

Implementation Plan
A companion document to the

Harvest Management Plan for the Porcupine Caribou Herd in Canada



December 17, 2010



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List of Organizations/Acronyms

ADFG	Alaska Department of Fish and Game
CSU	Community Support Unit, Joint Secretariat
CWS	Canadian Wildlife Service
ENR	Environment and Natural Resources, Government of the Northwest Territories
FWB	Fish and Wildlife Branch (Tr'ondëk Hwëch'in)
GC	Government of Canada
GNWT	Government of the Northwest Territories
GRRB	Gwich'in Renewable Resources Board
GTC	Gwich'in Tribal Council
HMP	(Porcupine Caribou) Harvest Management Plan
HTC	Hunters and Trappers Committee
IGC	Inuvialuit Game Council
IP	Implementation Plan
JS	Joint Secretariat
NND	First Nation of Na-Cho Nyäk Dun
PCA	Parks Canada Agency
PCH	Porcupine Caribou Herd
PCMA	<i>Porcupine Caribou Management Agreement</i>
PCMB	Porcupine Caribou Management Board
PCTC	Porcupine Caribou Technical Committee
RRC	Renewable Resources Council
TH	Tr'ondëk Hwëch'in
USFWS	United States Fish and Wildlife Service
VGG	Vuntut Gwitchin Government
WMAC (NS)	Wildlife Management Advisory Council (North Slope)
WMAC (NWT)	Wildlife Management Advisory Council (Northwest Territories)
YG	Government of Yukon



Overview

Introduction

The Porcupine Caribou Harvest Management Plan (HMP) and Implementation Plan (IP) will facilitate the coordination of management actions for an important transboundary caribou herd that ranges closely to eight communities in five aboriginal land claim areas in two territories within Canada.

The HMP was agreed to and signed by all eight Parties with authorities and responsibilities for Porcupine Caribou Herd management across the Canadian range, as follows:

- Gwich'in Tribal Council
- Inuvialuit Game Council
- Vuntut Gwitchin Government
- Tr'ondëk Hwëch'in Government
- First Nation of Na-Cho Nyäk Dun
- Government of the Northwest Territories
- Government of Yukon
- Government of Canada

Herd size	Licensed Hunters	Aboriginal Hunters
GREEN ZONE	Up to two animals each Mandatory bulls only	No harvest limit Cows and bulls may be taken
more than 115,000 animals	All hunters required to report ①	All hunters required to report ①
YELLOW ZONE	1 animal each Mandatory bulls only	No harvest limit Voluntary bulls only with a commitment to strive for 100% bulls harvest ②
80,000 – 115,000 animals **CURRENT LEVEL**	All hunters required to report ①	All hunters required to report ①
ORANGE ZONE	Harvest limit through permit ③ Mandatory bulls only	Harvest limit through subsistence allocation ③
45,000 – 80,000 animals	All hunters required to report ①	Mandatory bulls only All hunters required to report ①
RED ZONE	No harvesting	Extremely limited harvesting ④
Up to 45,000 animals		All hunters required to report ①

- ① *The Parties to the Harvest Management Plan are to work out a rigorous and verifiable system for reporting as part of the implementation plan*
- ② *All Parties commit to implementing a bulls-only harvest. If this target is not effectively met, the Parties will commit to review the measures, including the potential application of a mandatory bulls-only harvest.*
- ③ *Limits will be determined by the Annual Allowable Harvest (0.5 to 3% of herd) that will be reviewed annually in order to respond to population trend. The subsistence allocation will be determined through a 'Native User Agreement' and the licensed hunter allocation in Yukon worked out between the Yukon government and Yukon First Nations.*
- ④ *Essentially no harvesting but consideration will be given to allocating up to 0.1% of herd for ceremonial purposes, such as a potlatch.*



Overview

The HMP is a long-term framework that outlines how Parties will respond to the status of the herd whether the population is high or low. It establishes a proactive approach with four management regimes for different herd sizes and conditions.

There has not been a successful count of the herd since 2001. Best estimates put the herd's population at 90,000 to 100,000 animals, indicating a continued, slow decline from 178,000 caribou in 1989. At the time of finalizing the HMP, the Parties agreed that the herd is in the yellow management zone. A photocensus of the herd was completed in July 2010. The results of that photocensus are expected in early 2011.

The purpose of this Implementation Plan is to give effect to the requirements of the HMP and the commitments of the Parties. (See HMP, Appendix A: Commitments of the Parties under the Porcupine Caribou Harvest Management Plan.) The *Porcupine Caribou Management Agreement (PCMA)* and the HMP establish the foundation and framework respectively for the IP. Where there is any inconsistency or conflict between the PCMA and the IP or the HMP and the IP, the PCMA and HMP are paramount to the extent of the inconsistency or conflict.

The IP establishes a coordinated approach and integrated actions for the development and implementation of management activities that should result in effective harvest management outcomes. It consists of three key components:

1. Assessment of the population status of the herd and the annual harvest by hunters;
2. Management activities based on the population and harvest assessment; and
3. Monitoring and evaluation of the reliability of assessment methods, the effectiveness of management measures in achieving the objectives of the HMP and the management (colour) zones, and the modification of the reporting and assessment methods and management measures where necessary.

Roles and Responsibilities of the Parties

The Parties are those governments and organizations that have jurisdictional authorities and associated responsibilities for the management of the harvest of Porcupine Caribou in the Canadian range of the herd. They are the signatories to the HMP and to this Implementation Plan and hold ultimate responsibility for their implementation. The IP requires the Parties to work together to achieve the objectives of the HMP and to effectively manage the harvest by all users of the herd.

Role and Responsibilities of the Porcupine Caribou Management Board

The PCMB holds an important role and responsibilities for the implementation of the HMP and the IP. The PCMA established the PCMB and assigned it the role of facilitating communications among the native users of Porcupine Caribou, governments, and other users to assist in the coordinated management of the herd. Consistent with the PCMA, the HMP and Implementation Plan assign a central role for the PCMB in



Overview

coordinating communications, information sharing, and the harvest assessment. The PCMB is responsible for convening the Annual Harvest Meeting recommending harvest management actions to the Parties. These requirements will place increased demands on the PCMB.

Role and Responsibilities of the Porcupine Caribou Technical Committee

The current Porcupine Caribou Technical Committee (PCTC) is a group of operational-level biologists and researchers who monitor the herd. The aim of the PCTC is to coordinate research and monitoring activities across jurisdictions and provide technical information and advice to various governments and boards. There is no formal membership but there is a core of agency biologists who consistently participate, along with the periodic involvement of other researchers and academics. (See the HMP, Appendix B for more information on the PCTC.) The HMP and IP assign the PCTC an important role in the preparation of the Annual Summary Report that includes a technical analysis of population and harvest data, and the reliability of the data and analysis for harvest management decision-making. (See Appendix 4)

Roles and Responsibilities of Co-management Boards, Hunters and Trappers Committees and Renewable Resources Councils

The WMACs, GRRB, HTC and RRCs, as appropriate, contribute advice and information to the PCMB and the Parties with regard to harvest reporting programs, the harvest management assessment and harvest management actions. In some instances, the RRCs and HTCs have a direct role in the collection of harvest information, communications with local harvesters, and the administration of the community-based harvest. (Details on the role of these organizations are described in Appendix 1)

Participants

The word “Participants” in the Plan refers to any Party or organization that has a role in the implementation of an identified activity. Its usage in this plan and those it refers to are distinct from and should not be confused with the term “Participants” in the *Gwich'in Comprehensive Land Claim Agreement*.



1. Harvest Management Assessment

The harvest management assessment is a cornerstone of the HMP and IP. It establishes critical information: the evidence on which harvest management recommendations and actions will be based. The harvest management assessment relies principally on two types of information: population information about the herd – importantly, the size of the herd and whether the herd is increasing or decreasing in size; and harvest information – the total estimated harvest of Porcupine Caribou bulls and cows by all harvesters of the herd throughout the year.





Harvest Management Assessment

The IP addresses the means by which this information will be collected and analyzed in Canada.

Once it is compiled in an Annual Summary Report, the PCMB will convene an Annual Harvest Meeting (AHM) to review the information and analysis, and recommend harvest management actions to the Parties. The IP addresses how this will be done through the Terms of Reference for the Annual Harvest Meeting. (See Appendix 3.)

This process — the collection of population and harvest information, its technical analysis and review, and the development of appropriate harvest management recommendations — represents the steps in the harvest management assessment.

1.1 Task: Report rigorous and verifiable harvest information for all hunters of Porcupine Caribou at all times of the year

HMP Requirement: pp. 13, 24

Responsible Party: All Parties

Participants: HTC, RRC, GRRB, JS, WMACs

The key objective of the harvest reporting program is to determine the total estimated harvest of Porcupine Caribou (bulls and cows) and the reliability (variance) of that estimate.

The collection of rigorous and verifiable harvest information for all hunters of Porcupine Caribou is one of the most demanding tasks in the IP. The IP commits the Parties for the first time to achieving an integrated approach and a consistent result for the collection of all harvest information on Porcupine Caribou. It commits the Parties to a high standard in the quality of the information collected and provides a means for verifying the quality of that information. The harvest reporting program of the Parties is described extensively in Appendix 1.

Historically the harvest management of the Porcupine Caribou Herd across its range has been heavily compromised by incomplete and unreliable harvest information, and by inconsistent harvest management actions. This task addresses the first of these.



Harvest Management Assessment

The IP establishes a harvest reporting program consisting of several elements:

- community-based door-to-door harvester surveys in user communities, and methods of verification as appropriate
- field monitoring and verification
- opportunistic field observations

The Parties are committed to sharing harvest information while protecting in confidence personal information from public release. Data-sharing agreements between the Parties may be used for this purpose as required.

A data template (Appendix 4) is provided to better ensure consistency in the reporting of the information that is compiled and to maintain the integrity of the harvest data.

The quality and the reliability of the harvest information are central to the harvest management assessment. These matters are addressed in an independent evaluation of the harvest reporting and verification program established in the IP. (Activity 3.2.1 has been pre-implemented) The report from this evaluation is attached in Appendix 9. It outlines data and the formula for calculating a total estimated harvest. This is the same statistically accepted calculation that has been used in the Inuvialuit and Gwich'in harvest studies.

In order to attain a high level of data reliability, the IP recognizes that the harvest reporting program will need to address the following important considerations on an ongoing basis:

- report effort will be a function of:
 - areas of greatest concern
 - harvest management (colour) zone
 - level of harvest (largest harvester communities of Porcupine Caribou)
- establishing a “Key Harvester” sub-sample in the active hunter population (list) in each community
- maintaining the integrity of the data by maintaining separate data sets for each data source (e.g. door-to-door survey versus check station) and repeated or revised reported harvest information
- data coverage and data deficiency
- the potential and actual intrusiveness of certain reporting and verification methods

The last point is a sensitive one. Subject to the requirements of the HMP and review at the AHM, the IP provides for a phased-in approach to field verification with a strong initial focus on harvest reporting. Verification depends on the level of confidence in the harvest estimates. For this reason, the harvest reporting program will also calculate the variance (or confidence), and a correction factor as appropriate, in the harvest estimate. The purpose of verification of reported harvest data is to confirm the accuracy and coverage of the harvest reporting program and modify as appropriate, not as a check on individual harvesters. Community-based verification is intended to mark any difference between what is reported and what is observed with a view to establishing as complete a record as possible of the actual harvest.



Harvest Management Assessment

If circumstances of low confidence in the harvest estimate or orange zone harvest management conditions apply, other means of verification are available — e.g. through tag-based reporting and visual confirmation of what was taken. Visual verification can be accomplished without requiring contact with all harvesters; a sample of harvesters would suffice provided that the participation of harvesters selected is mandatory. This is required in order to obtain a representative sample of hunters.

1.1.1 Activity: Establish an integrated harvest reporting program that collects comparable harvest information for all hunters of the Porcupine Caribou Herd that documents, at minimum, the following:

Name (held in confidence by Party)
User Group
Names of hunter party, if applicable (held in confidence by the Party)
Date/Month/Season as appropriate
Location: Game Management Subzone and/or 10x10 km (UTM) grid Number
Sex: Bulls, Cows (Unknown - assume female)

And that includes the following program components:

Jurisdiction-based harvest reporting and review
Dempster Highway check station reporting and field reporting
Evaluation and verification of reported and estimated total harvest (see Activity 3.2.2)

That are based on the following criteria:

Consistent standards
Timeliness
Cost effectiveness
Optimum harvester participation and response rates
Confidentiality of personal data
Confidence in the reported data

Lead responsibility: All Parties
Participants: JS, WMACs, GRRB, HTC, and RRCs
Timing: Fall 2010

1.1.2 Activity: Implement a jurisdiction-based harvest reporting/verification program in the communities of Tuktoyaktuk, Inuvik, Aklavik, Fort McPherson, Tsiigehtchic, Old Crow, Mayo and Dawson City. (See Appendix 1 for details.)

Lead responsibility: All Parties report to the PCMB and the PCTC incorporates harvest information in the Annual Summary Report (of the following year).
Participants: JS, WMACs, GRRB, HTC and RRCs
Timing: Fall 2010



Harvest Management Assessment

1.1.3 Activity: Implement a harvest reporting/verification program through the use of check stations and field monitoring. Check station and field monitoring operations include the development of an annual operations plan, the sharing of harvest information with the Parties as agreed to by the Parties, and reporting harvest information to the PCMB for inclusion in the Annual Summary Report (of the following year) as appropriate. (See Appendix 2 for details)

Lead responsibility: YG and GNWT are responsible for check station operations, annually reviewing and updating the operation plan, the sharing of this harvest information with the Parties as agreed to by the Parties, and reporting a summary of harvest information to the PCMB by June 1 for inclusion in the Annual Summary Report (of the following year) as agreed. Parties are responsible for implementing field monitoring activities as appropriate and as required.

Participants: Participation and partnerships with individual Parties as agreed to by these Parties

Timing: Fall 2010

1.1.4 Activity: Develop a template for the compilation of annual harvest data collected by each of the Parties for inclusion in the Annual Summary Report. (See Appendix 4)

Lead responsibility: PCTC

Participants: Parties approve

Timing: Approve by December 2010. Review in one year

1.1.5 Activity: Develop a software program as required to facilitate the calculation of a total estimated harvest, where appropriate.

Lead responsibility: GC

Participants: All Parties, GRRB

Timing: Fall 2011

1.2 Task: Conduct annual harvest data analysis

HMP Requirement: pp. 20; pp. 42-43

Responsible Party: All Parties

In the preparation of the Annual Summary Report, the IP assigns responsibility for the analysis of harvest data to the PCTC. It is recognized that the PCTC may require additional technical resources to conduct this analysis, particularly as it relates to statistical methodology, including the treatment of different data sets and the calculation of the variance and correction factor of the total estimated harvest.



Harvest Management Assessment

1.2.1 *Activity:* Analyze the harvest information collected and submitted by the Parties annually, as identified in Appendix 1, so as to include the assessment of:

- the total reported harvest, by sex, by community
- the total estimated harvest by sex, by community and variability (variance)
- the distribution of the harvest over time (season/month)
- the total number of active Porcupine Caribou harvesters by community
- the total number of Porcupine Caribou harvesters who responded by community
- the spatial distribution of the harvest
- total estimated harvest in Canada
- the reliability (variance) of the estimate
- correction factor as required

Lead responsibility: Chair PCTC

Participants: PCTC Members

Timing: Completed by November 15 (Annual Summary Report)

1.3 Task: Conduct annual population analysis

HMP Requirement: pp. 20, 22-23

Responsible Party: PCTC

Participants: PCMB, Parties

In the preparation of the Annual Summary Report, the IP assigns responsibility for the analysis of the best available population information to the PCTC. In those years when a photocensus is not possible, the HMP provides for the use of population models to conduct the population analysis. The IP recognizes that additional technical resources may be required by the PCTC to prepare updated annual population estimates through the use of population models and the use of information from the population census and other sources.

1.3.1 *Activity:* Review and prepare updated population models.

Lead responsibility: PCTC

Participants: Expert Contractor

Timing: No later than February 2011



Harvest Management Assessment

1.3.2 Activity: Provide herd population information annually to the GC-CWS, PCTC and PCMB to assist in the preparation of the Annual Summary Report, including:

- photocensus data
- adult cow survival
- calf birth rate
- calf survival to nine months
- body condition
- other relevant scientific information

Lead responsibility: YG, GNWT, ADFG, USFWS

Participants: PCTC, PCMB

Timing: As completed

1.3.3 Activity: Prepare and maintain a long-term database and provide annual summary of biological information to inform the Annual Summary Report and the population model.

Lead responsibility: GC-CWS

Participants: PCTC

Timing: Updated by November 1 annually

1.4 Task: Prepare Annual Summary Report

HMP Requirement: pp. 22; Appendix B

Responsible Party: PCTC

Participants: PCMB, Parties

The Annual Summary Report is a critical document in the harvest assessment. It is important that the PCMB, the Parties and co-management bodies receive the report in advance of the Annual Harvest Meeting for them to thoroughly review it and provide comment.

1.4.1 Activity: Develop and confirm the Annual Summary Report template, including consideration of indicators in the following areas (see HMP pp. 20; Appendix B, pp. 42-43) (See Appendix 5):

- population size and trend
- population dynamics and demographics
- harvest
- body condition
- habitat

Lead responsibility: PCTC

Participants: PCMB, Parties

Timing: 1 October 2010



Harvest Management Assessment

1.4.2 Activity: Prepare an Annual Summary Report, including a population estimate, with the most current available biological information about the herd and the analysis of the total estimated harvest and submit to the PCMB.

Lead responsibility: PCTC

Timing: Annually, no later than November 15

1.5 Task: Convene the Annual Harvest Meeting and conduct the harvest management assessment.

HMP Requirement: pp. 13, 24

Responsible Party: PCMB

Participants: Parties and others

The HMP assigns to the PCMB the task of convening the Annual Harvest Meeting and conducting the harvest management assessment with the participation of the Parties and others as appropriate. Based on the assessment, the PCMB is required to recommend the appropriate management actions to the Parties. The IP describes the steps and considerations by which this is accomplished. The IP recognizes that this new task for the PCMB places heightened demands on it.

1.5.1 Activity: Develop and approve the terms of reference for the Annual Harvest Meeting.
(See Appendix 3)

Lead responsibility: PCMB develops

Participants: Parties approve

Timing: Approve by December 2010

1.5.2 Activity: Distribute the Annual Summary Report to Parties, invite submission of additional information supplementary to the report and attendance at the Annual Harvest Meeting.

Lead responsibility: PCMB

Participants: Parties register prior to January 20

Timing: Annually no later than December 1



Harvest Management Assessment

1.5.3 Activity: In response to the Annual Summary Report, each Party will provide written comments and additional information on the following:

- the content of the summary report
- local and traditional knowledge to help inform the herd status decision
- self-assessment by each Party of their respective management actions

Lead responsibility: Parties

Participants: WMACs, GRRB

Timing: By January 20 for distribution by PCMB prior to Annual Harvest Meeting

1.5.4 Activity: Convene the Annual Harvest Meeting to discuss the Annual Summary Report and review current information regarding:

- population estimate
- level of harvest (reported and estimated)
- population trend (stable, increasing, decreasing)

Lead responsibility: PCMB

Participants: Parties

Timing: Annually during the second week of February

1.5.5 Activity: Collectively review the effectiveness of each Party's management actions as reported by each Party at the AHM.

Lead responsibility: PCMB

Participants: Parties

Timing: Annually during the second week of February

1.5.6 Activity: Conduct the harvest management assessment to determine the harvest management (colour) zone and recommend harvest management actions to the Parties.

Lead responsibility: PCMB

Participants: Parties, responsible co-management organizations, interested organizations and interested public

Timing: Annually during the second week of February; recommendations by the PCMB to follow within 30 days

1.5.7 Activity: Review harvest management recommendations from the PCMB and determine how to implement management actions within respective jurisdictions.

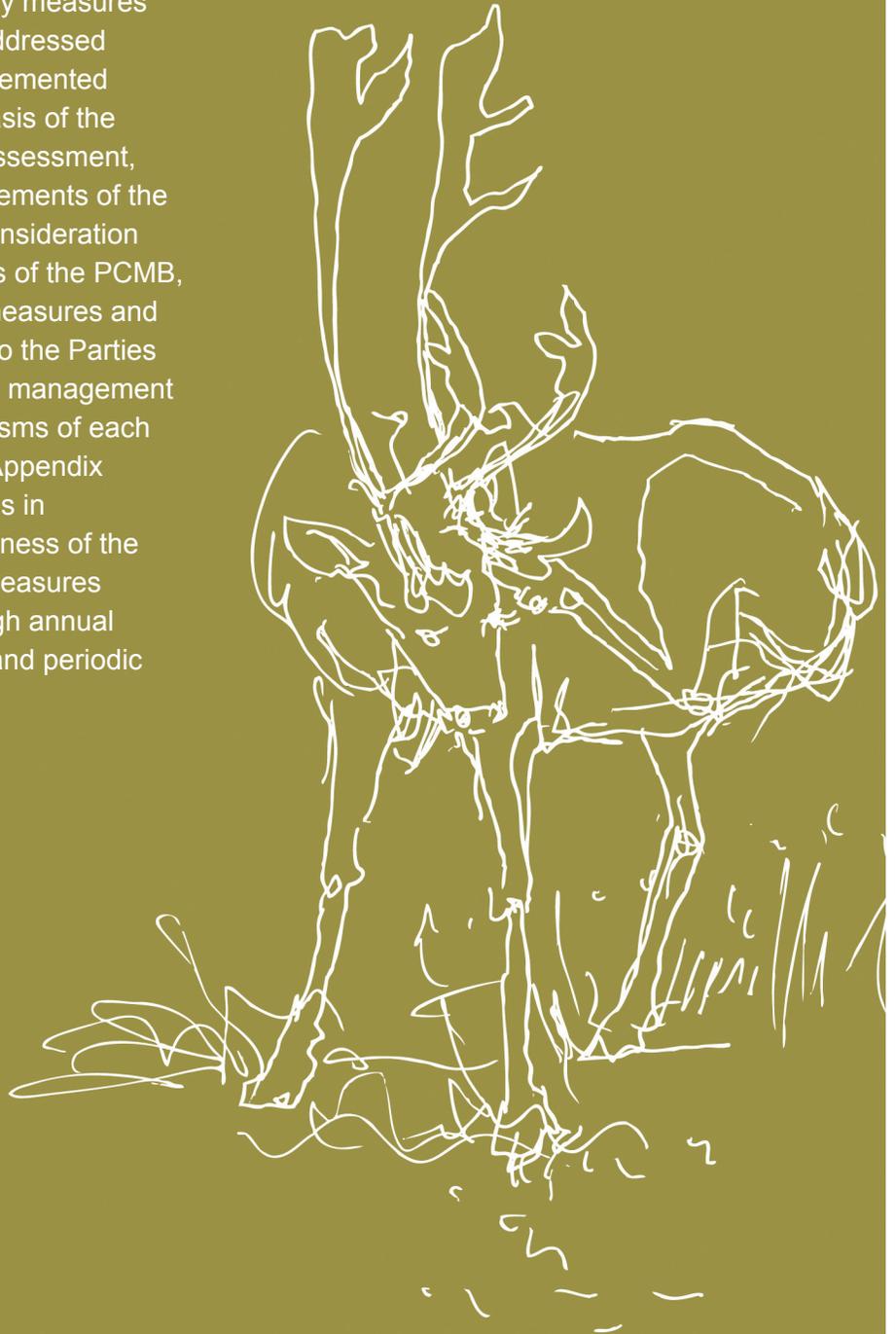
Lead responsibility: Parties

Participants: WMAC (NS), WMAC (NWT), GRRB

Timing: Provide a written response to the PCMB within 30 days of receipt of recommendations or indicate when a response will be provided. (See Appendix 3)

2. Harvest Management

Currently harvest management actions have been accepted by the Parties that apply to the yellow harvest management zone. A range of harvest management actions, utilizing both voluntary and mandatory measures and mechanisms are addressed by the IP. They are implemented by the Parties on the basis of the harvest management assessment, the management requirements of the HMP's colour zones, consideration of the recommendations of the PCMB, and the management measures and mechanisms available to the Parties at the time. The harvest management measures and mechanisms of each Party are described in Appendix 1. The IP also addresses in section 3.0 the effectiveness of the harvest management measures and mechanisms through annual evaluation at the AHM and periodic formal reviews.





Harvest Management

2.1 Task: Develop and implement communication and education materials and programs

HMP Requirement: pp. 28

Responsible Party: PCMB

Participants: Parties, WMAC (NS), WMAC (NWT), GRRB, RRCs, HTC's

The IP recognizes the important role that effective communication and education can play in harvest management in circumstances where both voluntary and mandatory measures apply. This is especially the case for the former. Consistent with the PCMA and the HMP, the IP has assigned the PCMB an important role in developing communications and educational initiatives that can then be modified as appropriate and utilized by each of the Parties.

2.1.1 Activity: Develop communications materials to inform and educate harvesters about the HMP, with attention to the following matters:

- the history of the plan and the process to develop it
- the signing of the plan and its meaning
- conservation concerns about the herd
- shared responsibilities of aboriginal governments/organizations and federal/territorial governments (pursuant to land claim agreements and the PCMA) for the conservation of the PCH
- the benefits of the HMP for the PCH
- what the HMP means to harvesters
- the responsibility placed on harvesters by the HMP to do their part for herd conservation

Lead responsibility: PCMB develops and issues a news release, newsletter (mail drop) and newspaper article concerning the signing of the HMP

Participants: GNWT, YG, IGC, GTC, VGG, TH and NND modify PCMB materials and communicate this information (including issuance of a letter) to address their beneficiaries/citizens and to meet their local needs.

Timing: PCMB releases information by 18 June 2010 or on signing of the HMP, whichever comes first. Immediately following this, Parties issue letters

2.1.2 Activity: Develop and implement a communications plan and distribute required information for fall 2010

Lead responsibility: PCMB convenes a meeting to develop materials (including joint messaging and logos) and mechanisms (including joint and/or consistent signage, radio spots, etc.) PCMB is responsible for coordination of these materials. The Parties are responsible for their content

Participants: Available Parties and communications specialists

Timing: Plan and materials completed by August 2010



Harvest Management

2.1.3 *Activity:* Develop PCH hunter education program, including:

- education modules
- best practices/values materials

Lead responsibility: PCMB coordinates development and makes recommendations to the Parties

Participants: Parties with GRRB, HTCs, RRCs

Timing: Complete modules by March 2011

2.1.4 *Activity:* Implement a youth/hunter education programs, including:

- sight-in-your-rifle programs
- community-based programs
- traditional knowledge - education campaign (elders, respected harvesters)

Lead responsibility: GNWT/YG holds sight-in-your-rifle programs

Parties develop and implement community-based programs and best practices/values materials

Participants: GRRB, HTCs, RRCs

Timing: GNWT holds one SIYR per community and two on Dempster prior to March 2011

2.1.5 *Activity:* Develop an annual communication work plan that addresses:

- herd status
- management actions
- board activities
- hunter education
- multi-year, multi-zone considerations

Lead responsibility: PCMB

Participants: Parties

Timing: By May 31 of each year and implemented prior to August 1

2.2 **Task: Develop harvest allocation measures**

HMP Requirement: pp. 26-27

Responsible Party: PCMB Parties

Participants: Parties, WMAC (NS), WMAC (NWT), GRRB, RRCs, HTCs

Consistent with the PCMA and the HMP, the IP establishes activities that will address the native user allocation of the Total Allowable Harvest when harvest conditions in the orange zone apply. The IP recognizes the guidance provided by the PCMA in this regard and that this guidance will be informed by the provisions of the land claim agreements of the Parties (such as Inuvialuit and First Nations community harvest allocation processes) as appropriate.



Harvest Management

2.2.1 *Activity:* Develop a range-wide Native User Access and Consent Agreement that includes the following considerations:

- access to harvest in different colour zones
- community harvesting areas as set out in Appendix II of the PCMA
- the Primary and Secondary Use Areas as set out in the *Gwich'in Comprehensive Land Claim Agreement*, including the Transboundary Agreement, and the NND, TH, VGG and Inuvialuit final land claim agreements
- settlement land access
- “subsistence-ceremonial purposes” (red zone HMP pp 13)
- timeline for review of allocation of Annual Allowable Harvest
- provisions for sharing

Lead responsibility: IGC convenes the meetings as required for the participants

Participants: TH, NND, VGG, IGC, GTC

Timing: Initiate by spring 2011 and complete by 31 August 2011

2.2.2: *Activity:* Develop a Yukon First Nations Native User Agreement that addresses, at minimum:

- the allocation of the Yukon Native Annual Allowable Harvest in the orange zone
- the unique dependence of the native users of Old Crow on Porcupine Caribou

Lead responsibility: VGG convenes the meetings as required for the participants

Participants: TH, NND, VGG

Timing: Initiate by spring 2011 and complete by 31 August 2011

2.2.3 *Activity:* Develop a Yukon First Nations/Yukon Government Agreement that addresses, at minimum, the allocation of Annual Allowable Harvest in the orange zone between licensed and native users.

Lead responsibility: YG convenes the meetings as required for the participants

Participants: TH, NND, VGG

Timing: On completion of Yukon First Nations Native User Agreement

2.2.4 *Activity:* Develop a NWT Native User Agreement that addresses at minimum, the allocation of the NWT Native Annual Allowable Harvest in the orange zone

Lead responsibility: IGC, GTC convene bi-lateral meetings as required

Participants: N/A

Timing: In progress



Harvest Management

2.2.5 *Activity*: Develop an NWT/Yukon/PCA administrative arrangement to recognize a range-wide Porcupine Caribou Herd tag

Lead responsibility: YG convenes discussions as required

Participants: GNWT, PCA

Timing: Initiate by February 2011 and complete by fall 2011

2.3 **Task: Implement harvest management measures**

HMP Requirement: HMP pp. 13, 21; Appendix 1

Responsible Party: All Parties

Participants: WMAC (NS), WMAC (NWT), GRRB, RRCs, HTC

The harvest management mechanisms and measures available to the First Nations and Inuvialuit Parties are evolving with the implementation of their respective final agreements and self-government agreements. In some instance these Parties have established traditional and legal instruments for the regulation and enforcement of a limited harvest, if circumstances warrant. In other instances, contemporary legislation is under development.

Some Parties have indicated they may choose to restrict all harvesting in the orange zone. Others have indicated that in the orange zone, to facilitate the implementation of a total allowable harvest quota, they may accept a range-wide tag with tag administration procedures and distribution to be determined by each Party.

In the yellow zone, and especially in the orange and red zones, the Parties, as appropriate, will consider the recommendations from the co-management organizations (consistent with the provisions of the applicable land claim agreements).

The IP recognizes that some of the Parties may establish intergovernmental agreements to facilitate monitoring and enforcement activities under certain harvest management conditions.

The Yukon *Wildlife Act* and NWT *Wildlife Act* and their regulations are mechanisms for harvest management that can be implemented in concert, where desired, with the legal instruments of Inuvialuit (bylaws) and First Nations' legislation and recommendations. They can provide for or enhance their legal effect, including their enforceability, as appropriate.

2.3.1 *Activity*: Develop and implement jurisdiction-based harvest management measures. (See Appendix 1 for details)

Lead responsibility: All Parties

Participants: JS, WMACs, GRRB, HTC, and RRCs

Timing: Fall 2010

3. Monitoring, Evaluation and Adaptive Management

Consistent with the HMP, the IP has developed an integrated harvest management assessment program and harvest management regime throughout the Canadian range of the Porcupine Caribou Herd. No such arrangement has existed before. Over the first several years, the IP requires special attention to monitoring, evaluating and modifying the harvest management assessment and harvest management measures and mechanisms to determine their proven effectiveness.



Monitoring, Evaluation and Adaptive Management

3.1 Task: Evaluate the population model and modify as required

HMP Requirement: HMP pp. 14, 36

Responsible Party: PCTC, PCMB, Parties

The IP recognizes that the population model is an important tool in the harvest management assessment, especially in circumstances where a photocensus of the herd has not been successful. As greater reliance is placed on the model, greater effort will be required to evaluate and update the model to maintain the confidence of all Parties and harvesters in the model as an effective tool for assessing the status of the herd.

3.1.1 Activity: Review and evaluate the population model and indicators, including the quality and reliability of the information they use and relative confidence in the estimates they produce. Modify as required.

Lead responsibility: PCTC

Participants: PCMB, Parties, Expert Contractor

Timing: As required

3.2 Task: Evaluate the quality and reliability of the harvest data and associated reporting program and methodology and modify as required

HMP Requirement: HMP pp. 35-36

Responsible Party: PCTC, PCMB, Parties

Participants: WMACs, GRRB, HTC, RRCs

The harvest reporting and verification program is one of the most important elements of the IP. It is critical to the future management of the harvest of Porcupine Caribou. The approach outlined in the IP is an ambitious one and will require an unprecedented level of cooperation and coordination among the Parties, and between the Parties and harvesters. The HMP explicitly requires a program that is rigorous and verifiable. The IP addresses this requirement in the design of the program and through systematic review and evaluation.

The Parties engaged an independent reviewer to evaluate the design of the harvest reporting and verification program in the IP. The report of the reviewer is attached in Appendix 9. It is an important resource to inform the ongoing development and implementation of the program and will be consulted appropriately.



Monitoring, Evaluation and Adaptive Management

3.2.1 Activity: Conduct an independent review and evaluation, with recommendations where required, on the design of the harvest reporting program and its components to determine the rigour and reliability of the data output and the determination of the total estimated harvest.

Lead responsibility: GC-PCA

Participants: Parties, PCTC, PCMB

Timing: Completed by fall 2010

3.2.2 Activity: Conduct an independent review and evaluation, with recommendations where required, on the methodology, and quality and reliability of the reported and estimated total harvest (including sex ratios) of Porcupine Caribou.

Lead responsibility: GC-PCA

Participants: PCTC, PCMB, Parties

Timing: Completed and provided prior to 2012 Annual Harvest Meeting;

Repeat periodically as agreed to by the Parties at the AHM

3.2.3 Activity: Based on the evaluation completed in Activity 3.2.2, formally review the effectiveness of harvest reporting methods and programs. Modify as required.

Lead responsibility: Parties

Participants: PCMB, PCTC, WMACs, GRRB, HTC, RRCs

Timing: AHM 2012; Repeat periodically as agreed to by the Parties at the AHM

3.3 Task: Review and evaluate the PCH Harvest Management Plan and Implementation Plan and modify as appropriate

HMP Requirement: HMP pp. 35-36

Responsible Party: PCMB, Parties

The HMP requires the evaluation of the effectiveness of the HMP. It is reasonable to assume that this would include an evaluation of the effectiveness of the IP and the harvest management measures and mechanisms that the IP relies upon for the conservation of the Porcupine Caribou Herd.



Monitoring, Evaluation and Adaptive Management

3.3.1 Activity: Evaluate the effectiveness and need for any revisions of the HMP and Implementation Plan based on a review that considers the following:

- fulfillment of HMP objectives and commitments and assigned tasks and activities
- annual harvest management assessments and summary reports
- effectiveness of harvest management measures having considered:
 - the harvest management objectives and measures recommended by the PCMB at the Annual Harvest Meeting and agreed to by the Parties
 - the most current population estimate and trend
 - the estimated annual harvest
 - local observations
- effectiveness of communications
- other matters as agreed to

And modify as appropriate.

Lead responsibility: The PCMB coordinates the evaluation, with involvement of the Parties, proposes revisions as necessary and submits a report to the Parties. The Parties review the report and agree on revisions that may be required

Participants: WMACs, GRRB

Timing: First review in 2015 or upon request of any Party



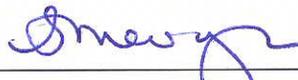
Signatories



Chief - Tr'ondëk Hwëch'in

FEB 4TH 2011

Date



Chief - First Nation of Na-Cho Nyäk Dun

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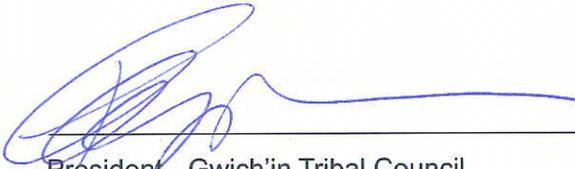
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Chief - Vuntut Gwitchin Government

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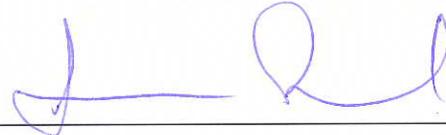
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President - Gwich'in Tribal Council

February 09, 2011

Date



Chair - Inuvialuit Game Council

March 22, 2011

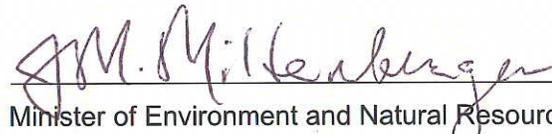
Date



Minister of Environment
Government of Yukon

April 14/11

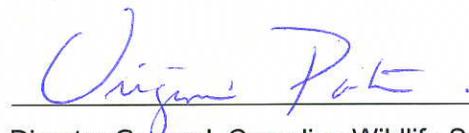
Date



Minister of Environment and Natural Resources
Government of the Northwest Territories

11/3/28

Date



Director General, Canadian Wildlife Service
Environment Canada

Apr 7, 2011

Date

Appendices

Appendix 1

Jurisdiction-Based Harvest Reporting Programs
and Harvest Management Measures/Mechanisms

Appendix 2

Check Station Functions and Operations

Appendix 3

Annual Harvest Meeting Terms of Reference

Appendix 4

Template for the Annual Submission of Harvest Data
to the PCMB

Appendix 5

Table of contents of PCTC annual summary report (Draft)

Appendix 6

Summary Table of Implementation Plan
Tasks and Actions

Appendix 7

Flowchart of Harvest Management
Assessment and Recommendations

Appendix 8

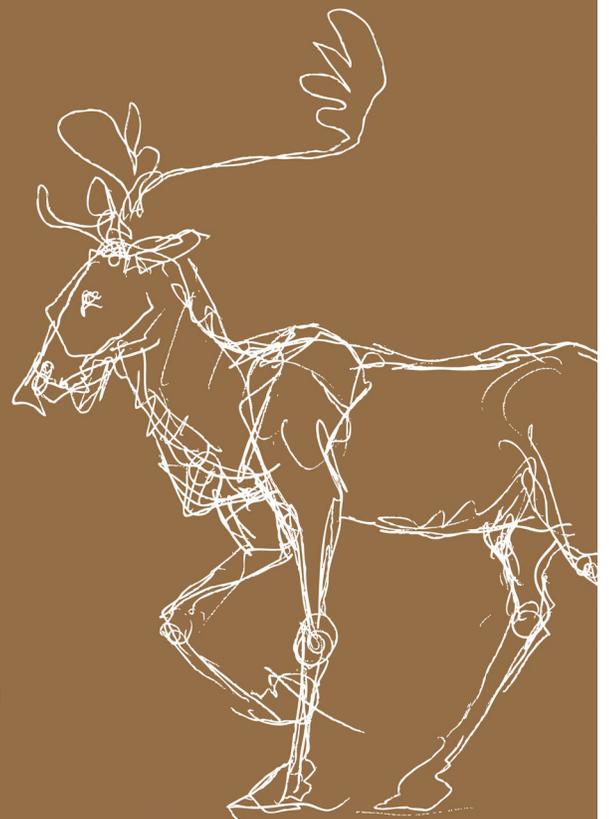
Milestones Calendar of Recurring
Annual Activities

Appendix 9

Porcupine Caribou Herd — A Review of the
Design of the Harvest Reporting Program

Appendix 10

Implementation Plan Development — Participating
Senior Officials







Appendix 1

Jurisdiction-Based Harvest Reporting Programs and Harvest Management Measures/Mechanisms

Vuntut Gwitchin Government

Gwich'in Tribal Council
(Gwich'in Renewable Resources Board)

Inuvialuit Game Council

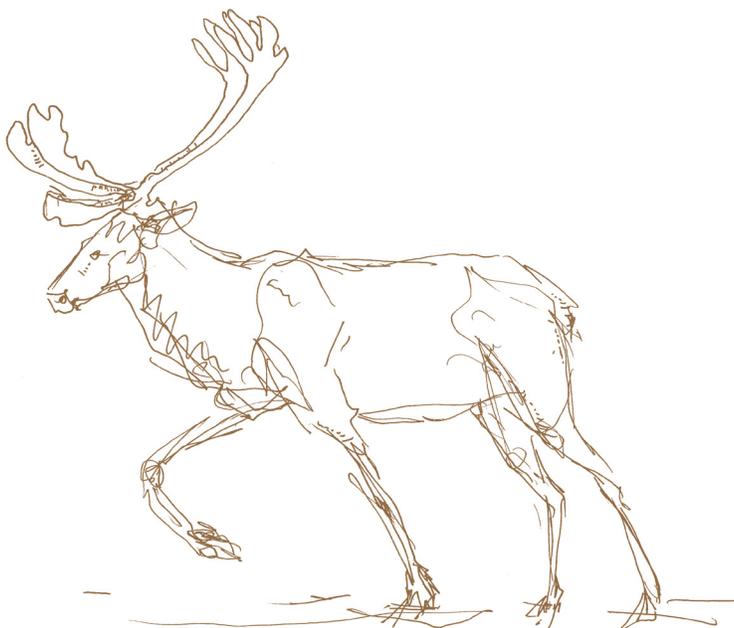
Tr'ondëk Hwëch'in

First Nation of Na-Cho Nyäk Dun

Yukon Government

Government of the Northwest Territories

Government of Canada – Parks Canada Agency





Appendix 1

Vuntut Gwitchin Government

Harvest Reporting Program

Program administration

- Department of Natural Resources (VGG-NR), Vuntut Gwitchin Government (VGG)

Compulsory information collected

- Name of individual interviewed
- Names of hunter party (if applicable)
- Date/month/season of harvest
- Location (Game Management Subzone)
- Number of animals
- Sex of animals: male/female

Supplementary information collected, if any (such as age class, biological samples, etc.)

- To be determined from time to time, and may be regionally linked to other related program and data requirements

Harvest reporting

- VGFN surveyor(s) will conduct door-to-door interviews in Old Crow of active PCH hunters as determined by VGG-NR
- Surveys will be conducted two times per year:
 - early summer following the spring migration (June)
 - mid-winter following the fall migration (November), and
 - in event of unusual herd distribution or hunting pressure, timing may change or additional interviews may be conducted
- Involvement of 100% of active hunters is sought. While full cooperation is anticipated, any lack of participation by will be discussed with Chief and Council
- Harvest information from VGFN citizens residing outside of Old Crow will be collected through the Dempster Highway check stations by prior administrative agreement between VGG, YG and GNWT
- VGG-NR will tabulate the community survey and Dempster Highway check station data involving VGFN citizens



Appendix 1

Harvest data review and submission

- Independent of the VGG-NR seasonal surveyors, VGG-NR monitors will be hired to contact hunters on the land, document current hunting activities (consistent with 'compulsory harvest information' requirements) proximate to the community (locally in spring and early winter primarily on Old Crow Mountain, Flats and on the Porcupine River) and submit this information to the VGG-NR
- VGG-NR will review the harvest data from the door-to-door surveys, the VGG-NR monitoring reports and the Dempster check station information in preparing VGG's annual report
- VGG-NR will calculate the reported harvest and harvester response rates for each community survey period
- VGG-NR will calculate the total estimated harvest (with software provided for that purpose, if required)
- Total reported harvest, total estimated harvest and harvester response rates, survey questionnaire, summary observations/reports from field (visual) monitoring, and an assessment of the program will be submitted by the VGG Director of Natural Resources to both the PCMB and the respective organizations of the Parties prior to the Annual Harvest Meeting and by no later than July 15
- VGG-NR will encourage and facilitate in-season information exchange between VGG and the other Parties, including community visits and staff exchanges, particularly during field operations when hunting and harvest monitoring is occurring

Harvest Management Mechanisms/Measures

- VGG intends to establish legislation as soon as practicable that requires all VGFN harvesters of Porcupine Caribou to harvest bulls only and to report their harvest
- Legislation will enable VGG to implement a harvest tag system when and if required
- Administrative arrangements are being developed with YG regarding enforcement of YG legislation in northern Yukon and cooperative arrangements with VGG regarding enforcement of pending VGG legislation
- VGG will consider requiring hunters to provide proof of sex for mandatory bulls in the orange zone as appropriate



Appendix 1

Gwich'in Settlement Region

Harvest Reporting Program

Program administration

Gwich'in Renewable Resources Board

Gwich'in Tribal Council – Lands Administration and Resource Management

Compulsory information collected

- Name of individual interviewed
- Names of hunter party (if applicable)
- Date/month/season of harvest
- Location (10x10 km grid NWT/GMS Yukon)
- Number of animals
- Sex of animals: male/female

Supplementary information collected

- Condition of animals
- Type(s) of vehicles used
- Hunting conditions (better, worse, etc.)
- Numbers of caribou observed (compared to previous years)
- Level of hunting activity compared to past
- Wildlife or food that is substituted for caribou, if hunting less
- Percentage of food that is store-bought
- Unusual observations
- Relevant harvest information reported elsewhere (check station/access consent form/field check)

Harvest reporting

- RRC surveyor will conduct door-to-door surveys of active Gwich'in harvesters of Porcupine Caribou in each of the communities of Inuvik, Aklavik, Fort McPherson and Tsiigehtchic
- RRCs in each of these communities will review and compile annually an active hunter list that includes active harvesters of Porcupine Caribou, which is provided to the GRRB and to surveyors
- RRCs will conduct surveys at a minimum of two times per year up to a maximum of four times per year (August, **November**, February, **May**)
- GTC/ENR/GRRB will undertake communications to encourage participation in the survey
- Involvement of 100% of active hunters is sought. While full cooperation is anticipated, any lack of participation will be discussed with RRCs/GTC
- The Shingle Point Charr monitor may also gather Porcupine Caribou harvest data
- RRCs will submit completed community surveys to the GRRB



Appendix 1

- GTC has responsibility for ensuring that Gwich'in harvest data in the Yukon (Primary and Secondary Use areas and Yukon North Slope) is collected and available to the GRRB
- GRRB will tabulate the community survey data, Dempster Highway check station data involving Gwich'in hunters not residing in the Gwich'in communities, and Gwich'in harvest data collected in the Yukon
- GRRB will compile annual data reports

Harvest data review and submission

- GRRB and RRCs will review the harvest data from the door-to-door surveys and the check station information before it is finalized
- GRRB will calculate the reported harvest and harvester response rates for each community survey period
- GRRB will calculate the total estimated harvest (with software provided for that purpose, if required)
- Total reported harvest, total estimated harvest, harvester response rates, and summary observations/reports from field (visual) monitoring will be compiled in an annual harvest report by the GRRB staff and reviewed by the GRRB board of directors before it is released and submitted, along with the survey questionnaire, to the PCMB, GTC and ENR prior to the Annual Harvest Meeting and no later than July 15
- Data will be made publicly available upon request, subject to GRRB protocols and the discretion of the Executive Director

Harvest Management Mechanisms/Measures

- GRRB can make recommendations to the NWT Minister for regulations under the NWT *Wildlife Act* and regulations. If these recommendations will restrict aboriginal harvesting rights, the process would require consultation and a public hearing
- The NWT *Wildlife Act* is currently being updated to include co-management board responsibilities
- GTC has the ability to pass resolutions to approve by-laws that would be applicable to Gwich'in Participants with respect to harvesting
- In the Yukon, GTC can make a recommendation to the Yukon Minister directly or through the Mayo District RRC process on issues relating to the Primary and Secondary use areas affecting Gwich'in harvesting rights
- GTC will consider requiring hunters to provide proof of sex for mandatory bulls in the orange zone as appropriate



Appendix 1

Inuvialuit Game Council

Harvest Reporting Program

Program administration

The Community Support Unit (CSU) staff at the Joint Secretariat (JS) on behalf of the IGC will administer the harvest reporting program for Inuvialuit hunters with the support of the Aklavik, Inuvik, and Tuktoyaktuk HTCs

Compulsory information collected

- Name of individual interviewed
- Names of hunter party (if applicable)
- Date/month/season of harvest
- Location (10x10 km grid NWT/GMS Yukon)
- Number of animals
- Sex of animals: male/female

Supplementary information collected

- If biological samples were submitted
- Hunter assessment of condition, evidence of disease
- Any strange observations: unusual weather events, animals
- Effectiveness of communications
- If harvest has been reported elsewhere (check station/access consent form/field check)

Harvest reporting

- Each HTC will annually review and update the active harvester list that includes active harvesters of Porcupine Caribou
- Field workers will be hired in each community by the HTC
- A door-to-door survey of active harvesters will be conducted two times per year (October/November and April/May)
- IGC and HTCs will undertake communications to encourage participation in the survey
- Involvement of 100% of active hunters is being sought. While full cooperation is anticipated, any lack of participation will be discussed with the HTC and IGC
- Data sheets will be provided to the JS staff by the HTC
- Data will be summarized in a standard spreadsheet and a GIS layer of harvest density (i.e. total number of bulls and cows taken in each 10x10 grid by month/season by community)



Appendix 1

Harvest Data Review and Submission

- After each collection period, the harvest data will be compiled by JS staff and returned to the HTC's for review and sign-off
- IGC will review and sign off the data following review by the HTC's
- All signed-off data (including harvester's name) will be stored at the JS
- The CSU will calculate the harvester response rates and reported harvest for each community survey period
- The CSU will calculate the total estimated harvest (with software provided for that purpose, if required)
- Total reported harvest, total estimated harvest, harvester response rates, summary observations/reports from field (visual) monitoring and the survey questionnaire will be submitted by the IGC to the PCMB semi-annually, prior to the Annual Harvest Meeting and no later than July 15
- GNWT conservation officers and other monitors will conduct patrols, and by agreement in partnership with the other Parties, monitor and record the reported harvest of Porcupine Caribou, and educate harvesters on hunter safety and best practices
- The CSU will compare the reported harvest from the door-to-door surveys against the field harvest monitoring from the Dempster check stations and other sources. These field recorded data will be used to help improve the documentation of the harvest reported during the interview process. (e.g. the coverage of the list of active harvesters of Porcupine Caribou)
- The results of the review process will be provided to the IGC, HTC's and field workers in an effort to improve the data collection
- The results of the review process will be submitted to the PCMB by IGC for the Annual Harvest Meeting
- The IGC will encourage and facilitate in-season information exchange between IGC and the other Parties, including community visits and staff exchanges

Harvest Management Mechanisms/Measures

- IGC or WMAC (NWT)/WMAC (NS) can make recommendations to the Territorial Ministers for regulations under the *Wildlife Act* and regulations; if these recommendations will restrict aboriginal harvesting rights, the process will require community consultation through the co-management process
- The NWT *Wildlife Act* is currently being updated to enhance co-management board responsibilities, including IGC participation, through the Conference of Management Authorities
- The Yukon *Wildlife Act* establishes the roles and responsibilities of the IGC and WMAC (NS) in harvest management as provided for in the *Inuvialuit Final Agreement*
- HTC Wildlife bylaws provide a means for collecting harvest information through the issuance of tags to Inuvialuit harvesters, should harvest management conditions require such an arrangement
- HTC wildlife bylaws are enforceable by the GNWT and YG should circumstances require it
- IGC will consider requiring hunters to provide proof of sex for mandatory bulls in the orange zone as appropriate



Appendix 1

Tr'ondëk Hwëch'in

Harvest Reporting Program

Program administration

The Natural Resources Department, Fish and Wildlife Branch (FWB) of TH will administer the harvest reporting program.

Compulsory information collected

- Name of individual interviewed
- Names of hunter party (if applicable)
- Date/month/season of harvest
- Location (Game Management Subzone)
- Number of animals
- Sex of animals: male/female

Supplementary information collected

- None provided

Harvest reporting

- A FWB steward will conduct door-to-door interviews of active TH harvesters at their places of residence
- The FWB management will compile and update annually an active hunter list of TH citizens that will include active harvesters of Porcupine Caribou
- TH FWB will undertake communications to encourage participation in the survey interviews
- TH FWB will undertake education measures as a part of the harvest reporting program to encourage hunter safety and best practices
- TH FWB will seek to complete 100% of the surveys from the list of active harvesters of Porcupine Caribou
- Surveys will be conducted two times per year at the end of October and the end of March
- YG, NND, and TH will review Dempster check station staff recruitment and operations
- TH FWB management will tabulate the community survey and Dempster Highway check station harvest data



Appendix 1

Harvest Data Review and Submission

- A TH harvest monitor, independent of the TH steward, will monitor the TH traditional territory fall harvest on the Dempster Highway, document who has harvested Porcupine Caribou, and submit this information to the TH FWB
- Dempster check station information will be collected and used, subject to the agreement between TH and YG, to complement community-based survey reporting
- TH FWB will make arrangements with Dawson Field Operation (YG) for joint patrols on the Dempster
- TH FWB will compile harvest information from all sources
- TH Director of Natural Resources will independently review the harvest data from the community-based door-to-door surveys, monitoring reports and the check station information before it is finalized by the TH FWB
- TH FWB will meet annually with the field operations manager (YG) to review activities on the Dempster Highway (e.g. infractions and other incidents)
- The reported harvest, harvester response rate, a summary of observations/reports from field (visual) monitoring and the survey questionnaire will be submitted to the PCMB by the TH FWB prior to the Annual Harvest Meeting and no later than July 15

Harvest Management Mechanisms/Measures

- TH has a *Fish and Wildlife Act* to manage and administer the harvest of Porcupine Caribou and other wildlife by their citizens, by citizens of other First Nations receiving consent to harvest in the TH traditional territory, and by licensed hunters on specified settlement lands
- Based on support of the HMP by the Elders Council and citizens, the Chief and Council will issue a directive for a mandatory bulls-only harvest consistent with harvest allocation. Harvest management measures are communicated to all TH hunters. Monitoring will continue; TH responds to non-responsible harvesting
- TH enforces the *Fish and Wildlife Act*
- Discussions with YG Department of Justice are anticipated to provide an interim administration of justice protocol for court services for prosecution under the TH *Fish and Wildlife Act*.



Appendix 1

First Nation of Na-Cho Nyäk Dun

Harvest Reporting Program

Program administration

The NND Lands Department will administer the harvest reporting program

Compulsory information collected

- Name of individual interviewed
- Names of hunter party (if applicable)
- Date/month/season of harvest
- Location (Game Management Subzone)
- Number of animals
- Sex of animals: male/female

Supplementary information collected:

- Supplementary information collected by harvest surveys includes condition of animals, climate, changes on the land, etc.

Harvest reporting

- NND surveyor will conduct a door-to-door interview during the spring months of each year of active NND harvesters in Mayo
- NND Lands Department will compile annually an active hunter list of NND citizens that includes active harvesters of Porcupine Caribou
- The intent is to survey all NND hunters who apply for Traditional Pursuits funding; all of those who apply for funding are interviewed
- Any and all NND traditional knowledge is prepared, assessed and stored by NND only
- NND has established policies for both their Traditional Pursuits program (requiring mandatory harvest reporting) and traditional knowledge policy (use of information) that applies to all NND citizens regardless of their place of residency
- NND will undertake communications to encourage participation in the survey
- NND Lands Department strives for 100% participation in hunter surveys. In the event of harvester non-reporting, further funding will not be granted
- YG, NND, and TH will review Dempster check station staff recruitment and operations
- Dempster check station information will be collected and used as appropriate between YTG and NND to complement community-based survey reporting. NND encourages all Dempster Highway hunters to report to the Dempster check station
- NND Lands Department maintains a well-established relationship with the local conservation officer and the local regional biologist



Appendix 1

Harvest Data Review and Submission

- The NND Lands Department will compile the community survey and Dempster Highway check station harvest data
- Independently of the surveyor, NND will review the harvest data from the community-based door-to-door surveys and the check station information before it is finalized by the NND Lands Department manager
- The reported harvest, harvester response rate, summary observations/reports from field (visual) monitoring and the survey questionnaire will be submitted to the PCMB by NND Fish and Wildlife manager prior to the Annual Harvest Meeting and no later than July 15

Harvest Management Mechanisms/Measures

- A wildlife act is in development to provide a legal basis to regulate harvesters, including the reporting of harvest as appropriate
- Based on support of the HMP by the Elders Council and citizens, the Chief and Council will issue a directive for a mandatory bulls-only harvest consistent with a harvest allocation. Harvest management measures are communicated to all NND hunters. Monitoring will continue. NND responds to non-responsible harvesting
- Discussions are underway regarding enforcement of an NND wildlife act
- Harvest allocations are anticipated to continue to be held by NND government for community hunts



Appendix 1

Government of Yukon

Harvest Reporting Program

Program administration

YG will administer the harvest reporting program for Yukon's licensed harvesters.

Compulsory information collected

- Name of individual interviewed
- Names of hunter party (if applicable)
- Date of harvest
- Location (Game Management Subzone)
- Number of animals
- Sex of animals: male/female

Supplementary information collected

- None provided

Harvest reporting

- All licensed hunters harvesting Porcupine Caribou in the Yukon are required to purchase a hunting licence and tag. Harvest reporting is mandatory for these hunters
- YG will undertake communications to educate harvesters of Porcupine Caribou about harvest reporting requirements and regulations
- YG will undertake education measures as a part of the harvest reporting program to encourage hunter safety and best practices
- A Dempster check station operated by YG and, by agreement, with other Parties, will collect harvest information from all southbound harvesters of Porcupine Caribou (See Appendix 2)
- Both licensed and aboriginal hunters of Porcupine Caribou under the current interim *Wildlife Act* legislation are required to stop and report at an open check station or to a field officer. Field officers will use a progressive compliance policy to guide enforcement actions respecting the interim legislation
- YG will compile the Dempster check station and field monitoring information and share the information with the appropriate Parties, through information sharing agreements where necessary
- YG will compile the information from all submitted harvest reports



Appendix 1

Harvest Data Review and Submission

- YG conservation officers will conduct patrols and monitor and review harvesting of Porcupine Caribou in the Yukon, along with other personnel (check station workers) in collaboration, where possible, with partners
- YG will conduct and/or assist with educational programs related to the HMP, including hunter safety and best practices
- YG will review the harvest data from the south Dempster check station, tag information and reports submitted by harvesters and field staff before it is finalized by YG. (See Appendix 2) Harvest data for individuals will be provided to other Parties as appropriate and by agreement by April 30 for inclusion in a Party's compilation of reported harvest and estimate of total harvest. A summary of reported harvest, harvester response rate, estimated total harvest and summary observations/reports from field monitoring will be submitted to the PCMB annually by June 1

Harvest Management Mechanisms/Measures

Current status

- The *Wildlife Act* interim regulations/measures include bulls only for aboriginal harvesters, one bull only for licensed hunters, mandatory reporting and evidence-of-sex measures
- These regulations are currently under review
- Enhanced field presence is currently in place
- South check station operational
- Initiating agreements/MOUs with various Parties (information sharing, joint operations, enforcement) and will continue to focus on bilateral discussions or arrangements for collaborative activities

Under consideration (without prejudice)

- Commitment to review interim measures (underway); ministers will review Implementation Plan
- Set aside mandatory bulls only for yellow zone with possible measures to reinstitute if needed (e.g.: if harvest does not substantively reflect HMP bulls-only provisions, or in consideration of one or more requests by Parties, or shift to orange/red zone)
- One bull only for licensed hunters (in effect)
- Mandatory reporting to conservation officers or where check station exists
- Evidence of sex is required
- Development of agreements with Parties on information sharing, joint operations and enforcement; provide in-season updates and information/education throughout zones

Orange zone (and red zone if required)

- Develop coordinated PCH range tag system with GNWT and collectively provide tags to identified Parties as determined through Allocation Agreements
- Field verification, monitoring and enforcement provisions to address any non-quota harvests (both licensed and aboriginal)
- Evidence of sex requirement



Appendix 1

Government of the Northwest Territories

Harvest Reporting Program

Program administration

ENR Inuvik Region will administer the harvest reporting program for resident hunters

Compulsory information collected

- Name of individual interviewed
- Date/month of harvest
- Location (converted to 10x10 km grid NWT/GMS Yukon)
- Number of animals
- Sex of animals: bulls/cows

Supplementary information collected

- If biological samples were submitted

Harvest reporting

- All resident hunters harvesting Porcupine Caribou in the NWT are required to purchase a hunting licence and tags. Harvest reporting is mandatory for resident hunters. Currently, reporting is requested through a voluntary mail-out questionnaire administered by ENR, Yellowknife; efforts are underway to change reporting methods, whether through the mail survey, reporting at ENR Office, or phone calls to hunters
- ENR renewable resource officers will undertake communications to educate harvesters of Porcupine Caribou of harvest reporting requirements
- ENR will undertake education measures as a part of the harvest reporting program to encourage hunter safety and best practices
- ENR, Wildlife Management will compile the information from all submitted harvest reports



Appendix 1

Harvest Data Review and Submission

- GNWT conservation officers will conduct patrols, and by agreement in partnership with the other Parties, monitor and record the reported harvest of Porcupine Caribou, and educate harvesters on hunter safety and best practices
- ENR, Inuvik Region staff will compile the north Dempster check station and field monitoring information and share the information with the other Parties, subject to agreements between the GNWT and the other Parties
- ENR, Wildlife Management will review the harvest data from the north Dempster check station, tag information and reports prepared by conservation officers, before it is finalized by the GNWT. (See Appendix 2)
- The reported harvest, harvester response rate, estimated harvest, and a summary of observations/ reports from field (visual) monitoring, will be submitted to the PCMB by ENR, Wildlife Management for the Annual Harvest Meeting no later than July 15
- ENR will encourage and facilitate in-season information exchange between ENR and the other Parties, including community visits and staff exchanges, particularly during field operations when hunting and harvest monitoring is occurring

Harvest Management Mechanisms/Measures

Current status

- Working with co-management partners to increase awareness of HMP at community level
- Enhanced field presence
- North check station operation
- Initiating agreements with various Parties (information sharing, joint operations)

Under consideration (without prejudice)

- Reduce resident harvest to one bull tag

Orange zone

- Implement an Annual Allowable Harvest and tag system if requested by PCMB, GRRB and WMAC (NWT) through HTC by-law regulations and big game hunter regulations
- Enhanced field verification of assigned allocation (e.g. tag) and verification of sex



Appendix 1

Government of Canada - Parks Canada Agency

Harvest Reporting Program

Program administration

Ivvavik and Vuntut National Parks of Canada will likely participate in field monitoring of Inuvialuit and Vuntut Gwitchin harvesting in the national parks and possibly the regions adjacent to these national parks if this can be done in a practical manner

Compulsory information collected

- Name of individual interviewed
- Names of hunter party (if applicable)
- Date/month of harvest
- Location (Game Management Subzone and/or 10x10 km grid)
- Number of animals
- Sex of animals: male/female

Supplementary information collected (if any, such as age class, biological samples, etc.)

- Age class
- If biological samples were collected

Harvest reporting and release of information

- Any harvest data collected by PCA will be shared with the Aklavik HTC and VGG Department of Natural Resources as applicable for harvest reporting and verification purposes
- PCA will participate in communications and education programs that encourage participation in harvest reporting programs, and encourage hunter safety and the application of best harvest practices

Harvest Management Mechanisms/Measures

Current status

Both Vuntut National Park and Ivvavik National Park are listed under the Canada *National Parks Act* and include subsistence harvesting activities and rights. Regulations are in place to prohibit non-beneficiary caribou harvesting activities

Under consideration (without prejudice)

Pursue mechanism to enable application of HTC by-laws and VGG legislative requirements for tag-based reporting should HMP conditions require



Appendix 2

Check Station Functions and Operations

Purpose

The current purpose of check stations operating on the Dempster Highway, and other appropriate locations, is twofold: to report/verify the harvest of Porcupine Caribou through information collected from hunters in the vicinity of the Dempster Highway/location and to function as a harvester education and communications tool.

Operations

Dempster Highway check stations operating in the Yukon and Northwest Territories are the responsibility of the YG and GNWT respectively. Other check stations will be operated as deemed appropriate by the Parties. YG and the GNWT will collaborate with all Parties in the preparation of an annual operations plan and with attention to considerations that include the following:

- herd status and recommended management actions
- coordination of operations between the check stations (including number of check stations, location, and timing)
- sharing of personnel resources, including partnerships with other Parties, the participation of their citizens and beneficiaries, staff interchanges and local hiring, standardized data requirements and information-sharing arrangements, staff qualifications and training
- after-hour assessment reporting and monitoring
- self-check harvest information surveys and calendars
- a communications plan to encourage public support for and harvester participation in check station operations
- signage at check stations
- enhanced efforts during the spring harvest period
- measures to encourage reporting



Appendix 2

Fall-Winter 2010-11 Operational Plan

The operational plan for the fall of 2010 is to establish one Dempster south check station jointly operated by the YG, TH, NND, and one check station at the Peel River jointly operated by the Tetlit RRC, GTC, IGC and GNWT. The south Dempster station will be in operation from September 15 to December 15 and again from January 15 to May 15. The north Dempster check station will be open at Midway Lake Festival and remain in operation as long as the ferry is operating at the Peel River.

In addition, the Yukon will provide enhanced field monitoring along the entire Dempster Highway within the Yukon and in Old Crow. NWT RRCs will also conduct field monitoring. The purpose of the field monitoring will be to verify and acquire harvest information and provide hunter education. This information will be compared to the data collected from the two check stations and through other data collection methods (e.g. door-to-door surveys). The intent is to evaluate the effectiveness of the various harvest collection methods in order to achieve the most rigorous and verifiable method in the future.

The operational plan for the spring of 2011 is under discussion between the Parties. It includes consideration of alternatives to a stationary check station. One consideration is a jointly operated mobile station after the ice bridge on the Peel is in place. This station would move between the Yukon and the NWT, depending on harvesting activity.



Appendix 3

Annual Harvest Meeting Terms of Reference

Background

The Harvest Management Plan for the Porcupine Caribou Herd in Canada (HMP) outlines a long-term framework for harvest management actions that are based on the status of the herd (e.g. herd size, population trend). This enables the eight Parties who are responsible for the implementation of the Porcupine Caribou Management Agreement to coordinate management actions with the Porcupine Caribou Management Board (PCMB).

The Parties, through harvest management (colour) zones described in the HMP, have pre-determined specific management actions.

Pursuant to the requirements of the HMP, the PCMB will convene an Annual Harvest Meeting in the second week of February of each year to assess the status of the herd, based on the best available information, including the Annual Summary Report prepared by the Porcupine Caribou Technical Committee. This information will be used to determine and recommend management actions to the Parties.

Purpose of the Annual Harvest Meeting

The PCMB will convene the Annual Harvest Meeting to:

- (i) Assess the population status of the herd;
- (ii) Determine the harvest management (colour) zone that applies to the herd based on the assessment; and
- (iii) Recommend management actions for the following harvest year to the Parties.



Appendix 3

Meeting Format

The Annual Harvest Meeting will be organized into three working sessions:

- (A) Public Information and Comment Meeting;
- (B) Meeting of the PCMB and Parties; and
- (C) Deliberation Meeting of the PCMB

A. Public Information and Comment Meeting

The purpose of the Information Session is to share the current information affecting the status of the herd and its habitat, and to provide an opportunity for public discussion and comment on the following matters:

- herd status and trend;
- reported and estimated total harvest of the herd, including sex ratio; and
- factors affecting the herd.

This will include an updated overview of current or recent harvest management actions by the Parties.

This meeting will be supported by presentations and comments by:

- the Porcupine Caribou Technical Committee,
- the Parties,
- co-management boards (i.e. Wildlife Management Advisory Committee (North Slope), Wildlife Management Advisory Committee (NWT), Gwich'in Renewable Resources Board),
- other organizations and stakeholders (e.g. Renewable Resources Councils, Hunters and Trappers Committees, Yukon Fish and Wildlife Management Board), and
- the general public.

The PCMB will prepare a short summary of this session to be available publicly within 60 days.

B. Meeting of the PCMB and Parties

The purpose of this *in camera* meeting of the PCMB and Parties is to collectively review the assessment of the status of the herd and harvest management actions and to discuss sensitive information and topics, where necessary. This will involve consideration of the following matters:

- herd status and trend;
- reported and estimated total harvest of the herd, including sex ratio, and methods used to verify actual harvests;
- factors other than harvest affecting the herd;
- assignment of the appropriate harvest management (colour) zone;
- rate-of-harvest risk scenarios;



Appendix 3

- evaluation of management actions by each Party;
 - challenges and/or successes encountered; and
 - management options and actions for the following harvest year.
- The Parties may invite technical experts as required.

C. Deliberation Session of the PCMB

The purpose of this *in camera* meeting is to develop harvest management recommendations for the herd for the next harvest year.

Within 30 days of this meeting, the PCMB will provide its report to the Parties identifying and recommending:

- (i) the harvest management (colour) zone and the rationale for this determination;
- (ii) the harvest management actions that should apply to the herd; and
- (iii) the rationale for these recommendations.

Fifteen days following the transmittal of this report to the Parties, it will be made available to the public by the PCMB.

The Parties shall, within 30 days of receipt of the recommendations, either provide the PCMB with a written response or, where they are not able to respond fully, they shall so inform the PCMB and advise when the full response will be provided.

Financial Considerations

The PCMB is responsible for expenses related to its members' participation, in accordance with the PCMA, and the administrative costs of convening these meetings. All other participants are responsible for costs they may incur in their participation.

Amendments to Annual Harvest Meeting Terms of Reference

This Terms of Reference will be reviewed from time to time as the Parties may determine. Any Party or the PCMB may propose amendments at any time, but amendments proposed within three months of the Annual Harvest Meeting shall not be reviewed by the Parties until after the meeting. The PCMB Chair shall forward proposed amendments to the Parties for review within 30 days of receipt. Parties shall have 90 days to provide comment. Once approved by all the Parties, the amended Terms of Reference shall supersede any previous versions.



Appendix 4

Template for the Annual Submission of Harvest Data to the PCMB

As described in each section of Appendix 1, each Party will provide the data listed below to the PCMB. This will be done annually or semi-annually, according to Appendix 1 of the Implementation Plan.

The data ultimately will be reported on a caribou year (June 1 to May 31).

In this format, the harvest in each grid or subzone would be summed and presented by month/season. There will be one line of data for each grid or subzone with successful harvest in that month/season.

Spreadsheet Variables

Entry Information

	IN – Inuvialuit
	GW – NWT Gwich'in
	VG – Vuntut Gwitchin
	TH - Tr'ondëk Hwëch'in
	NND - Na-Cho Nyäk Dun
	RES – Licensed Resident hunter
	NR – Licensed Non-Resident Hunter
User Group	OH – Hunters from other native groups
Community	Aklavik, Dawson, Fort McPherson, Inuvik, Old Crow, Mayo, Tsiigehtchic, Tuktoyaktuk, Other Yukon, Other NWT
Month	numeric value (1 to 12)
Year	numeric value
# Bulls	numeric sum of bulls taken in that area
# Cows	numeric sum of cows taken in that area
Unknown	numeric sum of caribou of unreported sex taken in that area
Total	formula that totals Bulls, Cows and Unknown
Grid/Subzone	location for this group of harvests
Number of hunters	number of hunters hunting in this area



Appendix 4

For each submission, by community, it is also necessary to provide:

1. period of the data collection;
2. the number of active harvesters;
3. the number of active harvesters that were contacted; and
4. the number of active harvesters that were willing to provide information.

The target is to identify “Key Harvesters” in the community as a separate stratum to improve the estimate of total harvest. Once this is done it will be necessary to identify the above information (1-4) for both “Key Harvesters” and the rest of the active harvesters.

Some Parties may only collect season versus month of harvest. If this is the case, then the data provided would be a single line for each GMZ or grid if mapping is desired, or a single line of data for each community if no location is provided.

Each Party will also be responsible for calculating the estimated total harvest of bulls and cows (including unknown sex) for each community for the reporting season. The formulas are included in the spreadsheet provided to each Party. It is necessary for each Party to do this calculation because of the need to know the total harvest of each harvester in order to calculate the variance on the estimate.

Each Party will also provide a summary of field monitoring or check station data and an assessment of the harvest reporting programs.



Appendix 5

Table of contents of PCTC annual summary report (Draft)

Indicator Table

Summary

Introduction

Herd Background

Management direction and goals

Population

Population size – photocensus

Population size – computer modeling

Adult female survival

Calf birth rate, and calf survival

Peak of calving

Short yearling survival to 3 years of age

Bull ratio

Scenario-based Risk Assessment of Rate of Harvest

Harvest

Hunt management

Estimated number of caribou harvested

Proportion of females in the harvest

Were hunters' needs met?

Caribou Body Condition

Hunter assessments

Indicator trends

Abnormalities

Habitat

Wildland fires

Snow depth

Extreme weather events

Literature cited

Appendices

Appendix A. Summary of biological parameters

Appendix B. Cooperative organizations



Appendix 6

Summary Table of Implementation Plan Tasks and Actions

	Activity	Lead	Participants	Timing
1. Harvest Management Assessment				
Task 1	Report rigorous and verifiable harvest information for all hunters of Porcupine Caribou at all times of the year	All Parties	HTCs, RRCs, GRRB, JS, WMACs	
1.1.1	Establish an integrated harvest reporting program and collect comparable harvest information for all hunters of the Porcupine caribou herd	All Parties	JS, WMACs, GRRB, HTCs, and RRCs	Fall 2010
1.1.2	Implement a jurisdiction-based harvest reporting/verification program in the communities of Tuktoyaktuk, Inuvik, Aklavik, Fort McPherson, Tsiigehtchic, Old Crow, Mayo and Dawson City	All Parties	JS, WMACs, GRRB, HTCs and RRCs	Fall 2010
1.1.3	Implement a harvest reporting/verification program through the use of check stations and field monitoring	YG, GNWT	Participation/partnerships with individual Parties as agreed to by these Parties	Fall 2010
1.1.4	Develop a template for the compilation of annual harvest data collected by each of the Parties for inclusion in the Annual Summary Report	PCTC	Parties approve	December 2010; review December 2011
1.1.5	Develop a software program as required to facilitate the calculation of a total estimated harvest, where appropriate	GC	All Parties, GRRB	Fall 2011
Task 1.2	Conduct annual harvest data analysis	All Parties		
1.2.1	Analyze the harvest information collected and submitted by the Parties annually	Chair PCTC	PCTC members	Completed by November 15 (Annual Summary Report)



Appendix 6

	Activity	Lead	Participants	Timing
Task 1.3	Conduct annual population analysis	PCTC	PCMB, Parties	
1.3.1	Review and prepare updated population models	PCTC	Expert contractor	No later than February 2011
1.3.2	Provide herd population information annually to the GC-CWS, PCTC and PCMB to assist in the preparation of the Annual Summary Report	YG, GNWT, ADFG, USFWS	PCTC, PCMB	As completed
1.3.3	Prepare and maintain a long-term database and provide annual summary of biological information to inform the Annual Summary Report and the population model	GC-CWS	PCTC	Updated by November 1 annually
1.4	Prepare Annual Summary Report	PCTC	PCMB, Parties	
1.4.1	Develop and confirm the Annual Summary Report template	PCTC	PCMB, Parties	1 October 2010
1.4.2	Prepare an Annual Summary Report, including a population estimate, with the most current available biological information about the herd and the analysis of the total estimated harvest and submit to the PCMB	PCTC		No later than November 15
1.5	Convene the Annual Harvest Meeting and conduct the harvest management assessment	PCMB	Parties and Others	
1.5.1	Develop and approve the terms of reference for the Annual Harvest Meeting	PCMB develop	Parties approve	Approve by December 2010
1.5.2	Distribute the Annual Summary Report to Parties, invite submission of additional information supplementary to the report, and attendance at the Annual Harvest Meeting	PCMB	Parties register prior to January 20	Annually no later than December 1



Appendix 6

	Activity	Lead	Participants	Timing
1.5.3	In response to the Annual Summary Report, each Party will provide written comments and additional information	Parties	WMAC, GRRB	By January 20 for distribution by PCMB prior to Annual Harvest Meeting
1.5.4	Convene the Annual Harvest Meeting to discuss the Annual Summary Report	PCMB	Parties	Annually during the second week of February
1.5.5	Collectively review the effectiveness of each Party's management actions as reported by each Party at the AHM	PCMB	Parties	Annually during the second week of February
1.5.6	Conduct the harvest management assessment to determine the harvest management (colour) zone and recommend harvest management actions to the Parties	PCMB	Parties, responsible co-management organizations, interested organizations and interested public	Annually during the second week of February; recommendations by the PCMB to follow within 30 days
1.5.7	Review harvest management recommendations from the PCMB and determine how to implement management actions within respective jurisdictions	All Parties	WMAC (NS), WMAC (NWT), GRRB	As practicable, dependent on management actions

2. Harvest Management

Task 2.1	Develop and implement communication and education materials and programs	PCMB	Parties, WMAC (NS), WMAC (NWT), GRRB, RRCs, HTC's	
2.1.1	Develop communications materials to inform and educate harvesters about the HMP	PCMB develops materials	GNWT, YG, IGC, GTC, VGG, TH and NND modify PCMB materials and communicate this information	By 18 June 2010 or on signing of the HMP, whichever comes first
2.1.2	Develop and implement a communications plan and distribute required information for fall 2010		Available Parties and communications specialists	By August 2010



Appendix 6

	Activity	Lead	Participants	Timing
2.1.3	Develop PCH hunter education program	PCMB coordinates development and makes recommendations to the Parties	Parties with GRRB, HTC's, RRCs	Complete modules by March 2011
2.1.4	Implement a youth/hunter education programs	GNWT/YG holds sight-in-your-rifle programs; all Parties develop and implement community-based programs and materials	GRRB, HTC's, RRCs	GNWT holds one SIYR per community and two on Dempster prior to March 2011
2.1.5	Develop an annual communication work plan that addresses: <ul style="list-style-type: none"> • herd status • management actions • board activities • hunter education • multi-year, multi-zone considerations 	PCMB	Parties	By May 31 of each year and implemented prior to August 1
Task 2.2	Develop harvest allocation measures	PCMB, All Parties	Parties, WMAC (NS), WMAC (NWT), GRRB, RRCs, HTC's	
2.2.1	Develop a range-wide Native User Access and Consent Agreement	IGC convenes the meetings as required for the participants	TH, NND, VGG, IGC, GTC	Initiate by spring 2011 and complete by 31 August 2011
2.2.2	Develop a Yukon First Nations Native User Agreement	VGG convenes the meetings as required for the participants	TH, NND, VGG	Initiate by spring 2011 and complete by 31 August 2011



Appendix 6

	Activity	Lead	Participants	Timing
2.2.3	Develop a Yukon First Nations/Yukon Government Agreement that addresses, at minimum, the allocation of Annual Allowable Harvest in the orange zone between licensed and native users	YG convenes the meetings as required for the participants	TH, NND, VGG	On completion of Yukon First Nations Native User Agreement
2.2.4	Develop a NWT Native User Agreement that addresses at minimum, the allocation of the NWT Native Annual Allowable Harvest in the orange zone	IGC, GTC convene bi-lateral meetings as required		In progress
2.2.5	Develop an NWT/Yukon/PCA administrative arrangement to recognize a range-wide Porcupine Caribou Herd tag	YG convenes discussions as required	GNWT, PCA	Initiate by February 2011 and complete by fall 2011
Task 2.3	Implement harvest management measures	All Parties	WMAC (NS), WMAC (NWT), GRRB, RRCs, HTC	
2.3.1	Develop and implement jurisdiction-based harvest management measures	All Parties	JS, WMACs, GRRB, HTC, and RRCs	Fall 2010
3. Monitoring, Evaluation and Adaptive Management				
Task 3.1	Evaluate the population model and modify as required	PCTC, PCMB, Parties		
3.1.1	Review and evaluate the population model and indicators, including the quality and reliability of the information they use and relative confidence in the estimates they produce; modify as required	PCTC	PCMB, Parties, Expert Contractor	As required
Task 3.2	Evaluate the quality and reliability of the harvest data and associated reporting program and methodology and modify as require	PCTC, PCMB, Parties	WMACs, GRRB, HTC, RRCs	



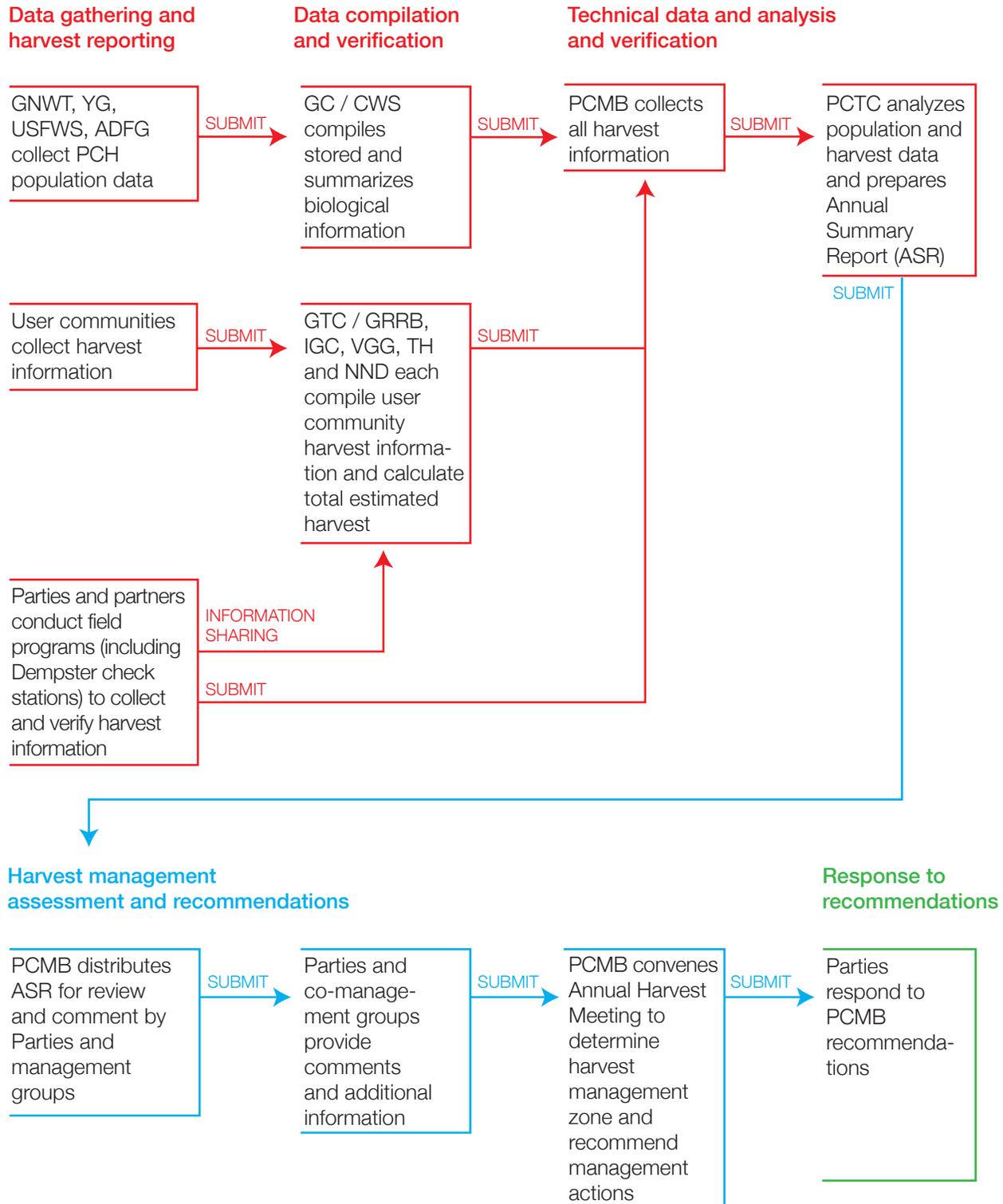
Appendix 6

	Activity	Lead	Participants	Timing
3.2.1	Conduct an independent review and evaluation, with recommendations where required, on the design of the harvest reporting program and its components to determine the rigour and reliability of the data output and the determination of the total estimated harvest	GC-PCA	Parties, PCTC, PCMB	Completed by fall 2010
3.2.2	Conduct an independent review and evaluation, with recommendations where required, on the methodology, and quality and reliability of the reported and estimated total harvest (including sex ratios) of Porcupine Caribou	GC-PCA	PCTC, PCMB, Parties	Completed and provided prior to 2012 Annual Harvest Meeting; repeat periodically as agreed to by the Parties at the AHM
3.2.3	Based on the evaluation completed in Activity 3.2.2, formally review the effectiveness of harvest reporting methods and programs; modify as required	All Parties	PCMB, PCTC, WMACs, GRRB, HTC, RRCs	AHM 2012; repeat periodically as agreed to by the Parties at the AHM
Task 3.3	Review and evaluate the PCH Harvest Management Plan and Implementation Plan and modify as appropriate	PCMB, Parties		
3.3.1	Evaluate the effectiveness and need for any revisions of the HMP and Implementation Plan	PCMB coordinates the evaluation; all Parties approve revisions that may be required	WMACs, GRRB	First review in 2015 or upon request of any Party



Appendix 7

Flowchart of Harvest Management Assessment and Recommendations





Appendix 8

Milestones Calendar of Recurring Annual Activities

January

20th Parties have provided to the PCMB their comments on the Annual Summary Report, supplementary information, and evaluation of harvest management measures

February

2nd week PCMB convenes Annual Harvest Meeting

March

2nd week PCMB has submitted harvest management recommendations to Parties

30th PCMB publicly releases recommendations.

April

2nd week Parties have responded to PCMB with written comments or advise when response will be provided.

May

31st PCMB and Parties complete annual communications plan

June

1st YG and GNWT submit summary harvest information to PCMB

July

15th All Parties have submitted summary harvest data reports and survey questionnaire to PCMB

15th - PCMB has forwarded harvest information package to PCTC for review

August

1st PCMB and Parties complete communications materials for distribution

September

October

November

15th PCTC has completed and submitted Annual Summary Report to PCMB

December

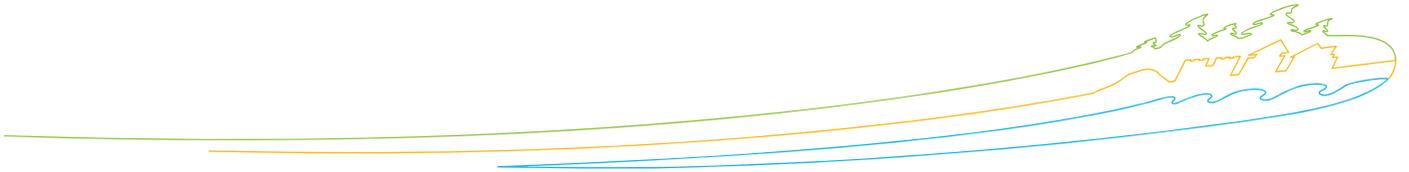
1st PCMB has distributed Annual Summary Report to Parties and issued invitations to the Annual Harvest Meeting

Appendix 9



Parks
Canada

Parcs
Canada



Porcupine Caribou Herd

A review of the design of the harvest reporting
program

17 September 2010

W.J. Rettie

Parks Canada

Western & Northern Service Centre, Winnipeg



Appendix 9



Summary

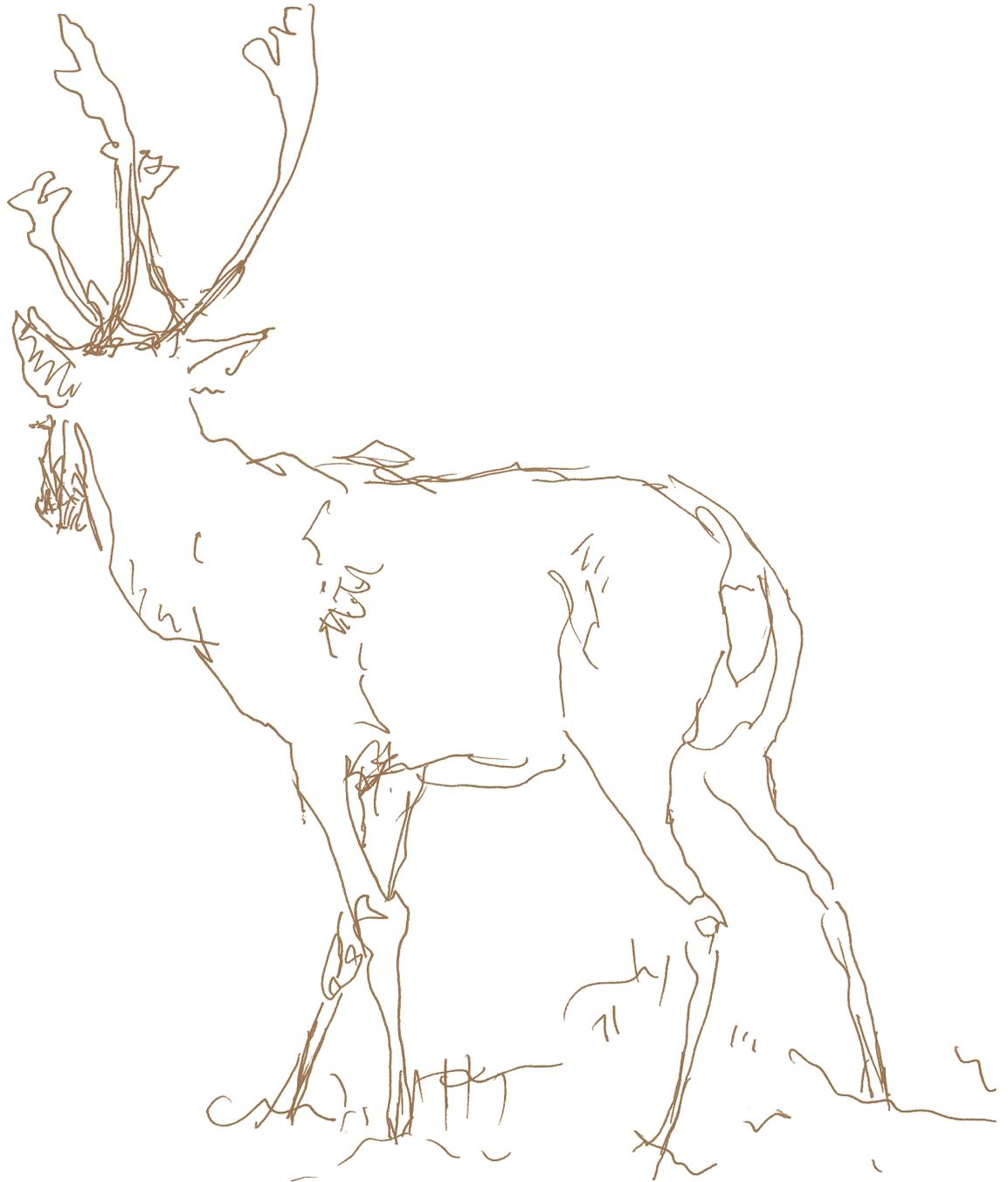
The following is a summary of my review and recommendations:

- R 1. The proposed structure of the harvest reporting as a stratified sampling program is appropriate and well done;
- R 2. The proposed maintenance of active hunter lists and the questionnaire format applied in recent harvest studies will generate all the necessary data to assess PCH caribou harvest.
- R 3. The analyses of interview data employed in the Inuvialuit and Gwich'in Harvest Studies to determine harvest estimates and their variances for the PCH, for each community, and for each season are all appropriate.
- R 4. The required precision of the harvest estimates will depend on the size and rate of change of the PCH. The required precision of harvest estimates will be highest when the population is in or near the orange and yellow zones outlined in the Harvest Management Colour Chart. The required precision of harvest estimates will be best determined through an examination of the sensitivity of the population model to a range of potential harvest levels.
- R 5. At the total harvest level, optimal sample distribution will dictate that higher efforts for hunter surveys will be required in communities that: a) have more hunters in them, and b) have more variable harvest rates among hunters. An ability to compare harvests among communities will require that each community have at least a minimum effort made to interview hunters.
- R 6. Harvest estimate calculations must be accompanied by a calculation of variance of each estimate which require individual hunter reports. The estimate and its variance can be calculated centrally but this will require that raw data be forwarded although there is no need for individuals to be identified. If calculations are to be done within a community and there is a concern about technical assistance required you could consider having a stand-alone data storage and analysis program written to assist with data entry, data validation, and data analysis.
- R 7. The current use of check stations and other field checks is not an effective means of verifying harvest. An effective verification process would require that harvest inspection be mandatory for a sample of hunters in each community and that oral reports be verified by physical inspection.
- R 8. The harvest estimates resulting from the door-to-door surveys will be correct based on the data received, but if the data are suspected of being inaccurate then the estimates will also be inaccurate.
- R 9. You need to determine your comfort with using unverified harvest estimates and the need to implement an effective harvest verification program.

Appendix 9



- R 10. If you are going to set up field check stations you could use location data to determine the best time and site for check stations. Focus on season when female harvest is a concern.





Appendix 9



1. Introduction

The Senior Officials acting on behalf of the parties to the Porcupine Management Agreement requested a review of the design of the harvest reporting program for the Porcupine Caribou Herd (PCH). This report is in fulfillment of their request as detailed in the Statement of Work (Appendix A). My objectives were to address the work requirements detailed in the Statement of Work and to add details, comments, and recommendations that I felt relevant to the program.

2. Objective of the PCH harvest reporting program

As indicated in the statement of work the PCH harvest reporting program has the objectives of:

1. providing assessments of caribou harvest required for modelling the population;
2. assessing the harvests by various communities;
3. providing the background information to make management decisions;
4. verification of harvest information.

I have structured my report in three sections. In the section 3A I provide some clarification on important terminology related to harvest estimates. In the section 3B I focus on the use of hunter interview data to generate harvest estimates. In Section 3C I address the effects of a need to verify an interview based harvest assessment. I have copied the explicit points listed in the Work Requirement section of the Statement of Work and placed them in the sections below in a *bold italic font*.

3A. Clarification and definitions of some terminology:

Accuracy of the harvest estimate

In every harvest survey the objective is to get an accurate estimate of the total kill. An accurate estimate requires that the survey be both precise and unbiased. In general, precision is improved through replication and bias is reduced through randomization (with an important exception, discussed below). Stratification can assist in meeting both objectives.

Precision (confidence) of the harvest estimate

Precision is the ability to consistently get the same answer if you did the same survey repeatedly. You use information from the hunters you have surveyed to make assumptions about hunters you did not survey; if you have interviewed all hunters then your estimate is perfectly precise. However, it may be difficult to interview all or even most hunters. For the survey to be precise you must survey enough people so that



you can make good assumptions about the number of animals killed by those who were not interviewed. A precise survey can still be inaccurate if the data are biased in any way.

Bias of the harvest estimate

Bias in hunter surveys will likely be from one of two main sources: sampling and reporting. Sampling bias may result from interviewers deliberately seeking to interview more hunters based on the interviewers' expectation of the hunter's success or it may arise if more successful hunters either seek to be interviewed or seek to avoid being interviewed - ideally each hunter in a community in a season must have an equal possibility of being interviewed.

Reporting bias is a tendency by hunters to over-report or under-report the number of animals they killed. Unlike survey precision and sampling bias, reporting bias will not be reduced with increased sampling or randomization and will require correction factors to be developed (Beaman 2005).

Population of hunters

From a statistical perspective, the population of PCH harvesters is all individuals who are entitled to hunt, either through aboriginal rights or through possession of a hunting license.

Stratification of the population of hunters

Currently, the PCH harvest reporting program is structured as a stratified survey of aboriginal and licensed hunters in Yukon and the Northwest Territories. Each party collects its own data and reports on its own harvest; the total PCH harvest is the sum of those estimates and the precision of the harvest estimate is based on the sum of the individual stratum variances. This is the same approach used in the Inuvialuit and Gwich'in harvest studies (Joint Secretariat 2003, Gwich'in Renewable Resources Board 2009). Similar to those harvest surveys, the total estimated PCH harvest and the confidence interval around the estimate is a combination of the information from licensed hunters and from each community about their caribou harvest in each season; it is a sample stratified both by season and by community.

There are two primary data sources: door-to-door hunter interviews in aboriginal communities; and harvest information from licensed hunters collected by Yukon and Northwest Territories governments. Estimates based each of these data sources depend on accurate self-reporting by hunters.



Appendix 9



3B. Harvest estimates in management of the PCH

a. What are the essential data required to estimate a total harvest?

The fundamental information requirements for harvest surveys were very well documented in both the Inuvialuit and Gwich'in harvest studies (Joint Secretariat 2003, Gwich'in Renewable Resource Board 2009). The equations presented for harvest estimates and their variances in the Gwich'in and Inuvialuit Harvest Study reports are also the appropriate equations for the Porcupine Caribou Herd harvest estimate. The equations are summarized in this report as Appendix B and they dictate the details of the information required to estimate the PCH harvest.

As with the Gwich'in and Inuvialuit Harvest Studies it is essential that you have complete information about what proportion of the people interviewed did and did not hunt.

The total estimated harvest for each community is not enough information to calculate the precision of the estimated total PCH harvest. To calculate the precision of the PCH harvest also requires the variance of the harvest by each community in each season (See Appendix B); the variance can be calculated through a standard formula within the community and submitted along with the harvest estimate or it can be calculated centrally. In either case, the calculation of the harvest variance requires knowledge of how many animals of each sex were killed by each hunter. If this is to be done centrally those individual hunter records must be made available, however it is not important to know who the individuals are.

The essential data for estimating the overall caribou harvest are:

- i. The number of individuals in each community from which the people interviewed were chosen. You would normally think of this as your hunter list, but it is important that individuals contacted who did not hunt are still part of this list for this survey - they can be removed before the next round of interviews if they are unlikely to resume hunting. This subject was addressed in the Inuvialuit and Gwich'in harvest studies with a question about activity of the individual in the hunting season (see example in Appendix C);
- ii. An ability to uniquely identify data from each individual interviewed (e.g., through use of a hunter number as used in the Gwich'in and Inuvialuit harvest studies);
- iii. For each person in each season they are interviewed:
 - Whether or not they hunted in that season
 - How many caribou of each sex they killed in that season



Both the Gwich'in and Inuvialuit Harvest Studies effectively addressed all these issues.

When choosing people to interview keep the following in mind:

- i. Each person who is on your hunter list before the survey begins must have an equal chance of being interviewed;
- ii. If there are some hunters who you expect to kill more animals then you should identify more than one group of hunters and determine which people belong to each group (i.e., stratify the hunters within a community). You must do this in advance of the survey and must not move the hunter to a different group even if their response is different from what you expected (e.g., if you place someone in your "low harvest group" before the survey and then find they killed a large number of animals they must be left in the "low harvest group" for analysis). You may move hunters from one group to another before the next survey. If you have stratified your hunters into more than one group and if you cannot survey all hunters in a survey period, try to survey a higher percentage of the hunters who are likely to be more successful - but survey hunters from all groups.

If the questions to be answered relate to which locations have more animals killed then you will also need to know where each animal was killed in each season. The 10 km x 10 km grid blocks currently used to record this information are appropriate for this information.

b. What confidence interval or range in estimating a total harvest is desirable in order to assess the status of the population (population modeling) and for harvest management and allocation purposes?

The answer to this question depends on the status and trend of the population at the time and on the potential harvest. This is best answered by your population modellers and will relate to the conditions of the population at a specific time. For example, if the population were large and increasing then even the maximum possible harvest might not be enough to slow the increase; in which case the variability in the harvest estimates would not affect the management decision and an imprecise estimate would be sufficient. Similarly, if the population were very low and declining then even a modest harvest would accelerate the decline and the management decision as outlined in the Harvest Management Plan (Porcupine Caribou Management Board 2010) would be to stop hunting. As there is no management decision to be made in either the red or green areas of your harvest management colour chart, the need for precise harvest data is low when the population is at one of those levels.



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My suggested solution is that you should build your harvest reporting system to deliver the level of precision needed when the harvest information is likely to have the greatest importance in management decisions; i.e., between or near populations of 45,000 to 115,000 caribou. To arrive at the level of precision I would employ a stochastic population model and run it multiple times using a range of possible harvest values and determine the sensitivity of the model to varying total harvest values and harvest sex ratios. The precision required for harvest estimates would be dictated by the sensitivity of the model and the resulting management decisions. I recommend modelling populations over a broad range, buffering the lower threshold for the Green zone and the upper threshold of the Red zone. For example buffering the thresholds by 10,000 animals would result in modelling populations in the 35,000 to 125,000 range. The precision of the harvest estimate would then be set to ensure that the information obtained would permit the correct management decision to be made.

c. What is the optimal level of effort for each method (door-to-door surveys, check stations, etc.) to achieve these purposes (e.g. response rate)?

The door-to-door surveys and field- or check-stations serve two different purposes. The door-to-door surveys are the basic tool to get a harvest estimate while the check-stations (or field-checks) permit some door-to-door survey information to be verified. The simplest method is to check all hunters in the field and at home but that also represents the greatest effort. However, there is always a possibility that hunters are mis-reporting their harvest during the door-to-door interview and I recommend that to be effective in harvest verification the use of check stations would need to be mandatory for a sample of hunters. The effort needed at check-stations would be sufficient to acquire data from at least half the hunters and that the half be selected at random. There are two related but separate pieces of information to be acquired at the check station: the first is the total harvest per hunter; the second is the sex ratio of the kill. This is discussed further in Section 3C.

d. For each method, how does the level of confidence (e.g. 80 - 90 - 95%) in the estimated harvest vary in relation to the level of effort to achieve it?

and

e. What are the options available for each method that would enhance confidence intervals and to what degree, and what is the associated level of effort?

The confidence interval around each estimate (the seasonal kill within a community, the annual kill within a community, and the total annual kill for the PCH) relates to both the variability in harvest by each hunter and the proportion of hunters surveyed. So the number of hunters surveyed in each community in each season (the sample size



- which is a measure of effort) will only partly determine the confidence interval. The level of confidence also depends on the variability of the harvest reported by the population of hunters. Because this is a stratified survey, it also depends on the variability within each community and on the size of the harvest within each community. To determine the relationship between effort and confidence requires estimates of variability for each community. These are best obtained from data collected from those communities. Data collection from one year can be used to estimate the variability and sample size requirements in later years. The first year's data collection should be regarded as a pilot study for future surveys and survey effort in the first year should be the maximum that you can afford.

As a general rule, if you were to allocate your total survey effort across all communities and all seasons then the seasons and communities with the greatest number of hunters and the greatest variability in harvest among hunters should receive a higher survey effort. Once there are reasonable estimates of community and seasonal harvests the optimal distribution of sample effort can be calculated using the formulas in Appendix D. This will likely place a higher requirement to conduct interviews on some communities than on others.

An additional consideration is that you will want to have a minimum level of precision for each community so that you can compare harvest across the communities.

f. What survey design considerations are recommended to address harvest reporting by hunting parties and avoid possible double counting of individual harvesters?

As with the Gwich'in and Inuvialuit Harvest studies the most effective means of avoiding double-counting is to word the questions to clearly ask the individual being interviewed about animals that he or she harvested personally. The methods of data analysis regard each individual hunter as a sample of the population of hunters. Each hunter must be uniquely identified and each harvested caribou should be connected to a single hunter; if more than one person shot the same animal only one must claim the kill. This must be addressed at the data collection and data storage stage.

g. How can the program design provide verification of the reported harvest (level of harvest and range of variability in the harvester population)?

By definition, any method of harvest verification requires a collection of data independent of the primary data collection process. Verification, by its nature, is intended to identify reporting or sampling biases. Ideally it will also permit the correction of any biases identified. The most straightforward verification process is the registration of harvested animals; harvested caribou would not simply be reported



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by hunters but would be aged, sexed, and marked at a check station. The check station could be in the field or in the community, but the registration of animals would be mandatory. See section 3C below for further discussion of verification.

h. What assumptions need to be made (for overall program design and within the application of each method or program component)?

In considering these surveys to be stratified by community and by season I have assumed that individuals in each community in each season harvest a unique number of caribou and that the variability of the harvest among individuals is also unique to that community in that season. These assumptions are equivalent to those made in both the Inuvialuit and Gwich'in Harvest Studies (Joint Secretariat 2003, Gwich'in Renewable Resource Board 2009). This avoids assuming that any two communities have the same success level or that any one community's hunting success is the same in one season as another. However, it does require that sufficient data be collected from each community in each season so it is more labour intensive. The data collected in this manner may confidently be used to compare hunting success among communities and among seasons; if patterns prove similar, sampling may be reduced in the future.

To use only door-to-door or voluntary check-station inspections to estimate the kill the assumption must be made that hunters are accurately reporting their kill. In the case of information acquired through voluntary inspections at check stations, the assumption is also being made that the hunters who stop at check stations are a representative sample of all hunters from their community.

With a survey stratified by community and by season, information will not be extrapolated outside that community for that hunting season. Consequently, all assumptions will be confined to the data collected in that community in the same season.

i. What, if any modifications, are recommended to the overall program or any of its components?

In the absence of knowledge of every caribou killed, any harvest reporting program will generate estimates of animals killed. The total estimated kill will be the sum of the kills estimated for each of the parties that are interviewed about their caribou hunting. Every estimate has a potential error associated with it. If every report from every hunter is accurate then the error will result from what we assume about the individuals who were not interviewed. Statistically we assume that the individuals that were not interviewed had the same success as those individuals from their group who were interviewed.



If there is a desire to verify the harvest then an independent data collection process is required. It is discussed below.

3C. Verification

Across North America hunters are most commonly interviewed via mail or telephone about their hunting success (Rupp et al. 2000). For the PCH, the door-to-door survey effectively replaces the telephone or mail survey; all of these surveys depend on accurate reporting by hunters. Among hunting management agencies, the desire for verification of harvest information is common where concern exists that hunter surveys may not produce sufficiently accurate harvest estimates. For this report, the explicit commitment in the PCH Harvest Management Plan (HMP) to the verification of harvest information suggests that there is concern that estimates derived from hunter interviews may not be accurate, i.e., there is a reporting bias. Concerns of inaccurate estimations were also mentioned by some individuals with whom I spoke. The need for harvest verification may significantly alter the method of data collection.

A sampling bias can be overcome through a more random distribution of sampling effort. A reporting bias will not be corrected with a higher sampling effort and is unlikely to be corrected through a second interview in the field, on the highway, or elsewhere. If there is a concern that hunters are underreporting the number of animals harvested or mis-reporting the sex of the harvest, then correcting for the bias will require that a sub-sample of hunters must submit their harvest to a mandatory physical inspection to verify the number, age, and sex of the animals they harvested. As all harvest reporting under the PCH harvest implementation plan is based on a stratified sampling design, the verification through physical inspection would need to be conducted in each stratum, i.e., in each community in each season and for licensed hunters in each season.

From the paired data (the hunters' oral reports to interviewers and the same hunters' inspected harvest) you can calculate a multiplier to account for animals harvested but not reported (see Appendix E). It seems likely that having had their kill inspected immediately following the hunt, any hunter subsequently interviewed would accurately report his total kill. In that case the value of the stratum multiplier would be 1.0 and the harvest would remain uncorrected. If that occurs the appropriate response would be to determine the mean harvest per hunter from among the hunters whose kills were inspected and compare it with the mean harvest reported by hunters whose kills were not inspected. Any variation would form the basis for applying the mean harvest rate from inspected hunters to all hunters.



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A broad scale harvest inspection program would be quite different from the currently proposed harvest reporting program. The current check stations do not fulfill this need.

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Appendix 9

Appendix A

Statement of Work:

Review the Design of a Porcupine Caribou Harvest Reporting Program

Project purpose:

The purpose of the project is to review the design of the Porcupine caribou harvest reporting program to determine if the overall program and program components as designed, and if implemented by each of the parties, can achieve a reliable estimated total harvest of Porcupine caribou.

Background:

Senior officials (SOs) on behalf of the parties to the Porcupine Caribou Management Agreement are developing a plan to implement the Porcupine Caribou Harvest Management Plan (HMP). The HMP commits all parties to report rigorous and verifiable harvest information for all hunters of Porcupine caribou at all times of the year.

The SOs have collectively designed and developed a harvest reporting program with the intention of meeting this requirement. The program provides for an integrated approach to the collection, reporting and verification of harvest information across their respective jurisdictions and that respects variations in method and approach while attempting to achieve a common result – a reliable estimated total harvest of Porcupine caribou by sex, location, and time of year in which the parties can place confidence.

The aggregated data collected through the harvest reporting program would be used for the following purposes:

- The assessment of the population status of the Porcupine caribou herd (through its use in population models or the “caribou calculator”)
- The application and evaluation of harvest management measures
- Allocation of the harvest between user communities (as informed by the Native User Agreement)
- Communications regarding harvest management and herd status

The harvest reporting program consists of the following components:

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- Jurisdiction-based programs to collect, compile and review a common data set of harvest information through the use of hunter surveys and in-field monitoring
- Operation of check stations on the Dempster Highway to collect and verify harvest information through the sharing of information among parties
- Collection of mandatory harvest information through other administrative and legal arrangements (permits, tags, etc.), if management circumstances warrant
- Periodic program evaluation

The design and development of a comprehensive harvest reporting program is underway. An independent review and evaluation of the initial program design could confirm that the proposed approach, or with recommended modifications, would result in an estimated total harvest that the parties could confidently use to assess the population status of the Porcupine caribou herd and apply for harvest management purposes.

Work requirements:

The review of the overall harvest reporting program and its components should determine how the proposed set of harvest reporting and monitoring methods, or with suggested modifications, can produce a reliable estimate of the total harvest of Porcupine caribou each year.

The review should address the following questions in a written report:

:

- What are the essential data required to estimate a total harvest?
- What confidence interval or range in estimating a total harvest is desirable in order to assess the status of the population (population modeling) and for harvest management and allocation purposes?
- What is the optimal level of effort for each method (door-to-door surveys, check stations, etc.) to achieve these purposes (e.g. response rate)?
- For each method, how does the level of confidence (e.g. 80 – 90 – 95%) in the estimated harvest vary in relation to the level of effort to achieve it?
- What are the options available for each method that would enhance confidence intervals and to what degree, and what is the associated level of effort?

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- What survey design considerations are recommended to address harvest reporting by hunting parties and avoid possible double counting of individual harvesters?
- How can the program design provide verification of the reported harvest (level of harvest and range of variability in the harvester population)?
- What assumptions need to be made (for overall program design and within the application of each method or program component)?
- What, if any modifications, are recommended to the overall program or any of its components?

In order to address these and other questions, and carryout the statement of work, the following considerations apply:

- subject to availability and time constraints, the reviewer should contact the appropriate SOs and any additional technical experts identified by the SOs or facilitator
- on behalf of the SOs, the facilitator will serve as a general point of contact for implementation of the statement of work
- subject to the agreement of the SOs and the independent reviewer, the reviewer may attend the September meeting of the SOs to present the report and discuss its contents
- time is of the essence in conducting the statement of work. The reviewer will endeavour to circulate a draft report at least one week prior to the September 20th meeting of the SOs.

Acknowledgement:

The SO's acknowledge that the review and any recommendations it may make are not binding on any party.

Also, the SOs gratefully acknowledge the efforts by Parks Canada personnel to carryout the review and with short notice.

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Appendix B

The following section is modified from Joint Secretariat (2003, Section 4.2)

Estimated harvest

Total seasonal harvests are estimated from reported harvests based on the proportion of hunters interviewed and their responses. It is assumed that there is no difference between hunters interviewed and those not interviewed, and the former are therefore treated as a random sample of the hunter population.

Therefore the total harvest for season m in community c is estimated by

$$\hat{Y}_{mc} = \frac{N_{mc}}{n_{mc}} \sum_i y_{mci}$$

where

N_{mc} is the number of hunters on the hunter list in season m in community c ;

n_{mc} is the number of hunters from the list who provided harvest information in season m for community c ; and

y_{mci} is the harvest reported by hunter i in season m and community c .

The variance for the estimated total is estimated by

$$\hat{V}ar(\hat{Y}_{mc}) = \frac{N_{mc}^2}{n_{mc}} (1 - f_{mc}) s_{mc}^2$$

where

$f_{mc} = \frac{n_{mc}}{N_{mc}}$ is the sampling fraction in season m and community c ; and

$s_{mc}^2 = \sum_i \frac{(y_{mci} - \bar{y}_{mc})^2}{n_{mc} - 1}$ is the sample variance for season m and community c .

where

\bar{y}_{mc} is the mean number of caribou harvested per interviewed hunter;



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As each season is treated as a separate survey, the annual total harvest for community c is estimated as the sum of the seasonal estimates,

$$\hat{Y}_c = \sum_m \hat{Y}_{mc}$$

and because the surveys are independent the variance is estimated as the sum of the estimated variances

$$\hat{V}ar(\hat{Y}_c) = \sum_m \hat{V}ar(\hat{Y}_{mc})$$

Similarly, the total harvest estimate and its variance are the sums of the community harvest estimates and their variances:

$$\hat{Y} = \sum_c \hat{Y}_c$$

$$\hat{V}ar(\hat{Y}) = \sum_c \hat{V}ar(\hat{Y}_c)$$



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Appendix D

Optimal allocation of sampling effort across strata

When estimated variances exist for all strata, they can be used to determine the proportion of the sampling effort (w_{mc}) that should be allocated to each season m in each community c . Optimal allocation will result in a sampling effort that will minimize the variance of the total annual harvest estimate for all communities. Note that S_{mc} is the standard deviation for the stratum, the square root of the sample variance (See Appendix B). The calculations effectively dictate that in each community in each season the survey effort will be higher when the number of hunters is higher and will be higher when the estimated harvest of each hunter is less predictable (more variability among hunters).

$$w_{mc} = \frac{N_{mc} S_{mc}}{\sum_m \sum_c N_{mc} S_{mc}}$$

note that $\sum_m \sum_c w_{mc} = 1$

In the initial years of data collection I recommend that the hunter survey be considered a pilot study in which the data collection effort is as high as you can afford. This will permit the best possible estimation of hunter harvest and how it varies among communities and among seasons. These data will permit you to examine the contribution of each community's hunters in each season to the harvest of bulls and cows. Through sub-sampling you could then determine the appropriate levels for future sampling for each community in each season. The data may then be used to guide the survey effort in following years.



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Appendix E

Estimating the detectability correction factor (DCF) and its sampling variance

To use a verified sample to correct for a portion of the harvest undetected through hunter reports the formula (for moderate sample sizes, e.g., 30 or more hunters) the stratum detectability correction factor (DCF) is calculated according to the equation below (after Gasaway et al. 1986, p. 33). For smaller sample sizes see the correction factors formulas in Gasaway et al. (1986, p. 33) and the discussion in Cochran (1977, pp. 160-162).

$$\hat{DCF}_{mc} = \frac{\sum_j v_{mcj}}{\sum_j y_{mcj}}$$

where the data in the calculation are restricted to those hunters who were both interviewed and had their harvest verified and where:

y_{mcj} is the harvest reported by hunter j in season m and community c ;

v_{mcj} is the verified harvest by hunter j in season m and community c

The sampling variance of the DCF is:

$$\hat{Var}(\hat{DCF}_{mc}) = \frac{n_{mcj}}{(\sum_j y_{mcj})^2} (s_{qs}^2)$$

where

n_{mcj} is the number of hunters from season m in community c who had their harvest verified;

s_{qs}^2 is defined by the equation given by Gasaway et al. (1986, p.33).



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