be respected”.

Regarding the cost of the program, Dave Olesen stated

“I know that in the North, in government, money seems to fall from the sky in huge, unencumbered bundles, but it still should carry with it some caveats and conscience, in order to use taxpayer dollars wisely. So please, crunch the numbers again, and look at what this is costing. And remember that this cost is not just in money, but in time and effort by everyone involved. A five-year program like the one proposed eats up an enormous proportion of the daily workload of an entire team of professionals, in ENR and elsewhere. These people would otherwise be able to focus their talents on other urgent matters… The main questions to consider, I think, are two: First, do the results make this a wise investment of effort and money? and second, what is the benefit of this wolf kill for the caribou herds? The latter is the fundamental question here”.154

150 PR (Wolf 2020): 148 - Public Comment from D. Olesen to the WRRB.
151 PR (Wolf 2020): 119 - Public Comment from G. Wallbridge to the WRRB.
152 PR (Wolf 2020): 122 - Public Comment from Délı̨nę Renewable Resources Council to the WRRB.
153 Ibid.
154 PR (Wolf 2020): 148 - Public Comment from D. Olesen to the WRRB.
7.5.4. Analysis and Recommendations

Overall, aerial diga removals appear effective, but the required effort indicated low diga numbers or diga were hard to detect. In contrast to the limited efforts to increase efficiencies and effectiveness for the ground-based harvesting, considerable effort was made to increase the effectiveness of the aerial shooting, e.g., aerial survey, use of the collared ɂekwǫ̲ locations, den sites and the bait sites.

Although the necropsy report indicated that, overall, the aerial diga removal procedures would meet criteria consistent with humane death, the high rate of wounding and the veterinary pathologist’s recommendations for closer scrutiny leaves room for doubt. The WRRRB is concerned that the timing of the proposed removal should not extend into May as the pregnant females are near-term.

The WRRRB notes concerns from the public about the cost of aerial removals and the diga management program generally. The WRRRB notes that funds from aerial removals could be put towards implementing a more robust ground-based harvesting program, as per the Wolf Technical Feasibility Assessment, the required research and monitoring, and habitat protection.

The WRRRB acknowledges that there is significant public concern about the use of aerial removals as a methodology for diga removals on the Kǭk’ęeti and Sahtí ekwǫ̲ range. The WRRRB also acknowledges that none of the Indigenous Governments or Organizations who participated in this process support aerial removals. As there are means in which diga can be managed and removed to halt the ɂekwǫ̲ declines and promote recovery of the herds, the WRRRB does not support aerial removals at this time. Should additional efforts to meet targets through ground-based harvests be unsuccessful, the Board would consider a proposal for other methods of diga removal.

**Recommendation #7-2020 (Diga): Aerial Removal**

<table>
<thead>
<tr>
<th>Recommendation #7-2020 (Diga): Aerial Removal</th>
</tr>
</thead>
<tbody>
<tr>
<td>The WRRB recommends GNWT and TG should not continue aerial removals of diga on Kǭk’ęeti and Sahtí ekwǫ̲ ranges. Instead, more resources should be put towards ground-based harvest. Subject to review based on an annual assessment of evidence during the annual review of the program, the WRRB would consider a proposal of other methods of diga removal.</td>
</tr>
</tbody>
</table>

7.6. Overall Analysis of Ground-based Harvest and Aerial Removals

A relatively large number (171) of diga were killed during the Pilot Project, including TG’s diga training program (Table 3). Harvesters from the North Slave Region and Nunavut took 130 diga while 36 diga were shot from a helicopter with a further 5 diga
that died during the collaring project.\textsuperscript{155} The removals related to the target levels for the Kök’èeti ekwǫ herds at 34 diga was within the 60-80% target level of 29-39 wolves. For the Sahti ekwǫ herd, 54 wolves were removed, which is less than the 60-80% target of 73-97.

Table 3. Summary of diga numbers, target levels, removal and diga left compiled from the Pilot Project.\textsuperscript{156}

<table>
<thead>
<tr>
<th></th>
<th>Target herds</th>
<th>Non-target</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sahti</td>
<td>Kök’èeti</td>
</tr>
<tr>
<td>Year 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UBI estimate diga numbers</td>
<td>121</td>
<td>49</td>
</tr>
<tr>
<td>Target based 60-80%</td>
<td>73-97</td>
<td>29-39</td>
</tr>
<tr>
<td>North Slave &amp; Nunavut ground removal</td>
<td>29</td>
<td>20</td>
</tr>
<tr>
<td>Aerial shooting + collaring</td>
<td>25</td>
<td>16</td>
</tr>
<tr>
<td>Total harvest 2020</td>
<td>54</td>
<td>36</td>
</tr>
<tr>
<td>Year 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Desired level to maintain 20-40% of original estimate</td>
<td>24-48</td>
<td>10-20</td>
</tr>
<tr>
<td>Likely Survived May 2020</td>
<td>67</td>
<td>18</td>
</tr>
<tr>
<td>UBI estimate less no. removed</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The WRRB is concerned about the three underlying assumptions for the diga reduction program. These concerns stem from the results from the Pilot Project. In the Revised Joint Proposal, the three assumptions are: 1) a 60-80% initial removal rate is required to meet objectives, 2) there is sufficient knowledge of the number of diga to which the 60-80% removal rate is applied, and 3) there is sufficient knowledge to assign diga removals to individual ḃekwǫ herds.

First assumption: The first uncertainty, based on experience in Alaska and Yukon, is the rule of thumb that 60-80% of the estimated number of diga have to be removed in the first year and subsequently kept at that level to meet stated objectives. However, the published examples were not based on either declining diga or diga in a multi-prey system. Other evidence on the effects of diga removal raise doubts about under what conditions such high rates are necessary.\textsuperscript{157}

A second concern that follows from the 60-80% rule of thumb is the assumption that the diga will rapidly replace their numbers by breeding and immigration. During diga

\textsuperscript{156} Ibid.
removal for the Fortymile herd, the breeding diga were removed and so recruitment was low. The WRRB notes that half of the 15 female diga killed during the aerial removal were pregnant, suggesting that possibly recruitment will be reduced. The Board suggests that the diga collaring project and a diga den survey will reduce uncertainty inherent in this assumption.

Second assumption: The WRRB is concerned that there may not be adequate information on the number of diga. The WRRB is surprised that after the experience of the Pilot Project, where relatively low number of diga were found, that the Revised Joint Proposal was not revised to consider implications of low diga numbers for the removal program. The WRRB comments that the low number of diga will add difficulty to estimating diga numbers, removing diga, and possible changes in diga behavior, such as increased influx of boreal diga to the ɂekwǫ̀ winter ranges. Consequently, with respect to this assumption, the WRRB is recommending improvements to estimating diga numbers.

Third assumption: TG and GNWT assigned the killed diga to the ɂekwǫ̀ herds based on an application of a distribution analysis using collared ɂekwǫ̀ over the previous four years. The analytical technique, kernel distribution estimation, was selected as appropriate at regional scales. This technique describes the likelihood of monthly distribution weighted by herd. The diga kills were assigned to a herd based on the kill’s location to the closest ekwǫ̀ distribution probability contours for the same month when the diga died. When two herd’s distribution overlapped, the diga was assigned to the closest probability contour.

Assignment becomes increasingly uncertain when there is high spatial overlap and a large discrepancy between herd sizes. Considering the geospatial analyses and the most recent ɂekwǫ̀ collaring data, the GNWT rationalized assigning herd identity to target diga for the Pilot Project that will be used in future years of the program.

The WRRB believes the Revised Joint Proposal’s methods of assigning diga kill location to a herd is only partially adequate as GNWT did not provide a table listing the distances of the kill locations to isopleths describing herd distribution. The use of distances could allow for confidence limits being applied to the herd assignments.

The WRRB suggests that providing descriptive statistics for the assignment of diga kill sites to a herd will resolve difficulties such as revealed in the Technical Pilot Project Report (Figure 7). The map depicts the location of nine diga outside of the 95%

---

kernel density estimate utilization distribution, but these diga were assigned to the Këk’ëeti ekwō herd. The Board believes a distance from the core Ṝekwō density area is necessary to determine how each diga can be associated to a herd.

Figure 7. Flight paths of aerial crews and support helicopter on Bathurst winter range area. April-May 2020.161

While the Technical Pilot Project Report describes the Ṝekwō distribution analysis in detail with monthly Ṝekwō distribution maps,162 it does not measure the overlap between the herds or the proximity of the diga kill sites to the Ṝekwō distribution contours. The

---

WRRB has undertaken a preliminary analysis to measure overlap in ᐆﭽ.modules herd distribution\textsuperscript{163} at the scale of the herd and individual collared ᐆﭽ. (Figure 8).

![Volume Index: overlap of the kernel densities](image)

**Figure 8. Trends in overlap between the Bathurst and Bluenose East and Bathurst and Beverly/Ahiak herds based on the Volume Index (Gurarie et al. In Prep).\textsuperscript{164}**

The Kǫ̀k’èti ᐆﭽ. herd has recently shifted its winter distribution northeast, which reduced overlap with Sahtì ᐆﭽ. and increased overlap with the Beverly/Ahiak ᐆﭽ. herd. The overlap starts relatively early in winter (October) and persists until May at the beginning of pre-calving migration. The overlap at the herd scale is less measurable at the scale of 200m between individual collared ᐆﭽ. either within a herd or across herds. The individual encounter rate based on proximity was highest for the Kǫ̀k’èti ᐆﭽ. herd with fewest ᐆﭽ.. The WRRB suggests that such an analysis or an alternative approach could be useful in refining the assignment of dìga removed to individual ᐆﭽ. herds.

TG and GNWT note uncertainty in whether an assignment of a dìga removal based on kill date and location relative to the concurrent distribution of collared ᐆﭽ. is robust and biologically accurate or not.\textsuperscript{165} The WRRB agrees with this uncertainty especially at a timescale of weeks to seasons as the dìga seasonal movements are currently unknown relative to ᐆﭽ. seasonal distribution. Although dìga previously denning on a

\textsuperscript{163} PR (Wolf 2020): 112 - Appendix 11.9 Bathurst, Bluenose-East and Beverly Caribou Winter Range Analysis - Figures (Part 2).

\textsuperscript{164} PR (Wolf 2020): 135 - Preliminary analysis of winter range overlaps between the Bluenose East, Bathurst and Beverly/Ahiak migratory tundra caribou herds.

The WRRB is concerned about the limited ecological evidence for assigning the diga kills to a specific ḣekwǫ̀ herd when winter distribution overlaps. Basing it on the proximity of a diga kill to the contours describing ḣekwǫ̀ distribution is reasonable in the absence of understanding diga movements but it is an uncertainty. To expect the diga during an entire winter or at any time would show fidelity to ḣekwǫ̀ from one herd when ḣekwǫ̀ from another herd are in the vicinity is unlikely.

The Board is also concerned that the difficulty and ambiguity in assigning diga removals within the Enhanced Incentive Area to ḣekwǫ̀ herds complicates widespread understanding of the program. While the WRRB understands that TG and GNWT have developed formulae to use in these situations, the Board believes more information is needed to understand how and at what timescale a diga is assigned to which ḣekwǫ̀ herd or to tǫdzı.

### Recommendation #8-2020 (Dìga): Assigning Dìga to Herds

The WRRB recommends that TG and GNWT explore alternative methods of assigning harvested diga to an ḣekwǫ̀ herd and to statistically determine confidence in the allocation. GNWT and TG should provide enough information to determine how the uncertainty affects the success of the program and submit results to the WRRB by September 30, 2021.

### 7.7. Research & Monitoring

#### 7.7.1. Introduction

Ongoing research and monitoring actions are required to make informed and timely management decisions for the Kǫk’ëeti and Sahtí ḣkwǫ̀ herds. Research and monitoring as part of the diga management program will include monitoring of diga and diga

---


harvest, a collaring program, and monitoring and modelling ɂekwǫ̀ response to the actions.\footnote{PR (Wolf 2020): 017 - GNWT & TG’s Revised Joint Proposal on Management Actions for Wolves (diga) on the Bathurst and Bluenose-East Barren-ground Caribou (ɂekwǫ̀) Herd Winter Ranges: 2021 – 2024.}

\subsection*{7.7.2. Monitoring Dìga}

\subsubsection*{7.7.2.1. Introduction}

The Revised Joint Proposal outlines five proposed monitoring activities for diga. The WRRB notes that the proposed monitoring only includes estimating the level of diga removals and information that supports the removals:\footnote{Ibid.}

\begin{enumerate}
\item Collecting information from diga harvester
\item Monitoring catch per unit effort
\item Estimating diga removal levels on ɂekwǫ̀ winter range
\item Monitoring diga condition, diet, health, and humaneness of aerial removals
\item Monitoring diga movements (collaring program under a separate proposal).
\end{enumerate}

\subsubsection*{7.7.2.2. Proponents Evidence}

\subsubsection*{Collecting information from diga harvesters}

TG and GNWT propose to require all diga harvesters to fill out a questionnaire and to provide information at check stations to describe among other things, their time expended and distanced travelled.

\subsubsection*{Monitoring catch per unit effort}

The information from the questionnaires will be used to estimate CPUE, which the Revised Joint Proposal describes as a key indicator. As the number of diga is reduced, the effort (hours travelled) by harvesters to find diga will increase. However, TG and GNWT acknowledge that overlapping herd distribution adds uncertainty to the use of the CPUE.

\subsubsection*{Estimating diga removal levels on ɂekwǫ̀ winter ranges}

The level of diga removal is required when assessing the effectiveness of harvester training, enhanced incentives, harvest camps, efficiency of search and removal techniques, and for evaluating effectiveness of diga removal actions on ɂekwǫ̀.\footnote{Ibid.}
The monitoring will also address the question of assigning diga removal to specific herds when the herds overlap in their winter ranges. The approach depends on ɂekwǫ̀ distribution information at the monthly scale and harvester’s information. Assigning diga to ɂekwǫ̀ herds will also depend on collared diga to study their movements on the winter ranges and their fidelity to summer ranges where they breed.

**Monitoring diga condition, diet, and welfare outcomes**

Examination of the diga carcasses through post-mortem necropsies on a selection of harvested diga will be used to monitor diet, condition, and humaneness of kills.\(^{171}\)

**Monitoring diga movements**

Monitoring diga movements within and among the ɂekwǫ̀ herds both seasonally and annually depends on using collared diga.

7.7.2.3. Other Participant’s and Public Evidence

In their final written argument, the NSMA requested that denning studies be conducted in the region to estimate diga recruitment and inform the Revised Joint Proposal more generally. NSMA stated that they have heard from harvesters that diga populations have been declining in the past decades.\(^ {172}\) Further, NSMA stated that there has been a lack of population estimates and thus this has not been captured.

In their final written comments, the LKDFN criticize the proposal for its high degree of uncertainty regarding the number of diga within the incentive area and lack of updated data on diga dens.\(^ {173}\)

Dave Olesen heavily criticized the Revised Joint Proposal’s claim of a moderate number of diga on the ɂekwǫ̀ ranges.\(^ {174}\) He stated that diga are easy for him to see from his plane and he has seen substantially fewer in recent years. Olesen objects to the GNWT’s claim that sightability is an issue for aerial surveys and removal of diga on the tundra. Olesen says he has been the main pilot for ENR’s diga-den occupancy surveys and has not been seeing occupancy of the dens on the Kǫ̀k’ętì ekwǫ̀ range.


\(^{174}\) PR (Dìga 2020): 148 - Public Comment from D. Olesen to the WRRB.
7.7.2.4. Analysis and Recommendations

Although the listed monitoring activities are largely those that were tested during the Pilot Project, TG and GNWT have provided no explanation of how the findings of the Pilot Project have led to changes in the proposed monitoring actions.

The Technical Pilot Project Report had specific recommendations to increase the clarity of the CPUE questions, but none about the level of reporting other than improving relationships with harvesters. The recommendations also stated that “more effort is needed to direct harvesters to areas of high diga abundance when caribou are distributed away from winter road corridors” but did not specify how this would be done. In the Enhanced Incentive Area, only 15% of the North Slave harvested diga were assigned to the Sahtì or Kôt’etek’ı̀k’ı̀ekw’ı̀ herds and only 21% of the Nunavut harvest was assigned to the Kôt’etéti and Beverly/Ahiak ekw’ı̀ herds. The encounter rate for diga based on 88 diga sighted is high for Nunavut CPUE and suggests that follow-up is needed in the questionnaire to learn more about diga availability.

The Revised Joint Proposal identifies diga removal levels as a key indicator, but not the effects of the removals on diga population ecology. Monitoring on the diga summer ranges should resume to measure if breeding and pup recruitment change during diga removal and to update the den inventory. Fall recruitment levels are a potential indicator of winter predation rates. The possible confounding effect of diseases including rabies, canine distemper, and parvo viruses on diga recruitment is an uncertainty, which limits the use of diga age structure as an indicator of the effects of diga removal.

The Revised Joint Proposal states that only a subset of diga will be necropsied for an evaluation of condition, diet, and welfare outcomes. The WRRB holds the strong view that diga welfare be a priority and that the diga management program be implemented as humanely as possible. As such, all diga should be necropsied and evaluated for humaneness criteria.

---

**Recommendation #9-2020 (Diga): Den Occupancy**

The WRRB recommends that GNWT and TG monitor diga den occupancy to measure pup production, recruitment, diet, and disease incidence to describe the extent of compensatory breeding and to better understand the minimum number of diga on the Kôt’etéti and Sahtìk’ı̀ekw’ı̀ summer ranges, starting in the 2020/2021 harvest season.

---

Recommendation #10-2020 (Diga): Necropsy

The WRRB recommends that GNWT and TG ensure all diga removed as part of this program from 2021-2024 undergo a full necropsy to determine injuries, physical condition, reproductive status, and diet, to fully understand health of the diga on the ranges of the Kǫ̀k’èeti and Sahtì ekwǫ̀ herds.

7.7.3. Collaring

7.7.3.1. Introduction

On January 8, 2020, the ENR submitted a Wildlife Research Permit application for collaring 30 diga on ranges of the Kǫ̀k’èeti, Sahti, and Beverly ekwǫ̀ herds. The WRRB did not support this Wildlife Research Permit as the Board was then unable to undertake the process of reviewing and providing recommendations on the 2020-2025 Diga Joint Management Proposal to which it is closely tied. ENR issued themselves Wildlife Research Permit #WL500830 for the diga collaring program. A diga collaring program occurred in early 2020.

On June 24, 2020, ENR submitted an amendment to Wildlife Research Permit #WL500830. The WRRB replied to ENR on September 4, 2020 informing them that until the Board could provide recommendations on the 2021-2024 Diga Revised Joint Management Proposal, the WRRB could not provide support for the WRP Application to collar diga on the central barrens.

7.7.3.2. Proponents Evidence

Thirty satellite collars are proposed to be placed on diga with approximately ten each being deployed on Kǫ̀k’èeti, Sahti and Beverly ekwǫ̀. The Revised Joint Proposal states that collared diga will be used to determine 1) how diga travel among ɂekwǫ̀ herds on their winter ranges, 2) broader diga movement patterns across ɂekwǫ̀ ranges on an annual and multi-year basis, and 3) fidelity of diga to send sites and ɂekwǫ̀ ranges and assist in the evaluation of diga management actions.

The secondary objective of the collar program is to direct aerial removals. GNWT and TG proposed that diga collars would be used to direct aerial harvesters to diga packs, with every effort being made not to remove collared diga or their pack mates.

---

178 Ibid.
7.7.3.3. Other Participant's and Public Evidence

In regard to the uncertainties of the program, the LKDFN wrote

“At the most basic level, uncertainty on the number of wolves currently within the wolf incentive area during caribou migration, including a lack of updated data on wolf dens, will mean that we will not be sure as to when cull targets will be met, or exceeded”.\textsuperscript{179}

NSMA supports the proposed monitoring and looks forward to seeing the number of collars deployed on diga increase in future years.\textsuperscript{180}

7.7.3.4. Analysis and Recommendations

The WRRB is perplexed by how little information on the 2020 diga collaring is available on the public record to provide a foundation for the Revised Joint Proposal. The number of diga collared was fewer than expected although the WRRB does not know whether it was difficulty in finding diga or technical problems (four diga died during the collaring and one diga was euthanized as in poor health) that resulted in the low success rate of the collaring during the Pilot Project.

One objective of the collaring program was to determine the movements of diga relative to the ñékwò seasonal ranges. The preliminary results of the collar data suggest a complex diga-ñékwò system, but the Board is unable to make conclusions as the sample size of collared diga is low and there is only four months of data available.\textsuperscript{181} With adequate sample size, the collared diga movements may reduce uncertainty of assigning diga removals to ñékwò herds. Effective statistical design including precisely worded objectives is essential to detect and measure rates of immigration. Measuring if boreal diga shift to migratory tundra ñékwò winter range as a response to low numbers of tundra diga could reduce uncertainty as to whether the removals are drawing in diga from the boreal forest.

The Technical Pilot Project Report also noted the need for an ecological understanding of ñékwò and diga interactions, such as diga movement and spatial use patterns from collars, and genetic variability which can be added isotope analysis of diga diet.\textsuperscript{182}

\textsuperscript{181} PR (Wolf 2020): 166 - Commitments #4 to #8 - WRRB’s Science Technical Session, October 5, 2020.
Recommendation #11-2020 (Dìga): Dìga Collaring

The WRRB recommends that GNWT continue the dìga collaring program, beginning in 2021, using a statistically rigorous design to measure dìga movements relative to the dìga-ɂekwǫ̀ spatial distribution, including reducing the uncertainties involved with assigning dìga to ɂekwǫ̀ herds.

7.7.4. Monitoring ɂekwǫ̀ Response

7.7.4.1. Introduction

There are many factors likely influencing the current trend in ɂekwǫ̀ populations including environmental factors, disturbance, and predation. To monitor whether the objectives of the Revised Joint Proposal are met, ɂekwǫ̀ herd demographic data must be monitored for improvement. This is achieved through aerial surveys, on-the-ground monitoring, and collars.

7.7.4.2. Proponents Evidence

The final part of the monitoring program was to monitor adult survival, age ratios, and herd size through traditional surveys. The Ekwǫ̀ Nàxoède K’è (Boots on the Ground) program will observe calf survival and ɂekwǫ̀ health. These are all activities that are currently occurring, and nothing new was proposed. The Revised Joint Proposal does state, however, that other factors affect ɂekwǫ̀ survival and so determining the effects of dìga removal may be difficult.

7.7.4.3. Other Participant’s and Public Evidence

In their closing arguments, the NSMA writes

“while large natural changes in the abundance of migratory barren-ground caribou populations have been documented, the current declining trend is seen as an unusual, prolonged low in caribou abundance. The low number of Bathurst caribou on the calving grounds in recent years is a suspected result of low adult survival rates, reduced recruitment, and to a lesser extent, harvest. However, there is still no consensus about the main cause of the decline, with several factors such as habitat degradation and fragmentation, predation, climate change, parasitism, and disease being blamed.”

The LKDFN stated in their closing arguments that

---

“LKDFN has participated in a review of this proposal and a review of material provided to the WRRB. Through this participation we have observed a high degree of uncertainty regarding whether wolf culling measures will lead to caribou recovery”.185

One member of the public186 criticized the Revised Joint Proposal’s remote language and reminded the Board that they are talking about the “beleaguered hunters of a shockingly reduced caribou herd”.

### 7.7.4.4. Analysis and Recommendations

The Revised Joint Proposal lists monitoring of estimated and modelled adult female ɂekwǫ̀ survival, age ratios and population trends, but it will be challenging to attribute changes in those factors to dìga reductions.187 The means to address this complexity are not outlined in the Revised Joint Proposal, apart from modelling. There are no plans to include statistical power in evaluating the program, although in the response to information request to LKDFN, GNWT identified increasing sample sizes to minimize the risk of drawing incorrect conclusions about the effect of the dìga removals.188 To evaluate the impact that dìga removals have on ɂekwǫ̀ populations, a better understanding of what is causing calf mortalities on the calving grounds is required.

<table>
<thead>
<tr>
<th>Recommendation #12-2020 (Dìga): Calf Mortality Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>The WRRB recommends that GNWT and TG complete a calf mortality study in conjunction with 2021 calving ground surveys to determine the effect of dìga on calf survival on both Kǫ̀k’èeti and Sahtì ekwǫ̀ calving grounds. This calf mortality study should, if possible, be done in cooperation with Government of Nunavut and with the assistance of experienced Dene and Inuit elders as field observers.</td>
</tr>
</tbody>
</table>

As early as the 1990s, Tłı̨chǫ elders and harvesters spoke of the importance of understanding the state of habitat for ɂekwǫ̀. Habitat became more of a focus in the 2000s, with statements such as one by Harvester Alfred Arrowmaker in 2008,

> “Different animals’ habitat are lush at different times. Sometimes the wolves are healthy because their habitat is lush, and sometimes the ɂekwǫ̀ are healthy because their habitat is lush”.189

---

186 PR (Wolf 2020): 148 - Public Comment from D. Olesen to the WRRB.
188 PR (Wolf 2020): 146 - LKDFN Response to Question #6, Information Request Round No. 2.
Elder Phillip Dryneck, during the Bluenose-East Caribou Public Hearing in 2016, was concerned with the loss of habitat when he said, “Caribou have been with us for many, many years. And now they’re…blaming the predators, like wolves, bears…[it] is not possible because they always co-existed.”

During the TK Technical Session, the elders called for more TK research to better understand diga and ᖇekwǫ̀ relationships through time. As noted by Tłı̨chǫ elders, boreal diga and tundra diga behave differently; and recently the behaviour of diga has changed. Other TK studies have found that diga that are linked to migrating prey will travel much longer distances that territorial diga. Since tundra diga have been researched much less that other diga, TK research will be valuable to understand differing behaviour through time and space.

**Recommendation #13-2020 (Diga): Diga and ᖇekwǫ̀ Relationship**

The WRRB recommends that TG collect and document stories about the changes that Tłı̨chǫ elders and their families have observed to the diga and ᖇekwǫ̀ relationship through time, and in the present considering other animal behaviour, climate change, loss of habitat, and population declines.

The Ekwǫ̀ Nàxoede K’è program collects Tłı̨chǫ knowledge on Kǫ̀k’èeti ekwǫ̀ and their relationship to the land, and predators. The WRRB acknowledges the importance of this program and sees an opportunity for a concerted effort to collect Tłı̨chǫ Knowledge about diga while on the land. The need for this comes at a time of change where past stories from the 1990s can be compared to the present. For example, members of the Tłı̨chǫ Elders Regional Committee often mention places named after diga, such as *Digati* (wolf-lake). One of which was named “because the wolves have dens in the esker and chase the caribou when they migrate across this lake. It is a long lake, with narrows.”

Elder Johnny Eyakfwo, like other elders, explained that,

“If there were some other animals or a wolf, bigger caribou would block [the smaller caribou from] it. Because that big caribou have antlers, the wolf is afraid of them, [and] the smaller caribou are unable to defend themselves, so the big animal like a big caribou will shield the little caribou. That is how they move. If it were not so and if the bigger animal were not with it [the young], [the wolves] would easily kill it. That is what we learned from our elders [and by walking the land].”

---

193 Ibid.
Elders at the TK Technical Session called for more TK research that would include stories of the past and occurrences in the present as a way of finding solutions to the current situation.

**Recommendation #14-2020 (Dìga): Ekwǫ̀ Nàxoèede K’è**

The WRRB recommends that TG collect Tłı̨chǫ stories about dìga and ɂekwǫ̀, while on the land, from elders participating in the Ekwǫ̀ Nàxoèede K’è program to increase the understanding of the current relationship between dìga and ɂekwǫ̀ and how it has changed through time.

### 7.7.5. Modelling ɂekwǫ̀ Response

#### 7.7.5.1. Proponents Evidence

The potential effects of dìga removals were explored through statistical modeling.\(^\text{194}\) The October 2020 model used two levels of adult survival (averaged for the last three and five years) and average or low calf survival.\(^\text{195}\) The model assumed that 60% of adult and calf mortality was a result of dìga predation.\(^\text{196}\) This assumption was conservative and although field data is mostly lacking, there is support from the Fortymile herd where about 78% of the adult cow’s death rate was shown to be from dìga predation.\(^\text{197}\) Additional model scenarios examined the effect of reducing dìga predation on calf mortality from 60% to 25% and for adults from 60% to 30% (Table 4).\(^\text{198}\)

**Table 4. Vital rates used as input to the demographic model, Russell 2020.**\(^\text{199}\)

<table>
<thead>
<tr>
<th></th>
<th>Kǫk’èetti Ekwǫ̀</th>
<th>Sahti Ekwǫ̀</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2018 herd size</strong></td>
<td>8,200</td>
<td>19,800</td>
</tr>
<tr>
<td><strong>% decline 2015-2018</strong></td>
<td>29%</td>
<td>23%</td>
</tr>
<tr>
<td><strong>Adult survival 2018-2020</strong></td>
<td>88%</td>
<td>82%</td>
</tr>
<tr>
<td><strong>Adult survival 2015-2020</strong></td>
<td>83%</td>
<td>85%</td>
</tr>
<tr>
<td><strong>Spring calf: cow from 2016-2019</strong></td>
<td>33:100</td>
<td>36:100</td>
</tr>
<tr>
<td><strong>Fall calf: cow from 2016-2019</strong></td>
<td>34:100</td>
<td>38:100</td>
</tr>
<tr>
<td><strong>July 2020 calf: cow</strong></td>
<td>44:100</td>
<td>47:100</td>
</tr>
</tbody>
</table>

\(^{194}\) PR (Wolf 2020): 019 - Summary Caribou Population Modeling of Varying Levels of Wolf Removal BATH BNE.  
\(^{195}\) Ibid.  
\(^{196}\) Ibid.  
\(^{197}\) Ibid.  
\(^{198}\) PR (Wolf 2020): 166 - Commitments #4 to #8 - WRRB’s Science Technical Session, October 5, 2020.  
\(^{199}\) Ibid.
For both herds, in the absence of diga removals, when calf survival was average, ekwǫ́ numbers increased or were stable depending whether adult survival was higher or lower. When calf survival was low, the numbers declined for either level of adult survival. With 80% diga removal, despite low calf survival, Kǫk’ëeti ekwǫ́ numbers increased. Without diga removal, the low calf survival resulted in a stable trend in herd size.

The modelling for the Sahtì ekwǫ́ herd projects a need for diga reduction if the herd is to increase as although adult survival is high, it is not sufficient for the herd to increase. Without diga removal and average calf survival, the herd will stabilize, but with reduced calf survival, the herd declines. However, as with any simple modelling projection, caution is advisable. The model illustrates the reduced effectiveness of diga reduction if diga are not responsible for 60% all mortality, especially on the calf cohort.

### 7.7.5.2. Other Participant’s and Public Evidence

There were no comments received from the other parties or the public specific to the modelling work completed by the GNWT.

### 7.7.5.3. Analysis and Recommendations

The modelling scenarios emphasize the vulnerability of the Kǫk’ëeti and Sahtì ekwǫ́ herds to small differences in adult survival and the importance of average or low calf survival. While the results of the modeling are not surprising, they do illustrate the difference between the Kǫk’ëeti and Sahtì ekwǫ́ herds. That is that the Sahtì ekwǫ́ herd is more dependent on diga removal for recovery due to its lower adult survival rate.

By projecting trends in herd size, the model scenarios also allow a comparison of the sensitivity of the diga removal effectiveness to model assumptions. Of particular interest is the potential impact on the results if diga predation rates are not as high as assumed. If, for example, diga were only responsible for 25%, not 60%, of total calf mortality, then diga removal would be 24% less effective. If diga predation causes only 25% of the calf deaths, and 30% of adult deaths, the 60% and 80% diga removal levels would be 38% and 51% less effective, respectively. The scenarios that project reduced effectiveness of the diga removals when predation rates are lower may be of particular significance given the documented declines in diga abundance.

---

201 Ibid.
Recommendation #15-2020 (Dìga): Mortality Study

The WRRB recommends that GNWT and TG undertake field studies and modelling to determine causes of death of collared ɂekwǫ̀ so that the assumption that 60% of mortality is caused by dìga predation can be tested, and to estimate the influence of other factors in mortality in the 2020/2021 harvest season.

7.7.6 Adaptive Co-Management

7.7.6.1. Introduction

Adaptive management is simply a process which uses monitoring results to inform ongoing management decisions as well as to determine the effectiveness of management actions. Clear thresholds must be identified in an adaptive management framework to generate specific management implementation decisions that could lead to timelier implementation of management and monitoring actions.

The Barren-ground Caribou Technical Working Group has been working collaboratively to develop an Adaptive Co-Management Framework for Kọk’ęeti and Sahtì ekwǫ̀ herds.202 These efforts resulted from recommendations made by the WRRB during their 2019 Kọk’ęeti and Sahtì ekwǫ̀ proceedings. The intent of this Adaptive Co-Management Framework is to utilize the monitoring work that is already taking place to make decisions about the implementation of management actions throughout the year. The concept of an adaptive co-management framework includes thresholds for monitoring indicators that trigger an evaluation of existing management actions and could lead to changes in their implementation. A key component to the success of the Adaptive Co-Management Framework will be the timely reporting of monitoring results.

Adaptive management is an efficient mechanism to respond to uncertainty in the implementation of management actions. Uncertainty can be from low precision or inaccurate measurements, environmental variability such as unexpected weather, or incomplete knowledge about the biological systems.

7.7.6.2. Proponents Evidence

The Revised Joint Proposal lists adaptive co-management as an underlying premise for the project. It is stated that an annual evaluation will occur and then, at the end of the five-year implementation phase, GNWT and TG will undertake a comprehensive review.

---

of the diga management program with the WRRB and other Indigenous governments and organizations.

### 7.7.6.3. Other Parties and Public Evidence

The NSMA\(^{203}\) states the need for effective communication with collaborators to ensure diga are not over harvested. They write that consistent communication between the GNWT and Government of Nunavut should occur, with sharing of aerial removal results as well as ground-based harvest information.

In their final written comments, NSMA noted that many NSMA harvesters have been observing diga population declines, but since diga have not recently been well monitored, the lower population is not reflected in the Revised Joint Proposal’s diga removal targets.\(^{204}\) The NSMA further stated that they understand that adaptive management is planned to be used to set diga removal targets each year, but that they have concerns that the short project timeline does not allow for proper adaptive management.\(^{205}\)

LKDFN stated that other factors than diga may be more important to the Òekwọ decline, such as linear disturbance\(^{206}\), and that the GNWT’s proposed Slave Geological Province Road Corridor Project would have substantially more impact to the Òekwọ than this “last ditch” effort.\(^{207}\)

The Délį̨ne Renewable Resources Council\(^{208}\) additionally requested information on where the diga kills will be occurring and what impact they will have on diga near Délį̨ne and within the Sahtú region as a whole.

### 7.7.6.4. Analysis and Recommendations

The WRRB believes that a detailed approach to adaptive management is the key to resolving many of the uncertainties identified in the Revised Joint Proposal. Although the Revised Joint Proposal does list adaptive management as an action, it lacks details. The missing details include benchmarks for indicators such as CPUE, adult and calf Òekwọ survival, and overlapping Òekwọ winter distribution. The Revised Joint Proposal also does not describe how diga removals will be incorporated into the adaptive co-management framework already being developed for K Łį́k’èeti and Sahtí ekwọ herds.

---


\(^{207}\) Ibid.

\(^{208}\) PR (Wolf 2020): 122 - Public Comment from Délį̨ne Renewable Resources Council to the WRRB.
Dìga removal is a treatment being applied to the ᐱbufio herds and, as such, a means to evaluate the success or failure of dìga removals is required. The weaknesses in the current objectives mean that the question of at what point benchmarks would modify the aerial removal program, the ground-based harvesting, and the incentives be halted or intensified due to changing biological indicators in either dìga or ᐱbufio is left until the five-year review. The Board believes that comprehensive and collaborative annual reviews are more prudent than waiting for a five-year review that may be too late if the risks of removing too few or too many dìga are not anticipated and mitigated.

The WRRB emphasises that it is essential to avoid reporting delays. For example, the delay in providing the updated adult survival rates is detrimental. While the WRRB is recommending that the Barren-ground Caribou Technical Working Group consider results of monitoring vital rates throughout the year, the WRRB is also suggesting that individual rates such as adult and calf survival rates are reported as summer and winter rates.

**Recommendation #16-2020 (Dìga): Adaptive Co-Management**

The WRRB recommends that GNWT and TG, in collaboration with the WRRB through the Barren-ground Caribou Technical Working Group, establish benchmarks for key vital rates and integrate them into the Adaptive Co-Management Framework to identify at which point dìga removals would stop by March 31, 2020.

**Recommendation #17-2020 (Dìga): Adaptive Co-Management**

The WRRB recommends that any key vital rates of dìga and ᐱ bufio and Sahtì ᐱ bufio collected by GNWT and TG be reported to the Barren-ground Caribou Technical Working Group throughout the year, in alignment with the Adaptive Co-Management Framework, to contribute to the implementation of the adaptive management framework.

The Revised Joint Proposal does not outline how the annual evaluation for the Dìga Management Program will be undertaken, who will be involved, or how information will be shared. The Board is concerned that conditions could change significantly. The annual review should be sufficiently comprehensive that changes to the dìga removal program, even to the extent of a pause, are possible without having to wait until the five-year review.

The Wolf Technical Feasibility Assessment states that monitoring is essential to determine whether dìga management has been effective in halting the decline and beginning the recovery of ɂekwǫ̀. Three key questions were identified by the Dìga Feasibility Working Group:

1) Were actions conducted in a verifiable manner that achieved the humaneness objectives?
2) Were numerical targets for dìga removal met?
3) Were proposed changes in the ɂekwǫ̀ herd’s demography achieved?

To address these questions the Dìga Feasibility Working Group compiled a list of components that would need to be monitored for each dìga removal option discussed. For ground-based shooting on the winter range this includes information that should be recorded by harvesters and field support, and information that should be collected from a post-mortem necropsy.

Recommendation #18-2020 (Dìga): Adaptive Co-Management

The WRRB recommends that the annual review of the dìga management program be collaborative with TG, GNWT, and the WRRB and coincide with the November Barren-ground Caribou Technical Working Group Meeting, beginning in 2021.

Recommendation #19-2020 (Dìga): Adaptive Co-Management

The WRRB recommends that, in time for the 2021 annual review, GNWT and TG implement the recommendations in the Wolf Technical Feasibility Assessment: Options for Managing Dìga on the Range of the Bathurst Barren-ground Caribou Herd (2017) to develop the annual monitoring protocols for efficiency, effectiveness, and humaneness.

The WRRB is a central part of adaptive co-management as set out in the Tlíchọ Agreement, and co-management is key to the success of dìga management. Regular updates from GNWT and TG can help the WRRB in making timely, and informed management decisions.

---

211 Ibid.
212 Ibid.
The WRRB recommends that an annual report be prepared by GNWT and TG and presented to the Board at a scheduled board meeting to allow for the discussion of adjustments in methodology based on the evidence, beginning fall 2021.

**8.0. Conclusion**

The future of the Kǫk’èetì and Sahtì ekwǫ herds is uncertain. The WRRB is of the opinion that the need to implement effective management and monitoring actions is critical. In addition to harvest limitations and reducing disturbance to the ɂekwǫ herds and their habitat, additional management and monitoring actions that focus on reducing predation, specifically diga, are unfortunately necessary to support the recovery of the Kǫk’èetì and Sahtì ekwǫ herds.

The Board’s decisions in this report have been structured to provide the greatest benefit to ɂekwǫ at this time while recognizing that diga are an essential part of the ecosystem. Collaborative and adaptive management is essential to ensure a future for the Kǫk’èetì and Sahtì ekwǫ herds.
APPENDIX A    2020 Revised Joint Management Proposal
Wek’èezhìi Renewable Resource Board (WRRB)
Management Proposal

1. Applicant Information

<table>
<thead>
<tr>
<th>Project Title:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Contacts:</th>
</tr>
</thead>
</table>
| Michael Birlea  
Lands Protection and Renewable Resources Manager  
Department of Culture and Lands Protection  
Tłı̨chǫ Government  
Behchokǫ, NT. X0E 0Y0  
Phone: 867-392-6381 Ext: 1355  
Fax: 867-392-6406  
MichaelBirlea@Tı̨chǫ.com |
| Bruno Croft  
Regional Superintendent  
North Slave Region  
Department of Environment & Natural Resources (ENR)  
Government of the Northwest Territories (GNWT)  
2nd Floor, ENR Main Building  
P.O. Box 2668  
3803 Bretzlaff Drive  
Yellowknife, NT. X1A 2P9  
Phone: 867-767-9238 Ext: 53234  
Fax: 867-873-6260  
Bruno_Croft@gov.nt.ca |

2. Management Proposal Summary

<table>
<thead>
<tr>
<th>Start Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>January, 2021</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Projected End Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>July 1, 2024</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Length:</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 years</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Project Year:</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 of 5</td>
</tr>
</tbody>
</table>

The Government of the Northwest Territories (GNWT) and Tłı̨chǫ Government have prepared this joint management proposal for enhanced wolf (dìga) management actions to support recovery of the Bathurst and Bluenose-East barren-ground caribou (ekwǫ̀) herds. The proposal outlines a range of existing and enhanced wolf (dìga) management actions to support recovery of these herds, and builds upon lessons learned from the 2020 Wolf (Dìga) Management Pilot Program (Wolf (Dìga) Management Pilot Program Technical Report attached), Predator Management Recommendations from the Wek’èezhìi Renewable Resource Board (WRRB letter of February 6, 2019) and the response from the Tłı̨chǫ Government and GNWT (March 7, 2019).
There is an urgent need to continue enhanced actions put in place during the Wolf (Dìga) Management Pilot Program to increase caribou (ekwò) cow and calf survival rates of the Bathurst and Bluenose-East barren-ground caribou (ekwò) herds. Caribou harvest restrictions and wolf (diga) reduction are the two management actions most likely to influence the direct mortality of Bathurst caribou (ekwò), which has declined to a critical status, and the Bluenose-East herd, which is currently in the ‘red’ herd status as defined by the January 2020 Bluenose-East Action Plan (Advisory Committee for Cooperation on Wildlife Management 2020). Proposed actions to reduce the number of wolves on the winter ranges of the Bathurst and Bluenose-East herds, combined with ongoing caribou (ekwò) harvest restrictions, is predicted to improve caribou (ekwò) survival and promote population recovery for both herds. The 2019-2021 Bathurst and Bluenose-East ?ekwò (Barren-ground caribou) Herd proposals also identify additional management actions for habitat and land use, education and research and monitoring.

This proposal recommends that multiple approaches to reduce wolf (diga) predation on Bathurst and Bluenose-East caribou (ekwò) be undertaken in conjunction with annual monitoring for a minimum of 5 years (including the 2020 Wolf (Dìga) Management Pilot Program). If annual wolf (diga) removals are maintained at a meaningful level there is a reasonable likelihood of detecting a measurable effect on improved caribou (ekwò) survival rates within a 5-year time frame (Wolf Feasibility Assessment Technical Working Group (WFATWG), 2017). Recent caribou (ekwò) population modeling of various levels of wolf (diga) removal predicted caribou (ekwò) population stability over five years with a high level of removal initially followed by sustained removal to keep wolf numbers low (see attached Caribou Modeling Summary). The modeling also showed that with a sustained effort in maintaining low wolf numbers, a reduction in the rate of decline in a caribou population is achieved even when wolf abundance has been underestimated.¹

Wolf (diga) removal levels in the 2020 Wolf (Dìga) Management Pilot Program were 31 from the Bathurst winter range and 54 from the Bluenose-East winter range. The 60 to 80% target removal levels for these two herds were 29-39 on the Bathurst and 73-97 for Bluenose-East range based on caribou (ekwò) densities on the winter range, extrapolated herd population size and an Ungulate Biomass Index (see 2020 Wolf (Dìga) Management Pilot Program Technical Report). Based on these results, the Pilot Program was successful in reaching target removal levels on the Bathurst herd, and achieved removal of 45% of estimated wolves on the Bluenose-East caribou (ekwò) herd range. However, it is likely that the aerial program could have removed more wolves on the Bluenose-East range had the COVID-19 pandemic not delayed the program and impacted where the crew was based. Poor weather conditions also severely impacted the program as the crew was unable to fly on 20 of the 30 available days. Sustained removal effort will be required over the next 4 years to keep wolf (diga) predation rates as low as possible on these herds.

An evaluation of the Wolf (Dìga) Management Program will be undertaken each year to identify challenges, areas for improvement and to adapt procedures to any new information and understandings. At the end of the 5-year implementation phase, Tłįchǫ Government and the GNWT will conduct a comprehensive analysis of information collected, as well as a full program review with the WRRB and other Indigenous governments and organizations to:

- Assess the effectiveness of wolf (diga) reduction actions in achieving program goals and objectives;

¹ The modeling exercise did not consider environmental variability or other factors influencing caribou demography.
• Determine whether wolf (digā) reductions should continue based on the effectiveness of the Wolf (Digā) Management Program; and
• Implement improvements to the overall program, as required.

Attributing caribou (ekwō) population response to specific management actions will be complex, involving consideration of the interacting effects of harvest, predation and environmental conditions. Caribou (ekwō) population models will be used to help tease out the contribution of multiple factors affecting caribou (ekwō) population response including the effect of predator management.

This proposal includes 3 main approaches to wolf (digā) management:

1. Enhanced Support for Wolf (Digā) Harvesters and the Traditional Economy:
   • Continuation of Tłı̨chǫ Government’s Community-based Digā Harvest Training Program
   • GNWT workshops on wolf (digā) harvesting and pelt preparation
   • Continuation of Enhanced North Slave Wolf Harvest Incentive Program
     ○ Increased incentives are available to all NWT Resident and Indigenous harvesters
   • Participation of Tłı̨chǫ wolf (digā) harvesters
   • Participation of Nunavut wolf (digā) harvesters
   • Use of bait by hunters to support wolf (digā) removals

2. Aerial Wolf (Digā) Reduction Actions (if required):
   • Aerial shooting of wolves on Bathurst and Bluenose-East winter ranges

3. Monitoring, Research and Assessment:
   • Collecting information from wolf (digā) harvesters
   • Monitoring catch per unit effort
   • Estimating wolf (digā) removal levels on caribou (ekwō) winter range
   • Monitoring wolf (digā) condition, diet, health and humaneness of aerial removals
   • Monitoring wolf (digā) movements (collaring program under a separate proposal)
   • Monitoring changes in caribou (ekwō) herd demographic rates

This proposal builds on the lessons learned during the 2020 Wolf (Digā) Management Pilot Program which implemented new and enhanced management actions for wolf (digā) reduction, monitoring and assessment. These actions align with current and ongoing management and monitoring of the Bathurst and Bluenose-East herds and previous WRRB recommendations.

Please list all permits required to conduct proposal:
   a) NWT General Wildlife Permit will be issued to anyone wishing to use bait to harvest wolves and to permit aerial removals.

3. Background *(Provide information on the affected wildlife species and management issue)*

The Bathurst and Bluenose-East caribou (ekwō) herds have both declined significantly in recent years and the situation for both herds is dire. The decline of the Bathurst herd was first documented in 1996 when the population was estimated at 349,000 animals, down from 472,000 in 1986. Management actions to date have included harvest restrictions and wolf (digā)
harvest incentives starting in 2010; these actions have failed to halt the decline, and the herd was estimated at 8,200 animals in 2018.

The decline of the Bluenose-East herd was first documented in 2013 when it was estimated at 68,000 animals, down from 121,000 in 2010. In 2018, the herd’s population was estimated at 19,300 animals. Calving-ground photographic surveys, which take place in Nunavut, were scheduled in June 2020 for both these herds, but were postponed to 2021 due to restrictions put in place through Government of Nunavut Public Health Orders related to COVID-19.

Both traditional and scientific knowledge have shown that barren-ground caribou (ekwò) experience population cycles that can be between 30–60 years long. These cycles can be hard to predict and at times do not follow the same pattern. What drives these cycles in barren-ground caribou (ekwò) is not fully understood but likely include many factors such as harvest, habitat, predators, climate and disease. Previous low points in the cycle for the Bathurst herd occurred in the 1920s, and again during the period of 1950-1970 based on Tłı̨chǫ knowledge and spruce root scar frequency along key caribou movement corridors (Zalatan et al 2006).

The current population estimates for the Bathurst and Bluenose-East herds are the lowest estimates from survey results going back to the 1980s. To promote recovery of these two herds our goal is to reduce mortality rates of caribou (ekwò) and improve survival and encourage population growth. In 2016, the WRRB set a total allowable harvest (TAH) of zero for all users of the Bathurst herd within Wek’èezhìı which will continue until at least the 2020/21 harvest season. In 2016, a TAH of 750, bulls only, was established for all users of the Bluenose-East herd within Wek’èezhìı. In 2019, the WRRB determined that the TAH for Bluenose-East would be further reduced to 193 bulls. The Nunavut Wildlife Management Board is currently considering proposals from the Government of Nunavut to reduce harvest of Bathurst caribou (ekwò) in the Kitikmeot region, to zero from 30 and for the Bluenose-East to 107, bulls only, from 340.

This proposal presents a coordinated approach to wolf (díga) management actions aimed at reducing wolf (díga) predation on caribou (ekwò). Reducing wolf (díga) predation in combination with ongoing harvest management is anticipated to have a positive influence on survival rates of caribou (ekwò) in the Bathurst and Bluenose-East herds.

Previous joint management proposals for the Bathurst herd submitted by the Tłı̨chǫ Government and the GNWT resulted in the WRRB holding public hearings in 2010 and again in 2016. Public hearings were also held to address management proposals for the Bluenose-East herd in 2016 and 2019. During the 2016 and 2019 public hearings, through consultation conducted January 21-23, 2019, and more recent engagements (GNWT, GN and Indigenous leaders meeting, February 2020; Tłı̨chǫ community engagement February 2020) the WRRB, the GNWT and Tłı̨chǫ Government heard concern from community members that wolves are continuing to put pressure on barren-ground caribou (ekwò) populations.

The WRRB expressed at the public hearings for the Bluenose-East herd in April 2019 that the 20% rate of annual decline for the Bathurst and Bluenose-East herds is so serious that waiting any longer to implement predator management would make recovery of the herds even more difficult.

A preliminary summary of the 2020 Wolf (Díga) Management Pilot Program was provided to Indigenous governments and organizations on July 22, 2020 inviting feedback including any concerns (See attached Plain Language Summary). No responses were received by the time
A collaborative assessment of wolf (diga) management options for the Bathurst caribou (ekwô) range was conducted by the WRRB, GNWT and Tłįchǫ Government, and a final report entitled “Wolf Technical Feasibility Assessment: Options for Managing Wolves on the Range of the Bathurst Barren-ground Caribou Herd” was released in 2017 (WFATWG 2017). The assessment considered 11 options, including both lethal and non-lethal methods, their potential effectiveness, cost and humaneness. The feasibility assessment provided a basis for developing the current proposal for wolf (diga) management actions for the Bathurst and Bluenose-East herds which is comprised of a combination of three of the options presented: snaring, ground-based shooting and aerial shooting on the winter range. These options were selected as they allowed for a high level of involvement of harvesters and the traditional economy and focus on removal activities from the winter range within the NWT where Tłįchǫ Government and the GNWT have jurisdiction.

Wolves on the range of the Bathurst and Bluenose-East herds are migratory and their diet relies heavily on barren-ground caribou (ekwô). This is different than wolves in the boreal forest that are territorial and prey on multiple species in an area. It has been shown that wolves associated with barren-ground caribou (ekwô) herds can, on average, take 23 to 29 caribou (ekwô) per year (WFATWG 2017). This can vary seasonally and is likely influenced by factors such as pack size (Dale et al. 1994, Hayes and Russell 2000, Vucetich et al. 2004). As is the case in many jurisdictions, the GNWT does not have reliable estimates of wolf (diga) abundance across the NWT, or for populations of wolves associated with specific barren-ground caribou (ekwô) herds. The difficulty in obtaining estimates of wolf (diga) abundance arise from behavioural characteristics such as organization into packs resulting in clumped distributions, lack of territoriality and the tendency to be elusive resulting in reduced sightability from the air.

Monitoring of wolf (diga) abundance and denning activity on the Bathurst range indicated a significant decline in rates of wolf (diga) pup survival and den occupancy between 1996 and 2010 (D. Cluff pers. comm. 2019; Klaczek 2015). These lower rates are believed to be directly linked to the decline in Bathurst caribou (ekwô) numbers. Efforts to conduct more recent winter wolf (diga) abundance survey on the ranges of the Bluenose-East and Bathurst have been confounded by the fact that 3 caribou (ekwô) herds (Bathurst, Bluenose-East and Beverly) sometimes converge across a large, shared winter range.

Unlike wolves that live in the boreal forest, which defend permanent territories and prey upon multiple resident species such as moose and woodland caribou (ekwô), migratory tundra wolves associate with barren-ground caribou (ekwô) on their winter ranges and move northwards with spring migratory movements of caribou (ekwô), ultimately denning south of the caribou (ekwô) calving grounds (Heard and Williams 1992, Musiani et al. 2007, Hansen et al 2013). However, it is not well known how closely the tundra wolves (diga) seasonal movements are affiliated with specific barren-ground caribou (ekwô) herds on an annual basis, and whether the association between tundra wolves (diga) and caribou (ekwô) herds may establish a basis for defining wolf (diga) populations for management purposes.

Early research by Kennedy et al. (1991) assessed genetic variability of wolves sampled across ranges of barren-ground caribou (ekwô) in the Mackenzie delta, tundra range of the Bluenose herd (as it was known through the 1980s and 1990s), forested ranges in the Sahtu Region associated with woodland caribou and the Bluenose herd, and the area of the Richardson Mountains associated with the Porcupine caribou herd. This work found that wolves across
these different caribou ranges were generally similar suggesting a large panmictic population. This understanding was supported by field observations of extensive movements of wolves (dìga) throughout the study area, with many changes in pack structure and formation attributed to disruptions from hunting and trapping, with packs splitting and moving to new areas. Some males associated with two or three different packs and reproduction by more than one adult female per pack were observed (Clarkson and Liepins 1989a, 1989b). More recent research suggests that prey specialization may be a primary determinant of wolf (dìga) population structure (Carmichael et al. 2001), and that there are clear patterns of genetic differentiation between migratory wolves that rely on barren-ground caribou (ekwǫ̀) in the taiga and tundra biomes, and non-migratory, territorial wolves that live in the boreal forest (Carmichael et al 2007, Musiania et al. 2007).

While research has shown that the abundance and productivity of wolves on the range of the Bathurst herd has declined since 2000 (D. Cluff pers. comm. 2019; Klaczek 2015), the relative abundance of wolves today may still be having a significant impact on both the Bathurst and Bluenose-east caribou (ekwǫ̀) herds, and inhibiting population recovery.

The overall goal of the proposed wolf (dìga) management program is to reduce wolf (dìga) numbers sufficiently to enable an increase in survival rates of both calf and adult caribou (ekwǫ̀) promoting stabilization and recovery of these herds. The proposal is based on the following assumptions and caveats:

- Wolves are the primary predator of barren-ground caribou (ekwǫ̀), and on average can take 23-29 caribou (ekwǫ̀) per year;
- Wolf (dìga) management occurs within a broader social-ecological system where people are important harvesters of barren-ground caribou (ekwǫ̀) and wolves;
- Caribou (Ekwǫ̀) are a cultural keystone species that are an important foundation to culture, language and way of life to Tłįchǫ and other Indigenous peoples;
- There is some uncertainty in our knowledge of the caribou (ekwǫ̀)-wolf (dìga)-human system because of the complex dynamics and interactions of barren-ground caribou (ekwǫ̀), wolves, people, land and environmental conditions;
- Wolf (dìga) reductions on the Bathurst and Bluenose-East winter ranges should be carried out through a combination of coordinated management actions to help increase caribou (ekwǫ̀) survival and support herd recovery, including support for wolf (dìga) harvesters and the traditional economy; and
- The adaptive co-management approach recognizes uncertainty including the likely effectiveness of wolf (dìga) reduction actions, and emphasizes the importance of monitoring to enhance learning, revising approaches as our understanding improves and making decisions in a co-management context.

Since 2010, to encourage increased harvest of wolves (dìga) to facilitate recovery of caribou (ekwǫ̀), ENR’s North Slave Region has administered a region-wide harvest incentive program (Cluff 2019, unpublished report, ENR, 05 Sep. 2019). The incentive was originally set at $100/carcass (skinned) for any wolf (dìga) harvested within the North Slave Region. The incentive was increased to $1200/wolf (dìga) for the 2019/20 harvest season with an additional $400 advance for the pelt and $350 prime fur bonus for those of taxidermy quality. Further, the tag fee for all licence holders was eliminated in 2019/20.

In winter 2019/2020, wolf (dìga) harvesting within the North Slave Region occurred mostly outside of the North Slave Wolf Harvest Incentive Area. Of a total of 68 wolves harvested by NWT harvesters only 18 were within the North Slave Wolf Harvest Incentive Area. In addition,
Nunavut harvesters took 57 wolves in the Inuit traditional harvesting area within the NWT with 35 harvested within the North Slave Wolf Harvest Incentive Area (Cluff 2020).

The North Slave Wolf Harvest Incentive Area is defined on an annual basis based on Bluenose-East and Bathurst caribou (ekwǫ) collar locations (methods described in Caslys Consulting Ltd. 2016). In 2018/2019, a high degree of herd overlap led to defining a large North Slave Wolf Harvest Incentive Area. In 2019/2020, these two herds exhibited less overlap than in recent years, and the North Slave Wolf Harvest Incentive Area was adjusted as a result (Figure 1). Caribou (ekwǫ) herd mixing is an obstacle to estimating abundance of wolves associated with a specific caribou (ekwǫ) herd and poses a significant challenge when attempting to target harvest pressure on wolves associated with the Bathurst and Bluenose-East caribou (ekwǫ) herds. Given the June 2018 estimate of the Beverly herd (103,372 ± 5109 SE caribou (ekwǫ), Campbell et al. 2019), wolves associated with that herd will likely also travel into the North Slave Region significantly increasing wolf (dìga) numbers and predation pressure in the area over the winter.

It has been shown that removing up to 30% of the wolves in a population will have no numerical impact on wolf populations, within a year numbers will be back to pre-removal levels because of their high reproductive potential (large litters and a potential for more than one litter per pack) and their ability to disperse from far away (immigrating into areas of recent removals). These characteristics also allow wolf (dìga) populations to quickly rebound once management actions are no longer applied.

![Map of Wolf Harvest Incentive Area 2019 North Slave Region, NWT](image)

**Figure 1**: Enhanced North Slave Wolf Harvest Incentive Area in a) 2018/19 and b) 2019/20.

The purpose of the proposed wolf (dìga) management actions is to reduce wolf (dìga) numbers sufficiently for caribou (ekwǫ) survival rates to increase and facilitate population growth; it is not to eliminate wolves (dìga). Our understanding of wolf (dìga) ecology is that the risk of population extirpation is exceedingly low, because juvenile wolves (dìga) can immigrate from hundreds to thousands of kilometers away particularly with a larger caribou (ekwǫ) herd such as the Beverly herd and its associated wolves overlapping or wintering near the Bathurst and Bluenose-East herds.
4. Description of Proposed Management Action

**GOAL OF MANAGEMENT ACTIONS**

The goal of the proposed management actions is to sufficiently reduce wolf (dìga) predation on the Bathurst and Bluenose-East herds to allow for an increase in calf and adult caribou (ekwǫ̀) survival rates to contribute to the stabilization and recovery of both herds. Recent modelling which updated the work in the Wolf Technical Feasibility Assessment, suggests that with aggressive wolf (dìga) removal efforts (all else being equal) caribou (ekwǫ̀) herd size could potentially stabilize to extrapolated 2020 levels over the five year program (see attached Caribou Modeling Summary). The proposed actions will be adaptively managed to improve the program throughout its implementation.

The objectives of the program are:

1. Increase annual ground-based harvest of wolves (ekwǫ̀) on the winter range of the Bathurst and Bluenose-East caribou (ekwǫ̀) herds by increasing participation of harvesters in the traditional economy related to wolf (dìga) harvest and hide preparation.
2. Ensure sustained removal of wolves (dìga), using aerial removals if required, on the winter ranges of the Bathurst and Bluenose-East caribou (ekwǫ̀) herds to achieve a level necessary to maintain low wolf (dìga) densities and elicit a response in caribou (ekwǫ̀) population.

The following section outlines the proposed management actions to achieve the goal and objectives of this joint proposal with a summary describing the rationale for each.

**1: Enhanced Support for Wolf (Dìga) Harvesters and the Traditional Economy**

**Action 1.1: Tłı̨chǫ Government Wolf (Dìga) Harvester Training**

The Tłı̨chǫ Government proposes to take a similar approach to its Community-based Dìgà Harvest Training Program as it did during the 2019/20 season which consisted of three phases:

1. community consultation meetings with Tłı̨chǫ harvesters and elders to ensure the program follows and respects Tłı̨chǫ protocols of harvesting dìgà and plan logistics for the harvesting camps;
2. conducting a training workshop for local Tłı̨chǫ harvesters; and
3. establishing harvester camps to further support training and dìgà harvesting by Tłı̨chǫ on a rotational basis.

Community engagement meetings will be held as needed to review and seek guidance on improvements and revisions to the program (see 2020 Wolf (Dìga) Management Pilot Program Technical Report for more detail).

**Action 1.2: GNWT Wolf (Dìga) Harvester Training**

The GNWT will continue to provide trapper training workshops to support the traditional economy. Wolf (dìga) harvester training workshops will be hosted each fall to provide hunters and trappers in the North Slave Region with training opportunities to increase harvest success and enhance skinning skills specifically for wolves (dìga). In the 2019/2020 harvest season ENR hosted a wolf (dìga) harvester training workshop with Yellowknives Dene First Nation
(YKDFN) in December 2019 and supported Tłı̨chǫ Government in hosting a workshop in Wekweètì in January 2020. Based on feedback from the 2020 Wolf (Diga) Management Pilot Program, more effort is needed to direct harvesters to areas of high expected wolf (diga) abundance when caribou (ekwô) are located away from winter road corridors. Additional work is also needed to encourage and support higher rates of reporting for harvest effort and success by wolf (diga) hunters.

In support of the goals of the Enhanced North Slave Wolf Harvest Incentive Program, the focus of training workshops is to:

- Draw on the skills, expertise and techniques used by experienced and successful wolf (diga) harvesters;
- Offer training on the use of snares;
- Improve skinning techniques to maximize pelt value for harvesters;
- Teach best practices for humane hunting and trapping of wolves (diga);
- Discuss opportunities for obtaining information on areas of high wolf (diga) abundance based on current caribou locations;
- Provide training on how to fill out questionnaires, focusing on how to collect “catch per unit effort” information and importance of completing the questionnaires; and
- Review the wolf (diga) carcass sampling program and the biological data being collected and explain how it is used.

Workshop trainers will include representatives from the Fur Harvesters Auction, experienced northern wolf (diga) harvesters, experienced southern wolf (diga) trapper(s) and GNWT staff to discuss the Enhanced North Slave Wolf Harvest Incentive Program. As was done during the December 2019 training workshop with the YKDFN, the GNWT may also invite experienced Inuit harvesters to share their wolf (diga) harvesting techniques and experiences on the central barrens.

The GNWT will promote best practices to ensure the humane hunting and trapping of wolves (diga), as addressed in the “Wolf Technical Feasibility Assessment: Options for Managing Wolves on the Range of the Bathurst Barren-ground Caribou Herd”.

**Action 1.3: Continuation of Enhanced North Slave Wolf Harvest Incentive Program**

In 2010, the GNWT implemented a wolf (diga) harvest incentive program for wolf (diga) harvesters across the NWT. Harvest incentives have subsequently been increased in portions of the North Slave Region (North Slave Wolf Harvest Incentive Area) to encourage harvest of wolves associated with Bathurst and Bluenose-East caribou (ekwô). In addition, tag fees are no longer required (effective July 1, 2019) by licensed hunters. Wolf (diga) harvest over this time period has been variable, generally increasing with the increased incentives. However, the rate of harvest is also strongly influenced by the location of the caribou (ekwô) and their accessibility. In 2020, for example, harvest did not reach 2019 levels because wolves were more difficult to access due to the distribution of caribou (ekwô) which was further from the winter road.

The GNWT is proposing to continue the Enhanced North Slave Wolf Harvest Incentive Program for the next 4 years. A summary of the current price structure for wolf (diga) harvesting can be found in Figure 2.
**Figure 2:** 2019/2020 GNWT incentives, effective for wolf (diga) harvesters in the North Slave Wolf Harvest Incentive Area on the winter range of Bathurst and Bluenose-East caribou (ekwǫ̀).

**Action 1.4: Participation of Tłı̨chǫ Wolf (Dìga) Harvesters**

The Tłı̨chǫ Government, with support from the GNWT, will set up wolf (diga) harvest camps where Tłı̨chǫ harvesters can continue to improve on harvest, skinning and navigation skills and be safely away from communities where there might be cultural sensitivities. Based on outcomes from the 2020 Wolf (Dìga) Management Pilot Program, next winter two base camps will be set up where there are high densities of caribou (ekwǫ̀) and wolves. Rotations are recommended to be at least three weeks long, and preparatory work will be undertaken so that harvester time and effort while at the camp is most efficient. The 2020 Wolf (Dìga) Management Pilot Program Technical Report provides further detail on the harvest camps.

**Action 1.5: Participation of Nunavut Wolf (Dìga) Harvesters**

Beneficiaries of the Nunavut Final Agreement have overlapping harvesting rights in parts of the NWT (Figure 1b). The GNWT is coordinating with the Government of Nunavut (GN) in supporting harvesters from Nunavut to exercise their rights in the NWT by harvesting wolves on the winter ranges of the Bathurst and Bluenose-East caribou (ekwǫ̀) herds. When that harvest is within the GNWT’s Enhanced North Slave Wolf Harvest Incentive Program Nunavut wolf (diga) harvesters receive a payment of $900 from GNWT and $300 from GN. In 2020 Nunavut harvesters took 57 wolves in the NWT within their traditional use area.
**Action 1.6: Use of Baiting to Support Wolf (Dìga) Removals**

Harvesters can obtain a General Wildlife Permit from the GNWT to use bait to harvest wolves within the North Slave Wolf Harvest Incentive Area. This approach gives permit holders the ability to enhance their wolf (diga) removal success, while allowing the GNWT to regulate this activity and promote public safety. Baiting will also be used to support aerial removal efforts, if required.

Permits will be issued, under specific terms and conditions, to allow individuals to use approved forms of bait at known locations, directed by the GNWT. These locations will be kept a minimum distance from roads for public safety reasons and may occur across the North Slave Wolf Harvest Incentive Area to extend coverage across caribou (ekwǫ̀) winter range. Approving the location of baiting sites enables the GNWT to monitor and ensure permit holders are complying with their permit and all listed conditions.

The GNWT recognizes that while the use of bait will likely improve wolf (diga) hunting success within the North Slave Wolf Harvest Incentive Area, it needs to be carried out responsibly so that public safety is not compromised.

The Tłı̨chǫ Government was approved to use baits in association with their wolf (diga) harvest camps during the 2020 Wolf (Dìga) Management Pilot Program (see attached Technical Report).

**Action 2: Aerial Wolf (Dìga) Reduction Actions**

**Action 2.1: Aerial Shooting of Wolves on Bathurst/Bluenose-East Winter Range**

While our focus is on supporting harvesters to achieve the wolf removal levels necessary to support caribou recovery, aerial removal will be considered at the end of March if wolf removal targets cannot be met by harvesters alone. By waiting until later in the season, we give our harvesters the best chance to make an impact on wolf populations.

A successful wolf (diga) management program, according to the feasibility assessment (WFATAW 2017), must meet the following conditions:
- Define initial target wolf (diga) removal levels and track over time;
- Support and allocate effort for wolf (diga) removal; and
- Assess the effects of wolf (diga) removal levels on caribou (ekwǫ̀) and wolves.

Other jurisdictions such as Alaska, British Columbia, Alberta and Yukon have demonstrated the effectiveness of aerial shooting of wolves (WFATWG 2017; McLaren 2016; Russell 2010). Recent efforts to remove a targeted number of wolves in northern BC have successfully resulted in reductions to boreal caribou (ekwǫ̀) mortality, increased calf recruitment and increased herd size (Bridger 2019). In addition, a review of wolf management programs implemented elsewhere has shown that improvement in caribou (ekwǫ̀) survival rates is associated with wolf (diga) removal efforts of approximately 60-80% initially and then sustained removals for the duration of the management program to maintain low wolf (diga) density (WFATWG 2017).

If at the end of March, harvesters have not met removal targets, aerial removal efforts will be undertaken in a manner that avoids interference with ground-based harvesting activities, which occur primarily along the winter road system and near communities (Figure 3). Aerial removal
will focus on areas away from roads and harvesting locations reported in previous years, and will be done to minimize temporal and spatial overlap with ground-based harvesters.

**Figure 3:** Distribution of North Slave wolf (diga) harvest in 2020; primarily along the winter road and near communities.

Aerial removal of wolves each season will be undertaken in the manner described below.

1. Setting targets and applying them to aerial wolf (diga) removal activities:
   a. Targets were established in 2020 (year one of the program) using wolf (diga) abundance estimates based on caribou (ekwǫ̀) density, extrapolated herd size and Ungulate Biomass Index. Wolf (diga) abundance associated with the Bathurst caribou (ekwǫ̀) herd on its winter range was estimated at 49 wolves, and 121 wolves on the Bluenose-East herd’s winter range. The targets were set as a range representing 60-80% of the estimate (29-39 on the Bathurst and 73-97 for Bluenose-East range). Because wolf populations will not be impacted by removal rates of 30% or less, and we expect in-migration of wolves to be high with overlapping or nearby winter ranges of adjacent caribou (ekwǫ̀) herds, removal efforts will need to remain high. The targets will be assessed on an annual basis and adjusted as necessary.
   b. If there is overlap of the Bluenose-East and Bathurst winter ranges (December through February) the targets will be combined and applied across the combined winter ranges of the two herds such that removal effort can be allocated to areas of highest wolf (diga) density.
c. In circumstances when the winter range of the Beverly herd overlaps with that of the Bathurst and/or Bluenose-East\(^\text{ii}\), wolf (diga) removal targets will be assessed based on the amount of overlap of the Beverly herd, and the estimated number of wolves associated with the Beverly.

2. Support and effort will be allocated in the following manner:
   a. If ground harvest in a particular year does not meet the removal targets by March 15\(^\text{th}\) aerial removals will be initiated and operate in areas to minimize potential conflict with harvesters.
   b. Aerial removals will be continued until the target is met or until the operation period has ended.
   c. Support aircraft may be used to increase search effort and to direct aerial removal crews to wolf (diga) packs. Wolf (diga) collar locations will be used to locate removal crews in the general vicinity of wolves. Every effort will be made to avoid the removal of the collared wolf (diga) or its pack mates.
   d. Aerial removal crews will attempt to remove all un-collared wolves encountered, removing entire packs, where possible to reduce the possibility of splitting wolf (diga) packs, which may result in dispersal and/or establishment of additional packs.
   e. Every effort will be made to recover wolf (diga) carcasses and transport them for subsequent skinning and necropsy (discussed below in the Monitoring, Research and Assessment section).
   f. Continue aerial removal efforts each winter for at least 4 more years, if required.

3. Assessing the effects on caribou (ekwǫ̀) and wolves (discussed more fully in Monitoring, Research and Assessment section).
   a. Depending on environmental conditions, availability of aircraft and other resources, wolf track survey methods (Stephenson 1978, Becker et al. 1998, Gardner and Pamperin 2014) will be used to monitor wolves within the aerial removal areas.
   b. Wolf (diga) estimates or minimum counts, and removal efforts will be tracked, assessed and evaluated on an annual basis following the harvest season to determine operational efficiencies and corresponding areas for improvement.
   c. Correlations between wolf (diga) removals and caribou (ekwǫ̀) demographic rates will be undertaken after the five year completion of the program as there is an expected lag time between initiation of wolf (diga) removals and caribou (ekwǫ̀) population response. Population surveys for Bathurst and Bluenose-East are scheduled to be conducted in June 2021, 2023 and 2025. Calf:cow ratios will be obtained three times a year: in fall, late winter and summer.

3: Monitoring, Research and Assessment

Action 3.1: Collecting Information from North Slave, Tłı̨chǫ and Nunavut Wolf (Dìga) Harvester

Similar to the 2020 Wolf (Dìga) Management Pilot Program, a harvester questionnaire will be required to be filled out and submitted by all wolf (diga) harvesters in the North Slave Wolf

\(^{\text{ii}}\) The caribou winter range analysis described in section 5.2 of the 2020 Wolf Management Pilot Program Technical Report shows the Beverly herd overlapped with the Bathurst in all four of the previous years and with Bluenose-East and Bathurst in two of the previous four years.
Harvest Incentive Area to collect information on abundance, location, effort and harvest of wolves. Check stations along the winter road will be used to encourage harvesters to briefly stop to answer a series of questions on wolf (diga) observations and harvesting, and provide feedback on the effectiveness of management actions. Successful harvesters will be asked these same questions when submitting their wolf (diga) carcasses (if not reported previously) to ensure the maximum number of harvesters participate. To encourage participation in the survey, the GNWT will provide participating harvesters with a $25 gift card.

The questionnaires will be undertaken not only by wolf (diga) harvesters that successfully harvest wolves, but also by harvesters who spend time (effort) searching for wolves but are unsuccessful at harvesting. The GNWT updated the Enhanced North Slave Wolf Harvest Incentive Program questionnaire for use in the 2020 Wolf (Dìga) Management Pilot Program to help evaluate the relative abundance of wolves. Similarly, Tìchǫ harvesters will be asked a series of questions based on their activities at the Tìchǫ harvest camps to gather similar information (questionnaires for NWT and Nunavut harvesters and Tìchǫ harvest camp participants are provided in the 2020 Wolf (Dìga) Management Pilot Program Technical Report).

**Action 3.2: Monitoring Catch Per Unit Effort**

To assess the effectiveness of the Wolf (Dìga) Management Program, the GNWT will monitor “catch per unit effort” (CPUE) which is an indirect measure of the relative abundance of a target species (Rist et al. 2010). This will involve recording the actual number of hours or days spent harvesting (effort), distance travelled (km) and the number of wolves (singles, packs) observed during their trip.

Over the winter, and over several years of documenting catch per unit effort (CPUE) of harvesters and aerial crews, trends should emerge with fewer wolves being observed and harvested per hour of effort or distance travelled. As management efforts begin to reduce wolf (diga) numbers, more time and effort will be required to harvest a declining number of wolves. CPUE will be a key monitoring indicator to help assess whether removals are sufficient to keep wolves at low numbers.

For ground-based harvest, CPUE will be calculated for each harvester and trip based on the number of wolves harvested/sighted per hours travelled (regardless of whether a wolf (diga) was harvested) taken from the harvester questionnaires. CPUE will then be averaged across harvesters daily, weekly, monthly or by season as appropriate.

Search effort will also be calculated for all aerial surveys, collaring and removal efforts by relating the number of wolves observed per hour flown within the caribou herd (ekwǫ̀) winter ranges summarized daily, weekly, monthly or by season as appropriate. As the number of wolves removed increases and wolf (diga) density declines, it will take more effort and longer distances for harvesters to observe wolves.

CPUE will likely be influenced by overlapping winter distributions of two or more caribou (ekwǫ̀) herds as wolf (diga) densities would be expected to increase under that scenario. As a result, CPUE will need to be interpreted with caution and with reference to caribou (ekwǫ̀) and wolf (diga) collar distribution maps.

The 2020 Wolf (Dìga) Management Pilot Program identified challenges in sufficiently completing the questionnaires, and in receiving and collating information from harvester questionnaires and aerial removal crews in a timely fashion. Questionnaires will be reviewed and updated prior to
the 2020-21 harvest season and procedures for collection and collation of information improved to address the challenges identified.

**Action 3.3: Estimating Wolf (Dìga) Removal Levels on Caribou (Ekwò) Winter Ranges**

Wolf (diga) removal levels are both a key performance indicator for assessing efficacy of harvester training, incentives and harvest camps, efficiency of search and removal techniques, and a key input parameter for evaluating effectiveness of wolf (diga) removal actions on caribou (ekwò) populations.

Using caribou (ekwò) collar distribution patterns for the past 4 years, the GNWT has conducted geospatial analyses to better understand how the Bathurst, Bluenose-East and Beverly herds have used the landscape and the annual variation in their range use (see 2020 Wolf (Dìga) Management Pilot Program Technical Report). Overwintering caribou (ekwò) ranges can be discrete in some years, and have various degrees of overlap in other years. The geospatial analysis shows that the Beverly herd overlapped with the Bathurst in all four of the previous years (excluding 2019/2020) and with Bluenose-East and Bathurst in two of the previous four years.

Assigning wolves to caribou (ekwò) herds is relatively straightforward when there is little to no spatial overlap among caribou (ekwò) winter ranges. Assignment becomes increasingly uncertain when there is high spatial overlap and a large discrepancy between herd sizes. Considering the geospatial analyses and the most recent caribou (ekwò) collaring data, the GNWT has developed a rationale for allocating wolf (dìga) removal effort and assigning herd identity to target wolves for the 2020 Wolf (Dìga) Management Pilot Program that will be used in future years of the program. The rationale will be revisited on an annual basis considering new information from wolf (dìga) collars, caribou (ekwò) distribution and harvester questionnaires in preparation for each winter harvest period to inform and focus management action on the Bathurst and Bluenose-East herds.

The initial logical framework to assign a wolf (dìga) to a particular caribou (ekwò) herd’s winter range is based on the recorded locations and dates of wolf (dìga) kills relative to the monthly spatial probability (or utilization distribution) maps generated from home range analyses of caribou (ekwò) collar data from the Bathurst, Bluenose-East and Beverly herds. Herd affiliation of a wolf (dìga) harvest or removal will be based on which monthly herd distribution the removal location overlaps with and if it overlaps with more than one caribou (ekwò) herd distribution it will be assigned to the herd with the highest overlapping density class (see 2020 Wolf (Dìga) Management Pilot Program Technical Report).

This framework provides an initial approach for assigning wolf (dìga) removal levels to caribou (ekwò) herd winter ranges but will be revisited as new information from wolf (dìga) collars and other sources becomes available. It is important to note that there is uncertainty in whether an assignment of a wolf (dìga) removal based on kill date and location relative to the concurrent distribution of collared caribou (ekwò) is robust and biologically accurate. Movement patterns of collared wolves will provide empirical data to assess this means of assigning wolf (dìga) removals to a caribou (ekwò) herd.

**Action 3.4: Monitoring Wolf (Dìga) Condition, Diet and Welfare Outcomes**

Consistent with the 2020 Wolf (Dìga) Management Pilot Program, GNWT staff will necropsy, collect biological information and samples, and conduct laboratory analysis of wolves taken under this program. The information collected from the wolves will include:
• Sex;
• Age class;
• Health;
• Condition; and
• Diet.

Efforts will be made to necropsy the majority of wolves taken by both ground and aerial removals. In more remote areas, it may be challenging for harvesters to haul numerous wolf (dîga) carcasses (heavy loads) over long distances. ENR will facilitate the collection of as many wolf (dîga) carcasses as logistically possible; to maximize the collection of biological data since partitioning carcasses by herd affiliation, age and sex class will reduce sample sizes. It is anticipated that at the very least, most skulls will be processed to obtain a breakdown of the sex and age class structure of the harvest.

ENR will examine a subsample of wolves taken by ground shooting, trapping and aerial shooting to assess the animal welfare outcomes (see Hampton et al 2020) of each harvest approach being used. Based on these ongoing assessments, ENR is prepared to increase harvester training as well as training for aerial removal crews should evidence arise that wolves are not being killed quickly and humanely.

To aid in the assessment of animal welfare outcomes the aerial removal crews are required to record information in the field for each removal including:

• Pursuit time
• Pack size
• Number of shots fired
• Estimated time to death
• Documentation of other wildlife present/observed nearby
• Body condition

Details on the necropsies from the 2020 Wolf (Dìga) Management Pilot Program are presented in the attached Technical Report.

**Action 3.5: Monitoring Wolf (Dìga) Movements**

The GNWT has applied for an amendment to an existing five year Wildlife Research Permit to continue to deploy and maintain up to 30 satellite collars on wolves (generally 10 each on Bathurst, Bluenose-East and Beverly caribou (ekwô) herds) to support the wolf (dîga) monitoring and management actions being proposed. Collared wolves will assist in our understanding of wolves associated with the Bathurst, Bluenose-East and Beverly caribou (ekwô) herds, and their movements within and among these herds both seasonally and annually.

The objectives of the wolf (dîga) collaring program are to:

1. Determine how wolves travel among caribou (ekwô) on their winter ranges.
2. Determine broader wolf (dîga) movement patterns across caribou (ekwô) ranges on an annual and multi-year basis.
3. Determine fidelity of wolves to den sites and caribou (ekwô) herd ranges.
4. Assist in the evaluation of wolf (diga) management actions in the NWT.

While, the primary purpose of the collaring program is for the above stated research and monitoring objectives, secondarily the location information will be used to direct wolf (diga) harvest effort/camp locations and overall aerial removal efforts. Every effort will be made to avoid the removal of collared wolves and their pack mates.

**Action 3.6: Monitoring Barren-ground Caribou (Ekwô) Herd Demographic Data for Improvement**

Multiple factors (i.e. environmental, disturbance, predation) are believed to be influencing the health and status of the Bathurst and Bluenose-East caribou (ekwô) herds. It is anticipated that reduction in wolf (diga) numbers should allow for an increase in caribou (ekwô) cow and calf survival rates, which in turn will contribute to caribou (ekwô) recovery. Monitoring will be done to test and assess the relative effect of wolf (diga) removal levels on herd-specific monitoring data, including adult female survival (estimated and modelled), age ratios and population trends. The Tłı̨chǫ Government program Ekwô Nàxoèhdee K'è (Boots on the Ground) will contribute important information on key caribou (ekwô) indicators such as calf survival and caribou (ekwô) health.

Given the complexity and uncertainty regarding interaction of key factors influencing barren-ground caribou (ekwô) populations, caution is required when attempting to attribute the specific contribution of wolf (diga) reduction to observed changes in caribou (ekwô) productivity and/or population trends. For example, the influence of other factors such as environmental conditions, biting insect severity indices, anthropogenic disturbance and caribou (ekwô) harvesting may also be affecting caribou (ekwô) productivity and/or survival rates. Modeling caribou (ekwô) population response with covariates for wolf (diga) removal, and environmental indices such as insect harassment and vegetation productivity will be important for overall analyses.

5 **Consultation**

This proposal was jointly developed by the GNWT and the Tłı̨chǫ Government, and has included discussions with Tłı̨chǫ communities and leaders (December 2019 through February 2020). Wolf (diga) management actions were also discussed at the WRRB’s public hearing on the Bluenose-East herd held in Behchokǫ on April 9-11, 2019. The GNWT conducted consultation with Indigenous governments and organizations on wolf (diga) management actions in an initial proposal in November/December 2019, on the 2020 Wolf (Diga) Removal Pilot Program in July 2020 and the current revised proposal as of August 25, 2020. A detailed engagement log is attached.

6 **Communications Plan**

**General approach**

The general communications approach will be proactive and aimed at large, but specific audiences. Information about program activities, incentives, training opportunities and other general information will be relayed to key audiences – primarily communities, harvesters and the general public – through a variety of advertising and promotional channels, including print, radio, online and in-person. These communications will be done in Tłı̨chǫ Yati, English, French and other Indigenous languages as required and where possible. During the 2020 Pilot Program community
posters were developed to inform Tłı̨chǫ communities of wolf (dîga) management activities in the area, as well as radio ads and public service announcements. Website and Facebook pages were updated regularly to reflect program activities.

Communications will be aimed at achieving the following objectives:

- Ensuring the public understands the scientific, local and traditional knowledge rationale behind predator management as one aspect of a larger co-management approach for barren-ground caribou (ekwǫ́) recovery.
- Ensuring harvesters are aware of wolf (dîga) harvest incentives and know how to participate in the traditional economy by promoting training opportunities, eligibility criteria, safety information, wildlife regulations and harvesting best practices.
- Amplifying northern voices and knowledge in discussions about the effectiveness of predator management, especially those of our residents and co-management partners.
- Making the public aware of training and incentives that enable and encourage NWT residents to go on the land and participate in the traditional economy.
<table>
<thead>
<tr>
<th>7 Relevant Background Supporting Documentation</th>
</tr>
</thead>
</table>


## 8 Relevant Background Supporting Documentation

### Appendix A: Timeline of previous and proposed/proposed management actions for Bathurst and Bluenose-East caribou (ekwǫ) herds

<table>
<thead>
<tr>
<th>Mgmt Lever</th>
<th>Previous Years</th>
<th>I Start</th>
<th>Future Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harvest Management (allowable harvest)</td>
<td>Interim Emergency Measures (V)</td>
<td>Harvest Target (800)</td>
<td>MCBCCA &amp; Ceremonial Harvest (15 months)</td>
</tr>
<tr>
<td>Wolf Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range (disturbance)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Harvest Management (allowable harvest)</td>
<td>TAH (750 M only)</td>
<td>TAH (159 M only)</td>
<td>Caribou Harvest Management (likely continued)</td>
</tr>
<tr>
<td>Wolf Management</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

1. Follow-up shading indicates years where calving ground photographic surveys were conducted in previous years or planned for future years. A two-year interval for future calving ground surveys was assumed based on recent joint management proposals submitted by the Tlicho Government and the government of the Northwest Territories to the Wek’eechii Renewable Resources Board.

2. M = Male; F = Female

3. MCBCCA = Mobile Core Bathurst Caribou Conservation Area implemented in 2015/16

4. TAH = Total Allowable Harvest

---

Plan: Planned or proposed actions
8 Relevant Background Supporting Documentation

Appendix B: Tłı̨chǫ Knowledge

The traditional territory of the Tłı̨chǫ is vast, and the network of hunting trails extends far into every corner of their lands. The four Tłı̨chǫ communities of Behchokǫ̀, Whatì, Gametì and Wekweètì are located in the boreal forest, and the land stretches far north of the treeline into the tundra, where many Ekwǫ̀ hunting grounds are located. The traditional land use areas of the Tłı̨chǫ lie within the boundary known as “Mówhi Gógha Dé Njıtı́łë̀ë,” which was outlined by Chief Mòhwhì during the negotiations of Treaty 11 in 1921 (Helm 1994). The modern treaty area of Mówhi Gógha Dé Njıtı́łë̀ë is described in an illustrative map to the Tłı̨chǫ Agreement.

The traditional land consists of the area between Great Slave Lake and Great Bear Lake, from the Horn Plateau in the southwest, and as far north as the Coppermine River and Contwoyto Lake (2018 Results Ekwǫ̀ Náxoèhdee Kè (Boots on the Ground).

From time immemorial, the barrenland was populated with Inuit and Dene families. Several Inuit families lived and hunted along Contwoyto Lake as well as the large lakes further south to the treeline. From the treeline and north, Dene families lived and hunted as far north as Contwoyto Lake, and some harvested further north towards the Arctic coast. On numerous occasions, Inuit and Dene families met on the barrenlands. The Tłı̨chǫ families travelled by canoe and canvas boat to the barrenlands in the fall to hunt caribou. They camped in certain locations with a secure wood supply, such as Ts’ìedaa on Ewaàínì́tì (Courageous Lake). While the women and children remained in camp, the trappers ran their dog teams along the shoreline of the large lakes further north towards Contwoyto Lake (Kóhk’ëeti). These harvesters hunted caribou and trapped wolves, white fox and wolverine throughout the winter months. When spring arrived with warmer temperatures and sunlight, the Tłı̨chǫ trappers and their families returned south while the ice was still strong enough to hold the dog teams (2018 Results Ekwǫ̀ Náxoèhdee Kè (Boots on the Ground).

Times have changed from when Tłı̨chǫ families used to travel on the barrenlands to hunt Ekwǫ̀. Ekwǫ̀ are not as plentiful as they used to be back then. Ekwǫ̀ being a staple to the Tłı̨chǫ diet and a key species that connects them to their cultural way of life, the Tłı̨chǫ have taken it amongst themselves to be stewards of their lands by managing and monitoring the resources within their lands. The Ekwǫ̀ Náxoèhdee Kè (Boots on the Ground) program (initiated in 2016) and the Community-based Diga harvesting program (initiated in winter 2019/2020) are two programs that have been implemented by Tłı̨chǫ Government to help conserve the ekwǫ̀ populations.

Ekwǫ̀ Náxoèede K’è

Ekwǫ̀ Náxoèhdee Kè (Boots on the Ground) is a Kóhk’ëeti ekwǫ̀ (Bathurst caribou) monitoring program based upon the Traditional Knowledge (TK) of Tłı̨chǫ and Inuit indigenous elders and harvesters. The objectives are to monitor the conditions of Kóhk’ëeti ekwǫ̀ on the summer range, focusing on four key indicators: (1) habitat; (2) ekwǫ̀ health; (3) predators, and (4) industrial development.

Ekwǫ̀ Náxoèhdee Kè adopts a biocultural approach to emphasize the Tłı̨chǫ as well as Inuit knowledge of the ecosystem in which they live. Biocultural approaches explore the link between biological and cultural diversity, and their interdependency with one another. Our framework of research is based upon two methodologies developed over the course of the program named “We Watch Everything” and “Do as Hunters Do.” Tłı̨chǫ learned that the

---

iii Tłı̨chǫ Agreement – Part 3 to Chapter 1 - Illustrative Maps - p.17
success of the program is dependent on following exactly what local harvesters and elders have always done on the lake: travel similar routes; set camp at the same historical campsites and walk the same trails. The act of monitoring became an act of trying to position oneself at places where one anticipates Ekwǫ̀ will move through. In Tłı̨chǫ, Kók’èeti literally means empty campsite lake, and refers to the many old campsites that have been made at the lake over time. These campsites were chosen for a purpose; namely, for protection from wind or proximity to hunting locations. The program used the same sites for the same reasons (2019 Results, Ekwǫ̀ Nàxoèhđée Kè (Boots on the Ground).

Ekwǫ̀ are a keystone species because of their ecological influence as a herbivore on the plant communities and as a key source of food for predators and scavengers including Diga, Sahcho (Grizzly Bear), Nǫ̀gha (Wolverine), Ets’imbaa (Arctic Fox) and Det’ocho (Eagle). As their primary predator, diga rely on ekwǫ̀ for food and have a powerful influence on their daily behavior, and seasonal patterns of migration and habitat use. Diga are often seen denning or travelling near a water crossing, knowing that ekwǫ̀ will, at one point, enter the narrow funnel. There, a kill can be made with less effort than attempting to hunt one down on open ground. Over the past four years, observations of diga activity on the summer range has increased. Tłı̨chǫ monitoring efforts have increased yearly, which has improved the chances of wildlife encounters. The frequency of diga observations during summer months has increased greatly throughout the years (table 1).

Table 1. Results from Ekwǫ̀ Nàxoèhđée Kè since the program has been established in 2016.

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Diga seen</th>
<th>Pups of the year</th>
<th>Active Dens</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td>19</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>2018</td>
<td>16</td>
<td>*might have been in den</td>
<td>1</td>
</tr>
<tr>
<td>2019</td>
<td>31</td>
<td>7</td>
<td>2</td>
</tr>
</tbody>
</table>

Observations have been made of ekwǫ̀ kill sites most likely from diga, attempted chases on ekwǫ̀ as well as successful attacks by diga. However, there have not been any chases by nǫ̀gha or sahcho observed on ekwǫ̀, except for one unsuccessful attempt by det’ocho. Nonetheless, there have been many observations of said predator species and they all typically appeared healthy. Another observation noticed over the years, is that monitors have seen more diga dens and that when pups were observed, they appeared healthy, well-fed and had “lots of muscles”. The diga observations occurred all around Kók’èeti and Kwidliachį, where the teams walked. Concurrent to these observations, many groups of ekwǫ̀ were migrating through these locations.

Results from 2018 and 2019 show a low ekwǫ̀ calf abundance. The monitors stated that a contributing factor to the low calf abundance was the high diga activity observed around Kók’èeti. It was clear to them that the high diga activity had an impact on the ability of calves to survive their first few months, while they were still unable to outrun the chase of a diga. According to harvesters, barren-ground ekwǫ̀ herds (Bluenose east, Bathurst and Beverly/Ahiak herds) provide a steady and secure supply of meat for diga throughout the year, as they remain near to and north of the treeline on the central barrens year-round. Although the herds have declined, there are still thousands of ekwǫ̀ on the land that the diga can hunt (2019 Results, Ekwǫ̀ Nàxoèhđée Kè (Boots on the Ground).

In recent winters, the barren-ground caribou herds (Bathurst, Bluenose-east and Beverly-Ahiak herds) stayed within, or north of, the treeline on the barrenland for most of the year,
including winter. The presence of the Ekwǫ on the central barrenland throughout summer and winter creates a steady supply of meat for the wolves. The wolves can travel far distances in days, and the ready availability of herds on the barrenland provides caribou meat in relatively close proximity throughout the year. “Wolves hang around caribou all the time. They follow the herds all winter, all the time,” said one elder. Furthermore, during summer, when wolf pups are growing, they prefer to eat the meat from calves. Reflecting on his past observations the elder explained, “for wolf pups, it is good to eat the soft meat from calves.” (2019 Results, Ekwǫ Nàxoèhdee Kè (Boots on the Ground).

Wolf hunting in particular is an important conservation measure for the rapidly declining Bathurst caribou herd. The Ekwǫ Nàxoèhdee Kè program supports the traditional harvesting of predators as well as the Enhanced North Slave Wolf Harvest Incentive program by GNWT-ENR. The incentive is a way to support the traditional economy and generate income through wolf harvesting, which may help offset some of their financial costs. By increasing dìga and fur trapping on the herd range, we can help harvesters develop and maintain their knowledge and on-the-land skills.

Community-Based Dìga Harvesting Program

Through the ongoing decline of the Bathurst and Bluenose East ekwǫ herds, the Tłı̨chǫ Government and Government of the Northwest Territories Department of Environment and Natural Resources have been collaborating with the Wek’èezhìi Renewable Resources Board to implement co-management actions to support ekwǫ recovery. A key recommended action from the Ekwǫ Nàxoèhdee Kè program and from the 2019 Wek’èezhìi Renewable Resources Board hearing was that the Tłı̨chǫ Government implement a Community-Based Dìga Harvest Program.

The Tłı̨chǫ Government initiated its Community-based Dìga Harvest Program for the 2019/20 harvest season in three phases:

1) held a community consultation meeting with Tłı̨chǫ harvesters and elders to ensure the program followed and respected Tłı̨chǫ protocols of harvesting dìga and planned logistics for the harvesting camps;  
2) conducted a training workshop for local Tłı̨chǫ harvesters with an instructor from the Alberta Trappers Association; and  
3) established harvester camps to further support training and dìga harvesting by Tłı̨chǫ on a rotational basis.

There is a strong spiritual connection between the Tłı̨chǫ people and dìga. Archie Wetrade of Gameti, when he gave evidence to the WRRB at its 2019 Public Hearings concerning the Bluenose East Ekwǫ, had this to say on the subject:

I mentioned that we have to really focus in and work with – because this wolf, it’s a spiritual to – to Aboriginal people. We just – they just don’t go out there and start shooting wolf. Wolf and the caribou been among the people from the beginning and it – and they’re still here. Wolf are not in our way of system. We don’t play with – with the wolf. The wolf, they don’t play with us. When they take serious against people, there could be a very bad association into – association into – in that system. Wolf have their own technique to take down animals. But in my lifetime, I have never ever heard wolf attack Aboriginal people at all, never, because they respect us and we – we respect them. But also we have to understand that it’s out training level in the
community, each community, that we just have to work how we’re going to do it for the safety of the public and the children.

Joe Mantla of Behchokǫ also provided information on the connection to diga:

Yes, that – I know that the caribou, I guess, you know, that we’ve heard enough of it and now for the wolf wise says I – I do harvest some wolf from time to time when I have to, but somehow you got to be, you know, careful and you have some technique to do it. And I do have. And then the – at the same time I was taught on the land with my – my dad. He was a great hunter and a great trapper and then the – so although there are some spiritual manner that – that has with the wildlife such as the wolf, that the – that the – some of the people kind of I don’t want to handle the wolf because of the – some spiritual nature it has. You’ve got to be careful how you hand their – their carcass and then it that’s including their – their blood. And the – to date they feel kind of reluctant to – to handle them the way as professional people would do. I don’t see anything wrong with it if you do it right, because to date, its not like before, you got rubber gloves and all that. You got disinfectant, you know, substance that you could always clean your hand with once you’re completed.

A very important process in implementing the Community-based Diga Harvest Program was having the meeting with the Tłı̨chǫ elders and harvesters, this meeting occurred in Wekweétì on December 17. Having this meeting allowed for the program to be run following and respecting Tłı̨chǫ protocols based on the traditional knowledge gained. Many participants of the meeting voiced the importance of harvesting wolves for the sake of conserving the ekwǫ populations as well as for the safety of the communities. There were many concerns about the increase of diga surrounding all the Tłı̨chǫ communities. Not many Tłı̨chǫ hunters currently have experience in harvesting diga and so through the meeting it was suggested that Tłı̨chǫ hold a “trapper training” type of course for the participants of the harvesting program. There was a clear objective that came out of the meeting, it was important that for the recovery of ekwǫ and for the Tłı̨chǫ people to continue to live their traditional way of life, the diga population would have to be managed through increasing harvesting efforts.

The training was done at the beginning of January and was very well received by all participants. After completion of the training, the harvesting program was initiated. The program ran from January to March 2020 with little success - only 4 wolves were harvested through the program. After the program was done, surveys were done to identify ways to improve the program for future harvesting seasons. Based on those surveys, the main elements that need improvement were to start preparations for the program much earlier. Preparations would include starting to get bait ready in the fall, ensure the snares and traps are ready to be used, start planning the logistics of the program and meet with participants of the program to start strategizing snaring and trapping techniques so that participants can effectively and efficiently harvest diga. As was mentioned in the meeting with the elders and harvesters, diga are very smart, strong and powerful animals, they will know when they are being hunted and so Tłı̨chǫ need to carefully observe their behaviour and thoroughly strategize trapping and snaring them. While the objective is to harvest diga, Tłı̨chǫ choose to do so in the most respectful manner so that diga are not disrespected.

---

9 Time Period Requested

Identify the time period requested for the Board to review and make a determination or provide recommendations on your management proposal.

Management actions proposed here would apply from January 1, 2021 until July 1, 2024. Tłı̨chǫ Government and the GNWT suggest that management actions be reviewed annually or whenever key additional information becomes available.

10 Other Relevant Information

If required, this space is provided for inclusion of any other relevant project information that was not captured in other sections.

Attachments:
Engagement Log
Summary of Caribou Population Modelling of Varying Wolf Removal Levels on the Bathurst and Bluenose-East Herds
Plain Language Summary - 2020 Wolf Management Pilot Project

11 Contact Information

Contact the WRRB office today to discuss your management proposal, to answer your questions, to receive general guidance or to submit your completed management proposal.

Jody Pellissey
Executive Director
Wek’èezhii Renewable Resources Board
102A, 4504 – 49 Avenue
Yellowknife, NT. X1A 1A7
Phone: (867) 873-5740
Fax: (867) 873-5743
Email: jpellissey@wrrb.ca
APPENDIX B  WRRB Technical Response to Summary of Wolf Incidental Sightings from Bathurst and Bluenose-East Barren-ground Caribou Surveys, GNWT ENR, August 13, 2020
WRRB technical response to Summary of Wolf Incidental Sightings from Bathurst and Bluenose-East Barren-Ground Caribou Surveys, GNWT ENR, August 13, 2020

Background: Wolf sightings are opportunistically recorded during caribou sex and age aerial surveys and, as an index, the sightings are expressed as the number of wolves seen per 100 flying hours. Currently, in the NWT, wolf abundance is not monitored which raises the possibility that the incidental wolf sightings may index wolf abundance (density). Indices are recognized as being tricky to apply without measuring detection (Anderson 2003). Efforts are underway to determine if the wolf sighting rate has utility to estimate abundance (D. Cluff pers. comm.) although as an index to abundance, the wolf sighting rate depends on, for example, consistency in detecting the wolves during the caribou surveys.

The incidental sightings on the fall and late winter caribou ranges are also an index of the encounter rate between the wolves and caribou. Encounter rates are a component in theoretical predator-prey models that can underpin caribou recovery actions. The encounter rate with caribou is a component of the functional response, which describes how the consumption of prey by individual predators’ changes with prey density (Holling 1959).

As the Bathurst herd has declined, the wolves have also declined (their numerical response) at least, on the Bathurst herd’s summer range (Klaczek 2015) which suggests that the predator-prey ratio is relatively stable. Vucetich et al. (2011) discuss the importance of the predator-prey ratio to describe wolf-prey relationships. On the summer ranges, the wolves relative to their den sites are territorial but on the winter ranges, although the wolves are in packs, they are not occupying spatially predictable territories (D. Cluff pers. comm.).

The Wek’èezhìı Renewable Resources Board (WRRB) recognized the importance of predator incidental sightings when through Recommendation #4-2019 (Kǫk’èeti Ekwǫ̀), WRRB requested the incidental sightings to improve the understanding of the role of predators on the decline of the herd. In August 2020, the Government of the Northwest Territories provided a summary of predator sightings. WRRB has drafted the following exploration of the wolf sightings rate in the context of wolf management and adaptive management. For other predators, the incidental sightings for grizzly bears and wolverine will be incorporated into technical feasibility assessment for those two species.

1. For the late winter caribou sex and age composition surveys, the trend is a decrease in time for hours flown (sampling effort), which is assumed to indicate the area searched. The wolves counted do not correlate with hours flown or number of caribou classified.
2. The wolf sighting rate (wolves seen /100 h flying time) for the Bathurst herd since the peak in caribou numbers in 1986 is annually variable which limits describing a trend (mean 87.4 ± 12.95 SE wolves/100h; CV 14.8%) suggesting that the rate of wolves encountering caribou has persisted during the caribou and wolf decline (Figure 1).

![Figure 1](image1.png)

3. Using a subset of the Bathurst data to cover the same period as data available for the caribou composition surveys for the Bluenose East herd; the trends are a decline in the wolf sighting rate for both herds (2009-2020): Bathurst ($r^2=0.154$) and Bluenose East ($r^2=0.114$). However, the absence of surveys 2017-2019 limits interpretation (Figure 2).

![Figure 2](image2.png)
4. The sighting rate tended to be higher for the Bluenose East herd for late winter but lower in the fall: sample effort may be a factor as fewer hours were flown.

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Late winter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wolves/100 h</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bathurst</td>
<td>102.4</td>
<td>23.27</td>
</tr>
<tr>
<td>Bluenose East</td>
<td>140.1</td>
<td>41.25</td>
</tr>
</tbody>
</table>

5. The wolf sighting rates during the caribou fall composition surveys for the Bathurst herd are annually variable but between 2014 and 2018, were overall higher than late winter sighting rates (Figure 3). There are 6 winters when both fall, and late winter wolf sighting rates are available: fall rate was higher than the late winter rate in in 3 years. In 2019, no wolves were seen but search hours were low which may suggest a reduction in the wolf sighting rate (Figure 3).

6. On the Bathurst herd’s fall ranges, the high sighting rate since 2014 may suggest that emigration and or pup production/survival has increased (or detection has changed). This raises the question of whether an increase in the wolves is a compensatory response to wolf decline measured in 2014 (Klaczek 2015).

7. The wolf sighting rate on the Bluenose herd in fall is lower than for the Bathurst herd in contrast to late winter but the sample effort is less (fewer surveys for Bluenose East) and both herds were not often surveyed in the same year (Figure 4).
8. Mean pack size on the Bathurst herd’s late winter range (3.4 ± 0.22 SE) was similar to that recorded for the Bluenose East herd’s late winter range and did not consistently vary 1986-2019.

Changes in the overlap of winter ranges between the Bathurst and its neighboring herds

1. An implication of the winter range overlap is a possible increase in the wolf sighting rate on the Bathurst herd if more wolves were present from neighboring herds.
2. An index to the overlapping kernels for herd distribution is the Volume Index (Gurarie et al. In Prep.). The trend is for a recent (2017) increase in overlap between the Bathurst and the Beverly/Ahiak ($r^2 = 19\%$) and a decrease for the Bathurst with Bluenose East ($r^2 = 34\%$) (Figure 5).
3. However, the rate of sightings on the Bathurst herd’s winter range relative to the overlap index for the entire winter is unclear as sample size is a limitation especially 2017-19 missing wolf sighting rate.

4. The centroids indicate a shift to the northeast above the tree line especially since 2016 which has likely contributed to an increasing recent overlap with the Bevely/Ahiak herd’s winter range.

Figure 6. Annual overlapping polygons (95% kernel) and centroids for Bathurst herd winter range (Gurarie et al. In Prep.).

Summary

1. We acknowledge that while wolf sighting rate is a readily available indicator for wolves encountering caribou, annual variability in the detectability of the wolves and possible duplicated sightings add uncertainty and limit inferences. However, given the lack of information on wolf predation on migratory tundra caribou, examining the sightings data is prudent and may emphasize the need for a more standardized approach.

2. The wolf sighting rate did not appear to decline during the first 20 years of the Bathurst decline (1986-2008) and then possibly declined 2009-2019 during the period when the caribou decline accelerated and wolf abundance declined on the summer range (Klaczek 2015, Adamczewski et al. 2019).

3. The robustness of the wolf sighting rate as an indicator should be further examined as to if and how it contributes as a pre-wolf removal baseline given complexity of the combined effect of the caribou decline, the wolf numerical
response (summer range) and on-going wolf harvesting (both in Nunavut and the NWT).

Citations


