Cumulative Effects Assessment, Monitoring and Management Framework

Introduction

The Government of the Northwest Territories (GNWT) is developing a collaborative, multi-scale approach to assessing, monitoring and managing cumulative effects (CE) on wildlife and wildlife habitat. This document outlines a framework to place management of impacts to wildlife and wildlife habitat from industrial development and other human activities within the broader context of CE management. The framework involves working at both the local scale of individual projects and a broader scale appropriate to the species of interest, such as the annual range of barren ground caribou herds. The framework can be applied to other valued wildlife species and should be viewed as contributing towards more integrated CE management initiatives that may consider additional environmental or socioeconomic values such as water, air, community health, etc.

While the framework can be applied to any wildlife species, its current application to the Bathurst barren ground caribou herd stems from measures directed to the GNWT and other governments by the Mackenzie Valley Environmental Impact Review Board (MVEIRB) in two recent review processes. Revised[1] Measure 8[2] from the NICO process required the GNWT to collaborate with the Tłı̨cho Government (TG) on a response framework for managing CE on Bathurst caribou. Measure 3[3] from the Gahcho Kué process required GNWT and Aboriginal Affairs and Northern Development Canada (AANDC) to develop and implement a CE framework that links project specific monitoring and mitigation to CE monitoring and mitigation. This document is part of the GNWT's response to these measures.

Concerns regarding CE on the Bathurst caribou herd are repeatedly raised in environmental impact assessment (EIA) processes within the NWT and in Nunavut, emphasizing the need to evaluate the impact of multiple stressors on this herd throughout its range. The framework shows how a number of new initiatives led by the Department of Environment and Natural

[1] The wording of the original measure was modified by the responsible ministers following consultation with the MVEIRB, pursuant to s.130(b)(ii) of the MVRMA.
[2] http://www.reviewboard.ca/upload/project_document/EA0809-004_Results_of_consultion_on_modification_to_measure__8.PDF
[3] http://www.reviewboard.ca/upload/project_document/EIR0607-001_Gahcho_Kue_Diamond_Mine_Project_Report_of_EIR.PDF

Resources (ENR), and the existing regulatory structure, will fit together to adaptively respond to and manage CE on the Bathurst herd.

Background

The Canadian Council of Ministers of the Environment defines CE as, "a change in the environment caused by multiple interactions among human activities and natural processes that accumulate across space and time".[4] Understanding how individual actions or stressors combine to result in CE on a species of interest is not a simple task. Currently, the GNWT conducts a range-wide monitoring program for the Bathurst herd collecting information on herd size and trend, calf recruitment, fall sex ratio, health, disease and condition. Similarly, industry reports on results of site-specific and regional monitoring of abundance, distribution and behavior of caribou in their study areas. A CE framework will help bring these results together with other environmental information (e.g. fire) and human factors (e.g. harvest) to assess possible CE on the herd. With a framework in place, decision makers will be better situated to understand what factors might be influencing the herd, which can be managed and, more importantly, which factors are the most important to manage.

The EIA process assesses, mitigates and provides recommendations to manage the impacts of individual projects and their contributions to CE. However, project-specific processes are not designed to, and are not effective at, managing CE on wide-ranging species such as barren ground caribou. First, they operate at a spatial scale that often does not cover the entire range over which the particular species is exposed to CE. Second, project-specific assessment must consider a project's contribution to CE in relation to acceptable limits of change in species' abundance and distribution across its range. Acceptable limits of abundance and distribution and/or levels of disturbance on the range are best determined and agreed upon outside of the EA process. Such guidance can then be used to provide a reference for CE assessment and aid in the determination of significance in project specific assessments.

As a starting point the GNWT, with support from the Cumulative Impact Monitoring Program (CIMP)[5], conducted three workshops in 2013 in Yellowknife. These workshops brought together representatives from Aboriginal organizations, industry, monitoring agencies, environmental non-government organizations, academia, and specialists to discuss approaches and shared responsibilities for CE assessment, monitoring and management. One action item from the first workshop (February 2013)[6] was to "design, approve and initiate a pilot project relevant to the Tłı̨cho". As a result of that recommendation, GNWT-ENR has initiated a

[4] http://www.ccme.ca/en/current_priorities/cumulative_effects/index.html
[5] On April 1, 2014 CIMP devolved to the GNWT
[6] Workshop reports are available from ENR

collaborative planning process, involving Tłı̨cho government and Wek'èezhìi Renewable Resources Board (WRRB), for the management of cumulative disturbance on the range of the Bathurst herd.

The latter two workshops (held in March and November 2013) followed up on previous discussions related to the development of collaborative wildlife monitoring programs among industry partners on the range of the Bathurst caribou. Continued work in this area is attempting to develop standardized monitoring objectives and protocols for use by industry and government, where applicable. Such objectives and protocols would contribute to a regional picture of impacts to caribou and support an envisioned Regional Wildlife Monitoring Program that could be integrated at multiple scales to address impacts of development and other natural and human stressors.

These initiatives comprise key components of an overall CE assessment, monitoring and management framework for the Bathurst caribou herd and in combination with existing regulatory processes serve to complete the framework as presented below.

Cumulative Effects Assessment, Monitoring and Management Framework

Figure 1 outlines a CE assessment, monitoring and management framework comprised of the project-specific and regional components of an overall CE approach to managing impacts to Bathurst caribou and its habitat. The components on the left side of the diagram are largely delivered through the EIA and regulatory processes carried out under the *Mackenzie Valley Resource Management Act* (MVRMA) and the plans/programs developed through those processes. Components on the right side of the diagram are currently under development through collaborative efforts led by ENR and other partners. Each component is discussed below.

1. Project-specific review

Project-specific review is conducted through the environmental impact assessment and regulatory processes as defined in the MVRMA[7]. Projects are assessed for their potential impacts to wildlife and the project's contribution to CE, among other things. Where necessary, mitigation measures are identified to reduce potential impacts to an acceptable level. Thorough review of impacts at the project scale can help identify issues to address when setting landscape level objectives (arrow a).

[7] http://www.reviewboard.ca/upload/ref_library/MVE%20EIA%20Guidelines_1195078754.pdf

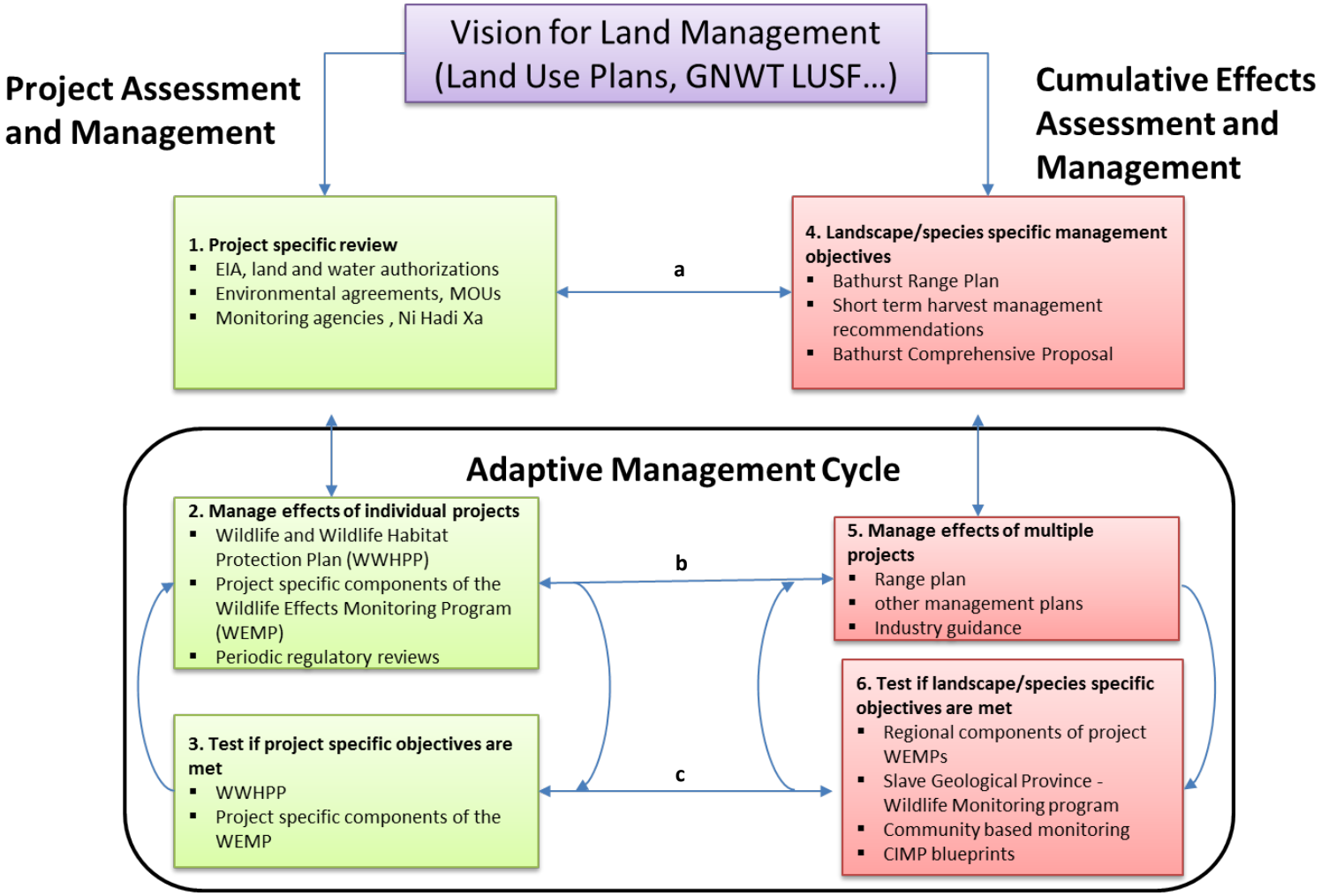

Figure 1 – Cumulative Effects Assessment, Monitoring and Management Framework[8]

[8] Adapted from: Francis S., Kennett S., Antoniuk T,. and Nishi J., 2013. Fish and Wildlife Values in CEA: Current Status and Yukon Needs Assessment. Prepared for Yukon Environment Fish and Wildlife Management Branch. Whitehorse, 111 pp.

2. Manage effects of individual projects

Individual project effects are managed through Wildlife and Wildlife Habitat Protection Plans (WWHPP) and Wildlife Effects Monitoring Programs (WEMP) developed and implemented by project developers. GNWT in collaboration with industry and other partners is developing guidelines for the development of these plans. The WWHPP and WEMP are applied within the project local and regional study areas respectively and are focused on the mitigation, monitoring and management of project-specific effects. Through the WWHPP and the WEMP, operators can contribute to CE management in two ways:

- Operators can minimize the impacts of their operations, which in turn reduces the combined impact of multiple projects at a broader scale. When individual operators develop effective mitigations and report on what they learn, this information can be incorporated into best-practices and guidelines for use by existing and future projects (arrow b).

- Through directed research, monitoring and mitigation programs, operators can contribute to the collective understanding of the impacts of development and other factors at a broader scale and to initiatives for managing those impacts (arrow b). This type of collaboration would be outlined in a WEMP.

3. Test if project specific objectives are met

The WWHPP and WEMP are also used to test whether project-specific mitigation, monitoring and management objectives for the site are being met and whether mitigation measures need to be revised.[9] This is part of the the adaptive management component of the framework. Annual results of the WWHPP and WEMP are reviewed by government, monitoring agencies, regulatory boards, Aboriginal organizations and communities and suggestions are made for improvements. In some cases, the WEMP can identify collaborative monitoring programs that contribute to a body of information at a regional rather than project-specific scale. This type of collaborative approach to monitoring with harmonized objectives and standard methods can help test whether landscape-level management objectives are being met (arrow c).

4. Landscape/species specific management objectives

[9] Environment and Natural Resources. 2014. Draft Wildlife and Wildlife Habitat Protection Plan and Wildlife Effects Monitoring Program Guidelines, 58 pp.

Landscape-level / species-specific management objectives (e.g. cumulative disturbance targets, seasonal habitat connectivity or intactness, harvest levels) help provide guidance to EIA processes (arrow a) and are used to manage wildlife and wildlife habitat at a spatial scale appropriate to the species of interest. For caribou habitat this means managing across the historic range of the herd. For the Bathurst caribou herd there are several initiatives underway to address landscape and species-specific management. These are:

- Range plan
  A Range Plan for the Bathurst caribou herd intends to provide recommendations for the assessment, monitoring and management of cumulative land disturbance on the range of the herd. It intends also to provide greater clarity and efficiency for land use management, planning, and regulatory processes that consider caribou habitat.

- Long-term management
  An approach to long-term management of the Bathurst caribou herd is being developed by government, Aboriginal organizations and co-management boards as required under the TłĮcho Agreement. Under consideration is a Caribou Management Board that would address all issues of concern related to the herd including harvest and predation. The Range Plan would be one piece of guidance with respect to habitat management for the Board or other management process to consider.

- Joint proposals for short-term management
  Joint proposals were developed by GNWT and TłĮcho Government and submitted to the WRRB in 2010, and another in 2014, as interim measures to primarily address harvest and predator management during a period of low caribou numbers in the Bathurst herd. WRRB recommendations on the first proposal covered the period 2010-2013[10]; the new proposal covers the time period from 2014-2019 but is currently on hold awaiting a new population estimate in June 2015.

5. Manage effects of multiple projects

Setting landscape-level and species-specific objectives for management of caribou and caribou habitat will allow all projects proposed on the Bathurst range to be evaluated against predetermined values (arrow b). These values may be in the form of cumulative disturbance targets, measures of habitat quality such as intactness or connectivity, or population level management such as harvest targets. Such values are set to minimize risks to the herd from natural and human disturbance on the range and are used to evaluate the potential significance of the contribution of new projects to CE. Landscape-level and species-specific objectives may

[10] http://www.wrrb.ca/sites/default/files/public_registry/Cover%20Letter%20and%20Final%20Report%20-%208oct10.pdf

include the use of tiered targets where management actions change according to cautionary, moderate and critical levels of change.

6. Test if landscape/species-specific objectives are met

Testing whether landscape-level management objectives have been met is an important part of the adaptive management cycle. A well-designed monitoring and assessment program is needed to determine whether the measures in place are achieving the desired effect. If designed well, industry WEMPs can contribute to a monitoring program designed to test landscape and species-level objectives in addition to meeting their project EIA requirements (arrow c). Several initiatives related to testing landscape and species-specific management objectives are discussed below.

- Regional wildlife monitoring program
  A coordinated multi-scale regional wildlife monitoring program is currently being developed through collaboration with industry, Aboriginal and government partners. At the site-specific and regional level (i.e. the WEMP), standard protocols for monitoring wildlife are being developed for use by industry and government where applicable. Standardization of approaches to monitoring caribou zone of influence, behavior and other variables important to CE assessment by operating mines is either underway or in development. Government continues to conduct monitoring of caribou population size and trend.

- Community-based monitoring
  Community-based monitoring initiatives contribute to our understanding of harvest, health and condition, land disturbance and caribou responses to natural and human activities on the landscape. Community monitors are the link between harvesters and wildlife managers at the community, co-management and government levels by recording harvester information in a systematic form for use by these agencies.

- Cumulative Impact Monitoring Program (CIMP)
  CIMP has developed a blueprint for directing and supporting CE monitoring initiatives on Bathurst caribou. The blueprint is structured to address current research and monitoring gaps and to contribute the CEAMM framework through scientific and traditional knowledge research. CIMP recently developed a landscape disturbance inventory for the range of the Bathurst caribou herd based on Land and Water Board permit records and disturbance digitized from satellite imagery. It is anticipated that this dataset will be updated on an annual basis for use in CE monitoring and assessment. An online, interactive interface is also being developed to allow any user

to view and download the data. The landscape disturbance inventory is key to assessing the amount of disturbance on various parts of the range and comparing landscape objectives to actual disturbance.

Reporting

It will be necessary to bring together a group of interested parties to receive information on an annual basis and evaluate it against the management objectives set in the various planning pieces. It makes intuitive sense that the receiving body be the Caribou Management Board set up as a management mechanism under the Tłı̨cho Agreement but this would be determined at a later date. GNWT will report annually on the development, implementation and results of the framework as they apply to the regional scale through regional wildlife monitoring workshops, CIMP annual results workshops, meetings of the Bathurst caribou management board (if established) and through occasional updates to the NWT Discovery Portal. Operators are responsible for reporting on monitoring and mitigation undertaken at the project level according to schedules outlined in their individual WWHPPs, WEMPs and other project management plans. Landscape disturbance metrics that are tracked as a component of the Bathurst Caribou Range Plan will be summarized and reported annually by GNWT to facilitate an adaptive management approach to meeting landscape objectives.

Bringing it together

For additional clarity, an example is provided to illustrate how the pieces of the framework might fit together to manage CE on the Bathurst caribou herd. For illustrative purposes, consider a hypothetical scenario where the Range Plan for Bathurst Caribou has identified a cautionary maximum target of 25% effective habitat loss on the winter range.[11] A new proposed mining project is predicted to contribute an additional 3% of new effective caribou habitat loss through its predicted Zone of Influence (ZOI). It is determined through preliminary screening that in combination with other projects, the total amount of effective habitat loss on the winter range will exceed the cautionary target if the proposed project goes ahead. The Review Board would deem the impacts of the project to be potentially significant and the project would proceed through the EA process.

During the EA process, the proponent identifies mitigation measures in the WWHPP to limit dust and noise emissions and any other factors thought to be affecting the ZOI. A WEMP is designed to measure the ZOI and potential related variables (dust, noise, etc.). Other projects are also implementing WWHPPs and WEMPs to reduce and test for ZOI effects using standard

[11] This is purely hypothetical as the Range Plan has not put forward any habitat related recommendations at this point.

protocols. If, during this process, it is determined that the proposed or enhanced mitigation measures can reduce the proposed project ZOI to remain below the target identified in the range plan, or if there is agreement on an acceptable offset for the 3% addition to cumulative disturbance on the winter range, the report of EA might recommend that the project proceed subject to certain conditions.

As follow-up, on an annual basis, operators, government and other parties would collectively consider the combined level of effective habitat loss from the ZOI around mines, and from other infrastructure and natural disturbances. If it is determined that enhanced mitigation measures are not sufficiently managing the amount of effective habitat loss across the range, then other landscape-level management recommendations (i.e. habitat enhancement elsewhere on the range, progressive reclamation, or delaying further projects until targets are no longer exceeded) identified in the Range Plan might be triggered.

Conclusion

A comprehensive CE assessment, monitoring and management framework is necessary to understand and manage the influence of human and natural factors on barren-ground caribou herds and their habitat. A framework has been developed by GNWT that incorporates a project-specific component and a regional CE monitoring and response component. The comprehensive CEAMM framework ensures that individual projects are minimizing their project contributions to CE; that landscape level objectives are set to guide decisions about industrial development; and that CE are managed within acceptable limits (i.e. targets). Ongoing development of the CE assessment, monitoring and management framework will remain a collaborative effort among industry, government and co-management partners to develop, implement, review and as necessary revise (i.e. adaptively manage) the various components.