1 Caribou blueprint for barren-ground caribou in the NWT

Objective:

Develop a cumulative impacts monitoring approach for barren-ground caribou

Rationale:

Traditional and scientific knowledge suggest that barren-ground caribou herds cycle naturally. It is possible; however, that the current low numbers and declining trends in several herds are unprecedented and that climate change may be contributing to the low and declining numbers.

Management actions to conserve barren-ground caribou herds when they are at low numbers are generally directed at reducing adult female and calf mortality, either through reductions in harvest or predator management. However, a number of other factors have been suggested as driving the population declines, such as changes in weather and range condition, increasing development on the landscape, and fire. Participants at various meetings and hearings in recent years have accepted that the caribou declines are real, but have expressed a desire for a better understanding of the underlying drivers of change.

The Government of the Northwest Territories (GNWT) and co-management partners believe that a regionally-based cumulative impacts monitoring approach is necessary to monitor and assess human and natural factors that affect barren-ground caribou population trend and their habitat. In addition, further research is needed on how these factors may be linked to demographic indicators like pregnancy rate and calf survival. A number of NWT barren-ground caribou herds are declining. In some cases, there has been an increase in the overall amount of human disturbance, as in the Bathurst herd's range. In other ranges, such as the Bluenose-East herd's range, there has been little development.

A cumulative impact monitoring and research approach is necessary to determine how developments combine with other factors, such as fire, predation, environmental variability, harvesting, wildlife, or climate change, to affect barren-ground caribou. Knowing the relative contribution of each factor and their systemic dynamics will help decision-makers to understand what factors most affect caribou. For example, this information can be used as inputs in cumulative impacts models that can help guide management actions related to harvest, land use activities, and fire management.

Components of a cumulative impacts approach for barren-ground caribou include a comprehensive understanding of how NWT barren-ground caribou herds are doing in terms of size and trend, monitoring of key factors that affect caribou status, combined with an understanding of how natural and human factors affect herd dynamics across their historic range. Currently, the GNWT conducts demographic monitoring programs for all NWT barren-ground

herds across their range. This program has been peer-reviewed and includes information on herd size and trend, calf recruitment, estimated cow survival, and fall sex ratio, and periodic monitoring of health, disease, and condition. What is lacking is a full understanding of how these factors affect the size and trend of the herds, including potential interactions in the ecosystem. NWT CIMP seeks to fill those gaps.

Funding priorities:

The barren-ground caribou blueprint outlines four funding priorities that are listed below.

a. Methods and approaches to calculate and track landscape metrics in barren-ground caribou range (e.g. amount of human and natural disturbance, type of disturbance including fire, human development, road access, and range condition). Include considerations of scale, shape of disturbance, use of composite indicators and ease of administration.

b. Identifying species appropriate indicators, thresholds of disturbance, and actions and limits of acceptable change.

c. Determining the relative impact and relationships among human and natural factors that influence barren-ground caribou herd demographics and/or habitat, including:

    - Industrial activity/disturbance. For example:

        - standardizing methods of current monitoring between industry and government

        - innovative approaches to monitoring using remote sensing and emerging technologies

        - identifying potential mechanisms of zone of influence

        - novel approaches to industrial mitigation

        - measures of habitat fragmentation and connectivity

    - Predation. For example:

        - changes in predator numerical and functional responses, and whether predators are limiting recovery of caribou herds

- abundance of predators
- predation rates on adult and calf caribou

- Health, condition, and disease. For example:
  - measures of insect harassment and trends by season and year
  - pregnancy rates over time
  - caribou condition and changes over time
  - incidence and prevalence of key pathogens and parasites, and significance to caribou demography

- Range condition. For example:
  - habitat quality and/or quantity (e.g. vegetation classification, resource selection function models) over time
  - seasonal changes in vegetation biomass and trends over time
  - fire impacts on the winter range and likely trends in future
  - changes in vegetation over time and relations to climate change

- Behaviour. For example:
  - activity budgets both within and outside development Zones of Influence (ZOI), and implications to caribou energetics and demography
  - seasonal diets and feeding rates, and changes over time

- Harvest. For example:
  - accurate and complete reporting of harvest on all herds
  - significance of harvest to declining herds, particularly in relation to increased road access

- climate change and environmental variation, and their relations to caribou demography

- Innovative partnerships and techniques for research and monitoring any of the above.

d. NWT CIMP is also seeking proposals that serve to synthesize existing information on Bathurst caribou and its historical range:
    - Collating historical monitoring data, including industry data and traditional knowledge, to determine if it can be used in a regional cumulative impact assessment for the Bathurst herd.

    - Population modeling that integrates available demographic data and assesses the impacts of various factors on population trend

    - Research that helps explain current and recent demographic trends in the Bathurst herd and neighbouring herds.

2 Caribou blueprint for boreal caribou in the NWT

Objective:

Develop a cumulative impact monitoring approach for boreal caribou

Rationale:

Boreal caribou are a priority Valued Component that are listed as threatened under the federal Species at Risk Act and under the Species at Risk (NWT) Act. Local studies indicate that boreal caribou in the northern NWT may be self-sustaining, while those in the southern NWT may be declining.

Declines in the southern NWT may be attributed to the cumulative impact of human and natural disturbance on the landscape, which, based on extensive research in southern Canada, increases predation pressure on boreal caribou. Based on the National Recovery Strategy for Woodland Caribou, boreal population in Canada, maintaining or recovering boreal caribou requires that at least 65% of boreal caribou range remain free of human or natural disturbances. As defined in the Strategy, disturbed habitat is habitat showing i) anthropogenic disturbance (e.g. linear features) visible on Landsat at a scale of 1:50,000, including habitat within a 500 m buffer of the disturbance and ii) fire disturbance for the last 40 years. As of fall 2015, roughly 34% of boreal caribou range in the NWT is considered disturbed. Most disturbances are driven by fire (28%), although there is some human disturbance as well (8%).

There are concerns about how fire, in combination with new human development such commercial timber harvesting in the South Slave region, oil and gas exploration and development in the Sahtu region, and major infrastructure projects such as the Mackenzie Valley Highway and Tlicho all-season road, will impact boreal caribou across their NWT range.

The GNWT and Environment Canada believe that regionally-based cumulative impact monitoring approaches are necessary to assess and monitor how human and natural factors affect the size and trend of the NWT's boreal caribou population. Knowing this will help decision makers to understand what management actions are most crucial in order to protect boreal caribou. For example, this information can be used as inputs in cumulative impact models that can help guide management actions related to land use activities and fire management.

A cumulative impacts monitoring approach for the NWT's boreal caribou population requires a comprehensive understanding of how the population is doing in terms of size and trend, combined with an understanding of how natural and human factors drive population dynamics across its range, as well as an understanding of the landscape and how changes to the landscape affect how caribou use it. This first requires establishment of robust approaches to monitoring boreal caribou across their range. It also requires more information on those natural and human factors that affect population size and trends in the NWT.

Funding priorities:

The boreal caribou blueprint outlines funding priorities that are listed below:

NWT CIMP is seeking proposals that:

- Contribute to the establishment of standardized monitoring methods that provides robust information on boreal caribou population size or trends across its range in NWT;

- Improve understanding of boreal caribou population structure, gene flow and connectivity both within the NWT range and with neighboring ranges;

- Contribute to the establishment of a comprehensive, regionally-based cumulative impacts monitoring approach that tracks local boreal caribou population trends and those human and natural factors that affect them;

- Calculate and track landscape metrics in the boreal caribou range (e.g. amount of human and natural disturbance within the range, including fire, development, hunting access and other human activities);

- Determine rates of forest regeneration following fire or human disturbance in boreal caribou range;

- Improve and update land cover and habitat maps;

- Improve understanding of boreal caribou behavior, including habitat selection and movement;

- Determine when disturbed habitat (human or natural) becomes functional again for boreal caribou and forecast future landscape condition;

- Improve our understanding of, or project the implications of, climate change on processes affecting boreal caribou habitat supply and boreal caribou population dynamics; and

- Determine the impact and relationships between a number of human and natural factors that influence boreal caribou demographics and/or habitat. For example:

    - Fire

    - Predation

    - Alternative Prey

    - Health, condition, and disease

    - Climate change

    - Harvest, including the impacts of increased access

    - Range condition - habitat and forage quality and/or quantity

    - Development within the historic range of the herd – including both physical and functional habitat loss

NWT CIMP is also seeking proposals to synthesize existing information on boreal caribou and its range by:

- Collating historical monitoring data, including industry data and Traditional Knowledge, to determine if they can be used in a regional cumulative impact assessment for boreal caribou; and

- Identifying ways that past and current monitoring conducted by communities, industry and government can be standardized in methodology to improve population scale knowledge in the long term.

Proposals should clearly indicate how all sources of knowledge (local, traditional, and science) will be used to address funding priorities. Proposals should also clearly indicate how proposals will build capacity within communities.