

**Wildlife in Cumulative Effects Assessment:
Assessing Needs and Processes in Southwest Yukon**

by
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Abstract

The Southwest Yukon is a large mountainous area, famed for its wilderness and wildlife resources. Wildlife is of particular significance in this region because of its ecological and cultural values, for consumptive and subsistence harvesting, and as a base for considerable tourism. While Kluane National Park and Reserve encompasses 22,000 km² at the heart of this region, there are still current and pending threats to the region's wildlife. Small and large-scale developments and human activities have the potential to contribute to adverse effects on wildlife. Land and resource management, including environmental impact assessments, takes place through a complex set of mainly co-management institutions resulting from comprehensive land claims and Federal devolution of powers to the Yukon Territorial Government. Drawing on a literature review, document analysis, and semi-structured key informant interviews, I assessed why, despite its mandated requirement, assessment of cumulative effects on wildlife is rarely occurring in this region. I identify a range of challenges and potential responses with broad applicability for improving consideration of wildlife in Yukon CEA. Six key areas of gaps and obstacles are: data, research, monitoring, capacity and time limitations, political challenges, and the region's land use planning context. Major options for improvement include institutional guidance for researchers on needed and useful research projects; improved financial and human capacity support to fill data gaps, standardised monitoring programs; a comprehensive, inter-jurisdictional data management system, improved collaboration between departments, boards and stakeholders; fuller development of a common, accessible CEA guide and tools; and development of the land use planning context for environmental and development assessment.

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The wild mountains and animals of the Kluane Region always kept me motivated. I hope the results from this thesis can contribute to actions or discussions that will help the future management of this wonderful landscape.

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List of Acronyms

ASTIS – Arctic Science and Technology Information System
ARRC – Alsek Renewable Resource Council
CAFN – Champagne and Aishihik First Nations
CDC – Conservation Data Centre
CEA – Cumulative Effects Assessment
CEAA – Canadian Environmental Assessment Act
CEAM – Cumulative Effects Assessment and Management
COSEWIC – Committee on the Status of Endangered Wildlife in Canada
EI – Ecological Integrity
EIA – Environmental Impact Assessment
EMR – Energy Mines and Resources
FN – First Nation
KEMP – Kluane Ecological Monitoring Program
KFN – Kluane First Nation
KLRS – Kluane Lake Research Station
KNPR – Kluane National Park and Reserve
LUP – Land Use Plan
RRC – Renewable Resource Council
SSC – Salmon Sub-Committee
TK – Traditional Knowledge
UFA – Umbrella Final Agreement
VEC – Valued Ecosystem Component
WRFN – White River First Nation
YEAA – Yukon Environmental Assessment Act
YESAA – Yukon Environmental and Socio-Economic Assessment Act
YESAB – Yukon Environmental and Socio-Economic Assessment Board
YFWMB – Yukon Fish and Wildlife Management Board
YLUPC – Yukon Land Use Planning Council

1. Introduction

The Yukon has a considerable recent history of environmental assessment and land use planning attempts before and after the signing of the Umbrella Final Agreement (UFA) in 1993 (Government of Canada, et al, 1993). Chapter 11 of the UFA specifies how regional land use planning should be carried out in the Yukon; with regional land use plans to be created by Regional Land Use Planning Commissions. Even though the Yukon Environmental and Socio-Economic Assessment Act (YESAA) is mandated to incorporate cumulative effects assessment (CEA) in their evaluation process (the evaluation of combined impacts over a spatial and temporal scale), limited CEA is currently happening (SENES Consultants Limited, 2009).

Ascertaining options for the management of cumulative impacts on wildlife is significant because wildlife is a highly valuable resource for the area's ecological health and for consumptive and subsistence lifestyles. With the opening of the Alaska Highway in 1942 (Canadian Heritage, 2014), the Kluane Region was more accessible to visitors, Yukoners, and development agencies, which put increased development pressure on the land adjacent to the park (Parks Canada, 2010). Small and large-scale human impacts in the Kluane Region include mining, proliferation of access roads, hunting, local community growth, forestry and tourism. There is also an increase in low-flying aircraft for mineral exploration, hunting trips, research projects and glacier sightseeing (Parks Canada, 2008). Although the majority of developments in this region are small-scale, there is no clear mechanism in place within the current environmental impact assessment process to adequately address the cumulative impacts of these developments on wildlife and habitats. By assessing the needs, gaps, and obstacles to better addressing cumulative effects on wildlife, new ideas and perspectives may be incorporated into assessment and management decisions.

Rationale

The absence of land use planning in the Southwest Yukon, limited cumulative effects assessment consideration in territorial environmental assessment processes (YESAA), and the increasing small and large-scale development and land alienation, all combine to require evaluation of formal and informal options for fully considering cumulative effects on wildlife in the region.

Overall Research Goal

The overall research goal of this thesis was to outline the needs and challenges for identifying and monitoring cumulative effects on wildlife in the Kluane Region, and to review and assess relevant tools/approaches for this in the Yukon's institutional, policy and legislative context.

Objectives

To achieve the research goal, the objectives were to:

- 1) Review literature on wildlife cumulative effects identification, monitoring and assessment to develop options, an assessment framework, and identify best practices.
- 2) Undertake a review of the needs and existing options in Southwest Yukon via the literature review and key informant interviews.
- 3) Identify and evaluate Southwest Yukon options to develop specific recommendations and avenues for further research.

Key Areas of Relevant Literature

To frame the research within the current understanding of the topic, key literature on cumulative effects on wildlife, cumulative effects assessment, as well as northern wildlife management and monitoring was reviewed.

With advances in technology, there has been an increased opportunity to exploit various natural resources (Hegmann & Yarranton, 2011). While development projects are subjected to their own environmental impact assessment (EIA), the notion of cumulative effects assessment (CEA) is more recent and began to materialize within Canada in the mid-1980's (Noble, 2010). Instead of analyzing potential adverse effects of a single, and often minor, development project, CEA is a tool that evaluates a project based on its relation to a location and the land uses that are occurring in the surrounding area. CEA considers effects that are additive, interactive, synergistic, and irregular in nature, focusing on temporal and spatial accumulation of effects to significant levels (Canter, 1999).

Effectively assessing the cumulative effects on wildlife can be particularly challenging because not only do the sources of impacts vary, but each species interacts with their habitat and responds to disturbances differently (Duinker & Greig, 2006). Four main types of cumulative effects have been identified: 1. Linear additive, 2. Amplifying or exponential, 3. Discontinuous, and 4. Structural surprises (Hegmann, et al., 1999). While there are many pathways that can lead to these different types of cumulative effects, there is often a lack of knowledge about the existence of critical landscape and species thresholds that are needed to protect the integrity of valued ecosystem components (VEC's), and the implications that these effects will have (Duinker & Greig, 2006).

Understanding how cumulative effects impact wildlife in the Southwest Yukon is particularly important because effective management of wildlife and habitats is of great concern to local citizens, First Nations, and Government and non-government processes and institutions. Wildlife management in the Yukon usually occurs to maintain sustainable harvest quotas, to ensure that healthy subsistence lifestyles can continue, to support conservation goals, reduce negative human-wildlife interactions, and to provide safe wildlife viewing opportunities for

tourists and Yukon residents. Environment Yukon often takes the leadership role in managing wildlife, collaborating with other Governments, departments, organizations, and institutions to make informed management decisions (Environment Yukon, 2014).

Whereas the management of wildlife is usually done by Environment Yukon, their management decisions are often shaped from the wildlife data that has been collected by a variety of different monitoring programs. The Fish and Wildlife Branch, within Environment Yukon, releases a yearly Project Summary Report, highlighting current monitoring projects that they are involved in. This report also features their Yukon Conservation Data Centre (CDC) that tries to gather, maintain, and distribute collected monitoring data (Environment Yukon, 2015b). Wildlife monitoring also occurs outside of the Yukon Territorial Government. The Kluane Region, for example, has been heavily studied by a variety of researchers from around the world. Situated on the south shore of Kluane Lake, the Kluane Lake Research Station (KLRS) was established in 1961 by Walter Wood and the Arctic Institute of North America. The KLRS has been instrumental in providing a base for researchers working on a variety of projects (University of Calgary, 2014). Wildlife monitoring in the area also occurs through staff at Parks Canada, First Nations Governments, and citizens (such as the Christmas Bird Count). One of the most prominent long-term monitoring projects within the Kluane Region is the Kluane Ecological Monitoring Program (KEMP). KEMP began in 1973 lead by University of British Columbia professor and ecologist Charley Krebs, and continues to monitor the trends and health of the boreal ecosystem in this region (University of British Columbia, 2014). Data that is collected through these monitoring initiatives are often integrated into local wildlife management decisions.

Introduction to Methods

To achieve the research goal, a qualitative, multi-method case study methodology was used. A literature review was conducted on cumulative effects assessment, wildlife cumulative effects, as well as northern wildlife management and monitoring. Relevant institutional documents were also analyzed to understand the context of the past and current wildlife management and land use planning in the region. An ethics process occurred, consisting of multiple components: the Panel on Research Ethics TCPS 2: CORE course, University ethics approval, and obtaining a Yukon Scientists and Explorers License. Initial scoping of the thesis topic preceded the development of my research goals and objectives in the Yukon Territory in August 2013. Subsequent fieldwork occurred in Whitehorse and the Kluane region in December 2013, February 2014 and August 2014. Qualitative data surrounding the needs, gaps and obstacles for better addressing cumulative effects on wildlife was collected through nineteen audio-recorded key informant interviews with staff from Government agencies, First Nations, academics and individuals in the non-governmental organization sector. The Kluane Region was chosen as a case study due to the previous research that has occurred this region, and the local First Nations interest for this project.

The Kluane Region

The Kluane Region is a mountainous area that encompasses 60,000 km² in the Southwest Yukon. The region includes the Traditional Territories of the Kluane First Nation, the Champagne and Aishihik First Nations, and the White River First Nation (Appendix 1, Map 1). Situated within the Kluane Region is Kluane National Park and Reserve (KNPR), which protects 21,980 km² of land (Parks Canada, 2014). Together with Alaska's Wrangell-St. Elias National Park and Preserve, Glacier Bay National Park and Preserve, and British Columbia's

Tatshenshini-Atsek Provincial Park, KNPR is part of the largest connected international protected area (approximately 100,000 km²), and became a UNESCO World Heritage Site in 1979 (Parks Canada, 2010) (Appendix 1, Map 2). The Kluane Region is home to a variety of significant fauna that are highly valuable for the park's ecological integrity goals, the area's tourism potential, as well as to maintain the local citizens' culture and subsistence lifestyles.

Outline of the Thesis

In the next chapter, a comprehensive literature review will be provided on the causes and implications of cumulative effects on wildlife, and the past and current ways that these effects are assessed (cumulative effects assessment). The literature review will conclude by analyzing past and ongoing approaches for managing and monitoring wildlife in the north, with a strong emphasis on the Yukon. Chapter three will delve into the methods and methodologies that were employed for this project. A detailed description of the steps and protocols involved will be provided, including specific interview questions, and detail about the specific steps taken to ensure the confidentiality of key informant participants. Since the thesis was conducted using the Kluane Region as a case study, Chapter Four will provide a contextual background about the area. Details pertaining to the Kluane Region, including the history, National Park, wildlife, and institutional programs and processes will be provided. The next chapter, Chapter Five, will outline the results of the key informant interviews. I provide a detailed break down of the various responses that were provided for each question. Following these results, Chapter Six will discuss the results in more detail, linking them to current relevant literature. I discuss the key emerging themes, and how these can be used to improve cumulative effects assessment of wildlife. To conclude, I provide a summary and conclusions for the thesis in Chapter Seven. This will include key recommendation that I have deduced from the results, as well as avenues for future research.

Appendices will provide maps, ethics-related documents (contact script, letter of consent, and interview script), and a detailed results table.

2. Literature Review

To frame my thesis within the current state of wildlife management and cumulative effects assessment in the Southwest Yukon, literature was explored on cumulative effects, the evolution of cumulative effects assessment in Canada, as well as the past and current wildlife management and CEA approaches that have occurred in the Kluane Region. While environmental impact assessments became required in Canada in the 1970's, the inclusion of cumulative effects only gained attention in the early to mid-1980's when the Canadian Environmental Assessment Research Council made CEA a research priority (Canadian Environmental Assessment Research Council, 1988). It was recognized that the regular process of conducting environmental impact assessments (EIA) had many shortcomings, including its exclusion of the fact that an activity can have more significant changes when it interacts and combines with effects from other past, present and future activities in an area (Noble, 2010).

Within the Yukon, devolution occurred in 2003, transferring the responsibility of land and resource management from the Government of Canada to the Yukon Government. This led to the development of a variety of processes and legislated frameworks in conjunction with comprehensive land claims, including the Yukon Environmental and Socio-Economic Assessment Act (YESAA) (Slocombe, et. al. 2016). While YESAA states that projects must be evaluated for the adverse socio-economic and environmental cumulative effects that may occur, the Act did not provide a definition of cumulative effects, or guidance on how to assess these effects (Yukon Environmental Socio-Economic Assessment Board, 2006). Throughout the remainder of this chapter, I will provide a more comprehensive overview of the evolution and process of CEA in Canada, including its history and context in the Yukon.

Cumulative Effects and Wildlife

There has been an increased understanding recently that environmental effects from an action or project can also interact with other past, present and future projects, creating more significant environment changes than the effects of one single project alone – cumulative effects (Noble, 2010). Cumulative effects occur when an action affects an environmental component (such as wildlife, as focused on in this research) that is also affected by other actions. The wildlife or habitat therefore experiences effects from numerous sources, at different places and times (AXYS Environmental Consulting Ltd., 2001). These cumulative effects often occur in locations that are far removed from the project in space and time (Dube, 2003).

There are numerous factors that can create cumulative effects on wildlife, all with varying intensities. Many developments and human activities can contribute to these effects, such as mineral exploration and extraction, timber harvesting, vehicle and aircraft use, hunting, housing developments, recreational activities and traditional land use practices (AXYS Environmental Consulting Ltd., 2001). These effects can also be intensified when coupled with broader natural influences, such as habitat quality and composition, predation, wildfire activity, insect disturbances, and changes in climate (Porcupine Caribou Management Board, 2012).

Recreational use on a landscape can also have significant direct and indirect cumulative impacts on wildlife. Hiking, for example, may cause some species to alter their activity and behavioural patterns (Theobald et al, 1997). There are three types of wildlife disturbances that usually occur with recreational trail use. The first is where human presence is apparent and an animal smells, sees, or hears the human, but no contact is made and the animal does not alter its behaviour. Increasing in concern is a second type, such as when there is a clearing of vegetation, presence of food, camping or the creation of pathways that changes the wildlife's habitat. More

severe is where a human action causes direct and damaging contact with the animals. This can include hunting, fishing, collisions, and other accidents (Liddle, 1997).

Nontrivial stress responses to human disturbance can cause an animal to flee an area, expending additional energy from heightened metabolic rates, and can reduce their reproductive success. Some species may develop learned avoidance behaviour, purposely staying away from essential habitat near the development. The distance that wildlife may flee depends on the species, season, habitat type and the nature of the development (Theobald et al, 1997).

Development activities often involve the construction of new roads. One of the biggest implications of developing roads is habitat fragmentation. In addition to reducing the habitat available for wildlife, roads can fragment a landscape by dividing it into smaller areas that are a series of disjunct units. This may not only inhibit the movement of a species, but can also reduce the probability of the species re-colonizing once an activity subsides (Theobald et al, 1997). Roads have also been shown to increase access for hunting, and can increase wildlife-vehicle road mortality (AXYS Environmental Consulting Ltd., 2001). Additionally, increased access into an area can lead to additional competition between individuals in the region who rely on hunting and certain areas for subsistence (Sumi and Thomsen, 2001).

Although cumulative effects are not necessarily different from the effects assessed in a single-project EIA, the consideration of cumulative effects often requires concepts that are not found in conventional approaches (Hegmann et al 1999). This is, in part, due to the various types of activities and sources that can lead to cumulative environmental changes. It has been recognized that there are eight main sources of change that can contribute to cumulative effects, including space crowding, time crowding, triggers and thresholds, fragmentation, indirect, time lags, cross-boundary movement, and compounding (Noble 2010).

These sources of change can lead to a variety of types of cumulative effects, including linear additive effects, amplifying or exponential effects, discontinuous effects, and structural surprises. Linear additive effects are when small increments are either added or deleted from a fixed large storage. Effects that are amplifying or exponential occur from incremental additions that are made to an apparent limitless storage, with effects becoming gradually more detectable. Discontinuous effects occur when incremental additions do not have an apparent consequence until a threshold is crossed. Once this threshold is crossed, change becomes rapid or the variable moves into a distinctively different behaviour or regime. Structural surprises on the other hand, are effects that are caused by multiple activities within the region, and affect a number of ecosystem dynamics. These effects appear both locally and abruptly, but can also have slower changes that gradually intensify and spread over larger regions (Sonntag et al., 1987).

Having highlighted the main activities that can cause cumulative effects on wildlife, as well as their potential sources and implications, it is hopefully evident that due to their pervasive nature, addressing cumulative effects can also address many of the environmental challenges being faced at a local, national, and international scale (Kennett, 1999).

Cumulative Effects Assessment

As the human population has continued to grow in Canada, demands on the country's natural resources also increased. Advances in technology have improved our ability to exploit and extract these resources, creating a complex conflict between human resource needs and conservation (Hegmann and Yarranton, 2011). To address this conflict, a process of conducting EIAs was developed to identify and consider the impacts that a human development has on the surrounding environment (Hanna, 2016). The development components that are of particular concern for EIA's are the human activities and projects that compromise important

environmental values (Duinker and Greig, 2006). EIAs are designed to consider what the proposed activity is, and the baseline conditions that exist where the activity is to occur. They also identify the possible environmental effects the activity may cause, and propose mitigation measures to minimize these effects. Additionally, if done properly, they should also provide a plan for follow-up and monitoring (Hanna, 2016).

In the early to mid-1980's, the Canadian Environmental Assessment Research Council began to devote a lot of attention toward CEA because single-project EIA's were highlighted to have many shortcomings (Canadian Environmental Assessment Research Council, 1988). It was believed that not only did these EIA's not adequately take into consideration the additive effects of several developments; they also did not focus on the effects of secondary activities resulting from primary developments. Additionally, they did not include the non-linear and indirect environmental responses, or how various impacts interact over time (Noble, 2010). The Council felt that it would be too challenging to conduct sound EIAs without being able to understand the cumulative changes that result from multiple impacts, and how this fits into the regional context (Canadian Environmental Assessment Research Council, 1988). It was also strongly believed that effects in single-project assessments are cumulative, and therefore a cumulative assessment approach needs to be fully integrated throughout the entire process (Duinker and Greig, 2006).

Although the advent of CEA predates the Canadian Environmental Assessment Act (CEAA), the requirement of conducting a CEA was officially incorporated into the CEAA in 1995, making it mandatory for all national level EIA's (Noble, 2010). Many Canadian jurisdictions now require considering the impacts of multiple projects within the scope of project-specific environmental impact assessments, including within the Yukon Territory (Parkins, 2011). Shortly after its new mandate within the CEAA, and in response to a couple of

EIA court cases that were occurring in Canada, a number of conferences and other resources were initiated to provide guidance on how to conduct CEA's (Duinker and Greig, 2006).

A cumulative effects assessment is the process of identifying and classifying these environmental pathways and effects, and determining how various impacts interact over temporal and spatial scales (Harriman and Noble, 2008). Assessors should be able to predict not only the total effect of the project, but also the intra-project effects on a resource arising from the activities of different components (Therivel and Ross, 2007). Ultimately, CEA's should help to avoid the possible sources or triggers that can lead to cumulative environmental changes (Harriman and Noble, 2008).

In order to conduct a CEA, there needs to be a clear understanding of the current state of the natural and social environment. Having a detailed description of economic and environmental conditions in a region can help attain this, and will provide a platform for understanding the influence of driving forces while conducting the CEA (Johnson et al., 2011).

As with traditional single-project assessments, CEA's are expected to consider interacting and combined effects that projects and activities have on valued ecosystem components (VECs) (Hegmann et al 1999). The idea of VECS was introduced in the 1980's to help provide a focus for EIA's. Until then, assessment efforts were distributed more broadly and thinly, with an attempt to examine all environmental values. VECs are aspects of the natural and human world that are of particular value to a stakeholder. They often hold strong socio-ecological value, including ecosystem services and human health benefits (Milne and Bennett, 2016). VECs have remained the focal point of an EIA and CEA, and are proposed at the onset of an assessment. Within CEAs, larger-scale VECs are often the focus, such as an entire ecosystem, or the broader social and economic indicators (Hegmann et al 1999).

The process of conducting CEA is complex because it needs to consider multiple sources of change, alternative pathways of accumulation, as well as spatially and temporally variable effects (Hanna, 2016). There are five main steps that have been commonly accepted for conducting a CEA, including;

1. Identifying which VECs will be affected;
2. Determining what activities (past, present, and foreseeable future) have, or will, affect the VECs, and what has led to these activities;
3. Identifying how the project or activity will affect the VECs, and what the effects will be when combined with the effects of other activities or projects;
4. Determining what the significance of these effects is;
5. Identify how these cumulative effects can be managed (Noble, 2010).

Despite the attention that has been given to CEA, and the developments surrounding its concepts and application, there are a number of challenges that have continued to hinder its effectiveness (Duinker and Greig, 2006). Conducting CEA's on physico-chemical changes has proven to be a lot easier and effective than for biological and ecological changes. This is attributed to the consensus that surrounds which chemical and physical parameters are appropriate for measuring cumulative impacts. Ecological and biological predictions have continued to be more challenging, due to the lack of information about and the complexity of these systems (Sonntag et al., 1987). Many of the challenges faced within my case study region directly mirror challenges presented in this literature review . I will explore these specific challenges further in the results chapter (Chapter 5) and discussion chapter (Chapter 6).

A lack of information about ecological systems ties directly into the challenges of understanding the impacts that activities will have on ecological thresholds. This is particularly concerning because when a threshold is crossed, the behaviour of a system can change in a way that is difficult or impossible to reverse (Duniker and Greig, 2006). Due to their complexity, implementing thresholds in an assessment continues to be an obstacle (Kennett, 1999).

Thresholds often end up being defined by the values that are put forward by stakeholders

(Duniker and Greig, 2006). Developing thresholds, however, should take into account a combination of science, social values, public policy, and traditional and local knowledge (Kennett, 1999).

The application of CEA in project-level environmental impact assessments has also continued to be a challenge. Assessment of cumulative effects relies heavily on a VEC-centred approach. This can pose challenges because individual projects usually cause smaller levels of stress to VEC's, and therefore a broader VEC-centered lens is harder for proponents to focus on. Scoping for projects continue to be a weakness for CEA (Duniker and Greig, 2006). Scoping for combined projects, versus individual projects, typically does not receives additional distinct attention. When scoping does not properly occur, the ability to adequately analyze current and subsequent projects is limited (Baxter et al., 2001). Building on this, the uncertainty surrounding how these future activities will be implemented and what impacts they will have, further the challenges assessing cumulative effects (Duniker and Greig, 2006).

CEAs are supposed to be comprehensive in nature, assessing a range of systems in an interdisciplinary approach and within an inter-organizational context (Sonntag et al., 1987). In reality, however, even traditional single-project assessments have proven to be too complex for practical application. Cumulative effects, when incorporated into mandates, are often worded in an ambiguous way that conflicts with other Governmental policies (Sonntag et al., 1987). There is often confusion surrounding the role that cumulative effects assessment plays in EIA, compared to the regional planning structures that have been put in place around some parts of Canada (Crookes and Wit, 2009).

The lack of clarity surrounding the spatial and temporal boundaries for CEA's is an additional challenge (Crookes and Wit, 2009). Spatial boundaries have to be large enough that they include all of the relationships that occur between the proposed and existing activities. They

must also cover a temporal boundary that includes the past, present, and future (Noble, 2010). Defining the spatial or temporal boundary of a CEA is often an iterative process, with initial boundaries identified and then modified as more information becomes available (Hegmann et al 1999).

Another challenge for implementing CEA is the effectiveness of mitigation provisions and preventative actions. Committing to mitigation and monitoring plans that reduce cumulative effects, is an essential component of a CEA. In fact, many EIA's are approved under the condition that mitigation and monitoring will occur (Baxter et al., 2001). Even the best assessment of cumulative effects on a proposed activity would be useless if it was not followed-up by a rigorous monitoring program (Duniker and Greig, 2006). Monitoring helps to ensure that mitigation measures are working as they are supposed to (Therivel and Ross, 2007), and are critical for reducing uncertainty when conducting future CEA's on activities (Baxter et al., 2001). Community-based monitoring can play a part in engaging citizens and providing them with meaningful involvement in local resource development (Lawe et al., 2005). Despite this, current CEA monitoring efforts have been narrowly focused on specific sites, species or stressors, inadequately monitoring in a cumulative effects context that should include multi-scaled components that analyze the biodiversity response to changing anthropogenic impacts (Burton et al., 2014).

Despite the challenges, cumulative effects assessment can be a valuable tool for performing proactive conservation management for wildlife species (Weaver et al. 1987), and is important to implement because effects from human activities affect each species and location differently (Theobald et al, 1997). In the Yukon, for example, it is important that planning and management focus on multiple spatial and temporal scales, as many of the northern species require large ranges for breeding, feeding, and migration (Willig et al, 2003). The next section

will explore how environmental impact assessments have transpired in the Yukon, including the past and current strategies for wildlife management.

Yukon Environmental Assessment and Wildlife Management

The Yukon Territory has a relatively recent history of formalized land and resource management. In 2003 it was the first Canadian territory to take over the management responsibilities of its land, water and mineral resources. This process, known as devolution, began negotiations in the Yukon in 1998, but officially came into effect in 2003 after the Yukon Northern Affairs Program Devolution Transfer Agreement was signed in 2001 (Minister of Indian Affairs and Northern Development, 2001). This transferred the management responsibilities from the Department of Indian Affairs and Northern Development's Northern Affairs Program, to the Government of the Yukon (Government of Canada, 2013), and led to the development of a variety of processes in conjunction with comprehensive land claims, such as co-management Boards and other institutions. Most significantly, territorial institutions such as the Yukon Environmental and Socio-Economic Assessment Board (YESAB), the Yukon Land Use Planning Council (YLUPC) and regional Renewable Resource Councils (RRC's) were implemented as required by the signing of the Umbrella Final Agreement (UFA) in 1993. These boards and institutions continue to have substantial influence on how these resources are managed throughout the Yukon (Slocombe, et. al. 2016).

Included in this transfer, and as a component of Chapter 12 of the UFA, was the Territorial Government's new responsibility to legislate EIA in the Yukon. In March 2003, the Yukon Environmental Assessment Act (YEAA) was passed, as territorial legislation that mirrored the CEAA (Slocombe et al., 2016). Project proposals continued to be assessed under the YEAA until 2005, when the Yukon Environmental and Socio-economic Assessment Act

(YESAA) came into full regulatory force. YESAB was established to be the independent arms-length body responsible for implementing the YESAA. This system tries to ensure that an impartial body does assessments independently, and increases the accountability of the decision makers. The Board, as required by the YESAA, is made up of seven members, including three who are part of the Executive Committee. The Board is made up of representatives appointed by the Council of Yukon First Nations, Federal Government and Territorial Government (Yukon Environmental and Socio-economic Assessment Board, 2015a).

When a project proposal is submitted to YESAB, the activity that is proposed determines the level of assessment it will receive. The majority of proposals are assessed through regional designated offices, however larger projects may be required to be screened by the Executive Committee or presented for review by a Panel of the Board (Yukon Environmental and Socio-economic Assessment Board, 2015a). For my thesis, I mostly focused on projects that are screened through the Haines Junction designated office – one of the six designated community offices.

The assessment of cumulative effects has always been mandated within YESAA. The Act states that the Board must consider

42 (d) The significance of any adverse cumulative environmental or socio-economic effects that have occurred or might occur in connection with the project or existing project in combination with the effects of

- (i) other projects for which proposals have been submitted under subsection 50(1), or
- (ii) other existing or proposed activities in or outside Yukon that are known to the designated office, executive committee or panel of the Board from information provided to it or obtained by it under this Act (Yukon Environmental and Socio-Economic Assessment Act, 2003).

Despite the requirement of CEA in the Yukon, YESAA does not provide a definition of cumulative effects, or how this process is to occur (Yukon Environmental and Socio-economic Assessment Board, 2006).

The Umbrella Final Agreement also required that a comprehensive review of the development assessment process be completed within the first five years of YESAA's enactment. This task was given to SENES Consultants Limited, after a national competition for the job. The purpose of the Review was to examine the Yukon's overall development assessment process, with specific attention to its context within the objectives of the UFA. The Review highlighted numerous successes and challenges to EIA in the Yukon, including the strong concern about inadequate CEA. While it was noted that CEA had been hampered by the absence of regional monitoring and land use plans (LUP), other issues that were emphasized include:

- Lack of clarity and consistency in the scope and approach to CEA;
- Lack of mechanisms for regional or cumulative effects monitoring and baseline data; and,
- Lack of regional land use plans and clarity regarding the ongoing role of land use planning commissions (SENES Consultants Limited, 2009, p 38).

The Review put forward a number of recommendations for CEA in the Yukon, including organizing research and participatory forums to educate assessment practitioners, amending the YESAA to adopt best practices for the approach and application of future projects, making the development and approval of regional LUP a priority, clarifying the role of the Regional Land Use Planning Commissions, and the development of regional monitoring programs and regional databases to establish baseline information and trends (SENES Consultants Limited, 2009).

Following the YESAA Five-year Review, a series of educational and training forums occurred. The first YESAA Forum occurred at the Kwanlin Dun First Nation Cultural Centre in April 2012, with the first CEA-focused forum taking place later that year in Dawson City (Yukon Environmental and Socio-Economic Assessment Board, 2013). Additionally, since 2013, the Yukon Land Use Planning Council (YLUPC) has been taking an active role in encouraging the Yukon Government to establish a clear policy for involving Yukon First

Nations without final agreements in the regional planning process, which would help to address some of these challenges. While the YLUPC does not have the direct authority to address this issue, they do recognize that there are concerns surrounding the need to clarify the role that unsettled Yukon First Nations have in regional land use planning when their boundary overlaps with First Nations that have settled their final agreements. The YLUPC therefore encourages the Yukon Government to consult with all Yukon First Nations to develop a suitable policy for this (Robertson, 2013).

In addition to environmental impact assessments, the Umbrella Final Agreement also outlined the structure for how the Yukon's fish and wildlife were to be managed and how harvesting was to be determined. Within this chapter of the UFA – Chapter 16 – the roles are clearly defined for several different bodies, including First Nations, Yukon Government, Renewable Resource Councils (RRC), the Yukon Fish and Wildlife Management Board (YFWMB) and the Salmon Sub-Committee (SSC). The YFWMB is the main instrument for the management of fish and wildlife in the territory (Council of Yukon First Nations and Government of the Yukon, 1997). The YFWMB must act within the public interest and can make recommendations to the First Nation Governments, Minister, RRC's and the SSC on all matters related to the management of fish and wildlife (Yukon Fish and Wildlife Management Board, 2016a). The Salmon Sub-Committee is a sub-committee of the YFWMB and is the main instrument for managing salmon and their habitats in the Yukon (Council of Yukon First Nations and Government of the Yukon, 1997).

Renewable Resource Councils were to be established through the UFA to be the main body for local renewable resource management in each First Nations Traditional Territory where land claim agreements have been signed. With the additional responsibility of managing forests, RRC's also make recommendations to the Minister, First Nations Governments, the YFWMB

and SSC (Council of Yukon First Nations and Government of the Yukon, 1997). RRC's play an important advisory role in shaping the work plan of the YFWMB, by bringing forward wildlife concerns from citizens. They also help to integrate local and traditional knowledge from citizens within their Traditional Territories (Yukon Fish and Wildlife Management Board, 2016b).

Yukon First Nations have the responsibility to manage the local populations of fish and wildlife that are within their settlement lands, as long as coordination with other fish and wildlife management programs is not necessary (Council of Yukon First Nations and Government of the Yukon, 1997).

Even though these Boards and Councils have management powers and can make recommendations to the Minister, the Minister still has the final authority for managing wildlife and their habitats. That being said, the Minister must take every recommendation from the YFWMB, RRC's and SSC into consideration, and must provide a written explanation if a recommendation is set aside or varied, and provide them with the opportunity to submit a final recommendation (Council of Yukon First Nations and Government of the Yukon, 1997).

Within the context of CEA, all of these boards, councils, and Governments (First Nation and Territorial) can make recommendations and comments within YESAB proposals (Francis et al., 2013b). They have also created resources and tools that operators, managers, councils, boards, proponents and assessors can use to mitigate their cumulative effects. Two examples of these include Environment Yukon's 'Flying in Caribou Country' and 'Flying in Sheep Country' booklets. These reports are the result of projects that were funded by the Government to evaluate how aircraft disturbance affects ungulate species. 'Flying in Sheep Country' outlines how sheep typically respond to disturbance, and recommends that helicopter and fixed-wing aircrafts fly a minimum of 3.5 km from known sheep ranges (Laberge Environmental Services, 2006). 'Flying in Caribou Country' on the other hand makes five key recommendations, including to use fixed-

wing aircrafts instead of helicopters, maintaining an altitude of at least 300m above ground level (Government of Yukon, 2010).

Other organizations and individuals, such as non-governmental organizations, and the general public can also influence how wildlife is managed in the Yukon Territory. In addition to being able to submit comments for a YESAB proposal, many planning processes have a strong public consultation stage as a mandatory mechanism that is embedded from the UFA.

A review of key literature and the analysis of relevant documents has shed light on how environmental impact assessments and the process of conducting cumulative effects assessment has evolved in Canada and Yukon. While CEA has been integrated within the country longer than a formalized mechanism of EIA has been in place in the Yukon, there are many similarities between how the process is to occur, and the challenges that are faced across the country. Following the discussion of methods, succeeding chapters will explore the CEA-specific context of the Southwest Yukon, including some of the unique challenges and opportunities for better addressing cumulative effects on wildlife.

3. Methods

To fulfill the objectives of this thesis, a variety of methodologies and methods were used. This chapter will provide a detailed description of the qualitative, multi-method, case study approach that was taken, going into detail about the methods for the initial scoping of the thesis, literature and document analysis, the ethics approval process, fieldwork, data collection, coding, and dissemination of results.

Methodology

A methodology was designed for this thesis that would allow effective collection, interpretation and applicable integration of results. The research design took into account several considerations, including the research questions and goal, the geographic scope of the study, and the current state of knowledge on this topic (Newing, 2011). Using these factors, a methodology that was observational, multi-method, and qualitative was used, including selecting a particular area as the case study.

Multi-method

As with most qualitative methodologies of research, this thesis used multiple methods to collect different data. This approach allowed all available information to be reviewed and then organized into themes that cut across all of the data sources (Creswell, 2014). A combination of evaluating literature, conducting semi-structured interviews, and reviewing relevant documents, created an inductive approach for establishing comprehensive themes. A deductive analysis then occurred as the thesis progressed, with an emergent approach taken as respondents revealed new information.

Qualitative

To outline the needs and challenges for identifying and monitoring cumulative effects on wildlife in the Kluane Region, a qualitative, observational approach was used. This approach is commonly used by social scientists to gain an understanding and an in-depth description of a topic, without intervening in a way that effects change (Newing, 2011). Detailed descriptive data was obtained from key respondents answering survey questions that go into detail about their personal CEA knowledge and experience. By taking a qualitative approach, varied perspectives were elicited, focusing on the knowledge that each participant had. This approach was essential in order to reveal the complex picture of the current state of CEA in the Southwest Yukon (Creswell, 2014).

Case Study

To understand the complexities of CEA in the Southwest Yukon, a case study approach was used, with the Kluane Region selected as the geographic example. Case studies are used to help build an understanding of complex social and political phenomena, and are often the preferred technique for analyzing contemporary issues and events (Yin, 2009). It was therefore the most appropriate technique for taking a systematic approach to analyzing the current organizational, institutional and governmental processes surrounding EIA and CEA in the Southwest Yukon. After determining what the research goal and objectives were, it was evident that using a case study methodology would provide a suitable opportunity for incorporating multiple methods, and analyzing different forms of data over a sustained period of time (Creswell, 2014). Single-case study approaches (as opposed to multiple-cases) allow unique cases to be explored in detail, contributing new ideas to the broader understanding of underlying issues (Newing, 2011). The Kluane Region presents a very complex and unique situation for EIA

wildlife management in the Yukon, and was therefore vital to analyze independently. Sometimes case studies are used as a comparative tool for other geographic areas (Yin, 2009). While this thesis will not directly compare the Southwest Yukon to other parts of the Territory, the results and recommendations may provide causal links that could be used to help managers strengthen CEA in the Yukon.

Methods

Conducting research in a northern context can be a very different process than in the south. Successful northern research focuses strongly on the proposal development process and research design, understanding and respecting cultural protocols, as well as communicating strategies and disseminating results (Brunet et al., 2014). One of the fundamental ethical principles of conducting research in the north is to ensure that appropriate community consultation occurs at every stage of the research process (Association of Canadian Universities for Northern Studies, 2003). Before deciding on this thesis topic, I went on an initial research trip to the Yukon in May 2012. I attended meetings in the Kluane Region and in Whitehorse with my thesis supervisor and various stakeholders, to scope research needs for the community. The goal and objectives of this thesis stem from those meetings and will hopefully benefit other CEA stakeholders in the Southwest Yukon and Territory. An additional research trip occurred in March 2015 to receive feedback on the thesis. Available respondents were provided with an initial draft of the results chapter, as well as the completed results table. The feedback that was received from this trip has been integrated into this thesis.

Literature Review

To fulfill my first research objective of understanding the past and current context of wildlife monitoring, assessments and CEA in the Southwest Yukon, an initial broad literature

review and institutional document analysis was completed. As most successful literature reviews include careful cataloguing of the collected data (Machi and McEvoy, 2012), I organized the documents into various folders as themes began to emerge. The majority of the analysis occurred by obtaining online papers and documents from Government websites and relevant journal search engines. Scholars Geoportal, the Yukon Energy Mines and Resources (EMR) database, as well as the Arctic Science and Technology Information System database (ASTIS), were predominantly used. I also searched within specific academic journals, including *Environmental Impact Assessment Review*, *Journal of Environmental Assessment Policy and Management*, *Impact Assessment and Project Appraisal*, and *Ecology and Society*. Furthermore, I borrowed relevant hard copy documents from the Yukon Energy, Mines and Resources library. This review also influenced the development of the interview questions, and lead to more refined searches. In addition to my initial literature and document review, a number of key documents were provided to me from the respondents that I interviewed during the fieldwork components.

Ethics Approval Process

With the research context significantly shifting in the north – often as a result of First Nations settling their land claims and Self-Government Agreements, there has been an increased need for stronger ethics mechanisms and protocols that ensure meaningful relationships occur between northerners and researchers (Association of Canadian Universities for Northern Studies, 2003). For this thesis, an ethics process occurred that consisted of multiple components. To begin, I enrolled in the Panel on Research Ethics TCPS 2: CORE tutorial, successfully receiving the certificate of ethical conduct for research involving humans. The thesis proposal, including the contact script (Appendix 2), interview script (Appendix 3), and informed consent agreement (Appendix 4) were submitted to and approved by the Wilfrid Laurier University Research Ethics

Board (#3889). A Yukon Scientists and Explorers research license was also obtained (13-41S&E).

Data Collection

The results of the thesis are based on the qualitative data collected during three research trips that occurred between December 2013 and August 2014. Key stakeholders were emailed with the contact script (Appendix 2) to gauge interest in participation and to arrange interviews. The interviews occurred in-person in both Whitehorse and the Kluane Region. Before each interview, respondents were provided an informed consent agreement (Appendix 4), which highlighted the risks and benefits associated with their participation. This document also outlined the confidentiality agreement, and provided contact information for if they felt the ethics agreement was not being upheld. Participants were informed that at any point during the research process, they could decide to withdraw from the project. The agreement was signed by both the respondent and I before the interview proceeded. The respondents were then asked the same set of questions, as seen in the approved interview script (Appendix 3). Respondents were made aware that they could skip any question(s) that they did not wish to answer, or end the interview at any time.

Lasting around forty-five minutes, the interviews consisted of eleven open-ended questions. Using open-ended questions in a research interview allows the respondent to express their perspectives more fully, and provides insight into the reason for their particular viewpoint. Open-ended questions are also a useful way of increasing the descriptive qualitative data that is collected by the researcher (Newing, 2011).

A semi-structured method was also used for the interviews. Although the questions were determined in advanced with my supervisor, they were not always asked in a set order, and were

occasionally continued with prompts or follow-up questions. This is a common approach used in qualitative research because it allows increased flexibility in the interview structure and is an effective way of obtaining specific information from staff and officials from various sectors (Newing, 2011).

The questions for this thesis were centered on assessing the current state and importance of EIA and CEA in the Yukon; were used to gain context for the past and current data and tools available for CEA; as well for gaining an understanding of the data, tools and approaches that are needed to conduct effective CEA's in the future. A twelfth question, that was not included in the results, asked each respondent if there were any individuals they would recommend for me to interview. This proved to be a valuable question, as snowball sampling is an effective approach in the north.

The results comprise data from seventeen respondents. These respondents were selected because of their involvement with EIA in the Kluane Region, and because of the varying perspectives that they could contribute. Interviews occurred with professionals or researchers from First Nations, academia, Parks Canada, Yukon Government, non-governmental organizations and YESAB.

In addition to taking field-notes, each interview was recorded (with permission) using a hand-held audio recording device. These audio recordings were later transcribed, with each respondent assigned a specific code. Using codes in research can help assign certain attributes to the interview respondents that are particularly relevant to your research, such as their affiliation (Newig, 2011). These codes (as indicated in the informed consent agreement), not only ensured that confidentiality was maintained, but also helped to show the varying perspectives of the key informants. The following codes were assigned: A = Academic, FN = First Nations, TG =

Territorial Government, FG = Federal Government, Y = YESAB, and N = NGO. A number was also assigned to each code, as multiple stakeholders were interviewed from each code category.

The key linking participants and their codes was kept confidential, and was maintained separately from the data in a secure location. The digital data was only kept on a secured laptop and external storage media. All of the information that links participants and their interview data will be destroyed at the completion of this thesis research.

Analysis

Qualitative research is often based on data that is collected in the form of words, and is analyzed by interpreting and building a detailed description of the topic (Newing, 2011). For this thesis, the data from transcribed interview audio recordings and field notes was analyzed. Each transcribed interview underwent an in-depth examination, where the points that were most relevant to my research objectives were derived and entered into the results table to help with further analysis (Appendix 6).

Organizing data at the onset is important to ensure that you identify and differentiate the questions and topics you planned to attain answers to in the first place (O'Connor and Gibson, 2003). This was an important step in this thesis, as some respondents covered multiple questions in their answer to one question, making it important to sort their responses into the most suitable section of the results table. As we often learn a lot about a person's perspectives on a topic by the language they use (O'Connor and Gibson, 2003), I was careful when summarizing the answers, trying to maintain the meaning expressed in their responses. The results chapter (Chapter 5) is based on the key qualitative data that had been organized into the results table.

Working with the results table, I used annotations to go from the data in a results table to a written results chapter. Annotations usually take the form of notes in the margins and can be

used to mark particular sections that the researcher wants to draw attention or come back to (Newing, 2011). For each question within the results table, I used a list to gradually draw out themes that kept coming up, and to categorize the ideas and varying perspectives within those themes. I categorized the emerging themes of each question, and listed the codes of the respondents who contributed a perspective into that theme. This system of analysis allowed me to tighten up and combine themes, and provided me with a strong indication of what themes were most common among the interviewed respondents. I expanded on these themes to create the narrative for the results chapter,

The discussion chapter (Chapter 6) highlights the key overarching themes that were identified from the results chapter, and places the results within the context of literature and my understanding of wildlife management and cumulative effects assessment in the Southwest Yukon.

Dissemination of Results

For research in the north, it is vital that the individuals involved are regularly updated about the progress of the research, including the interpretation and results of the findings (Association of Canadian Universities for Northern Studies, 2003). On-going communication is an essential ingredient for building healthy research partnerships between northerners and researchers, with the timing and context of disseminating results being key to building trust in the community you are working in (Brunet et al., 2014). The thesis, as agreed in the signed informed consent agreement forms, will be disseminated via email to each key informant in the form of this final paper. An executive summary of the thesis has also been provided. Copies of the paper will be sent to relevant institutions, such as the Yukon Energy, Mines and Resources library, Yukon Archives, and Renewable Resource Councils in the Kluane Region. Furthermore,

as with the preliminary results, I will seek to disseminate the results from this thesis at relevant conferences and community events.

4. Kluane Case Study Background

To build an understanding of the needs and processes of cumulative effects assessments on wildlife in the Southwest Yukon, the Kluane Region was used as a case study. An overview is provided for context of the Kluane Region, including Kluane National Park and Reserve, the wildlife that is present in the region, local cumulative effects threats to wildlife, as well as past and ongoing wildlife management, assessment, research, and monitoring initiatives in the Southwest Yukon.

Kluane Region

The Kluane Region encompasses 60,000 km² in the southwest corner of the Yukon Territory. For this thesis, the boundary of the region is defined by YESAB's southwest assessment district (Appendix 1, Map 3).

The Kluane Region includes three First Nations Traditional Territories – Champagne and Aishihik First Nations (CAFN), Kluane First Nation (KFN), and White River First Nation (WRFN). The CAFN and KFN are Southern Tutchone Peoples (Council of Yukon First Nations, 2015), whereas the WRFN are Northern Tutchone and Upper Tanana Peoples (White River First Nation, n.d.). The ancestors of these First Nations have been living a subsistence lifestyle for thousands of years that are dependent on the natural rhythms of the plants and animals of the region. CAFN and KFN are self-governing First Nations who have both negotiated their land claims and signed their Final and Self-Government Agreements with the Territorial and Federal Governments (in 1993 and 2003 respectively) (Council of Yukon First Nations, 2015). WRFN also completed their negotiations but decided not to ratify these agreements (Fred, 2011).

The Champagne and Aishihik First Nation's traditional territory encompasses 29,000 km² in the Kluane Region of the Southwest Yukon and 12,000 km² in northern British Columbia. With more than 1,200 citizens, CAFN is one of the Yukon's largest First Nations, with permanent communities in Haines Junction, Aishihik, Takhini River, Klukshu, Champagne, and Canyon (Champagne and Aishihik First Nations, n.d.). CAFN has their administrative headquarters in Haines Junction and an office in downtown Whitehorse (Village of Haines Junction, 2015). The Nation's name is derived from two of their historic settlements, Champagne – located on the Dezadeash River, and Aishihik – at the north end of Aishihik Lake (Council of Yukon First Nations, 2015).

The Kluane First Nation has around 120 citizens and occupies the traditional territory from the Donjek-White River confluence south to the St. Elias Mountains and from the southeastern end of Kluane Lake at Silver City northwest to the Nisling River and Alaska border. The KFN administration building and the majority of its citizens are situated along the Alaska Highway in the village of Burwash Landing (Kluane First Nation, 2015).

The White River First Nation traditional territory overlaps completely with the KFN's, as they separated from the Kluane group to form their own First Nation in 1991. The majority of their 130 citizens are based along the Alaska Highway in Beaver Creek – the most westerly Canadian community, situated only a few kilometers from the Alaska border (Fred, 2011).

The Kluane Region has a relatively small population of around 1,200 individuals. The largest village is Haines Junction, situated about an hour and a half drive west of Whitehorse with a population of approximately 900 individuals. Other communities in the region include Destruction Bay (50 residents), Burwash Landing (110 residents), and Beaver Creek (120 residents) (Yukon Government, 2015b).

Two main roads run through the Kluane Region, the Alaska Highway and the Haines Highway. The Alaska Highway was completed in 1942 and spans 2,232 km from Dawson Creek, British Columbia, to Fairbanks, Alaska. This road passes into the Kluane Region as it travels west from Whitehorse, branching northwest at Haines Junction toward the village of Beaver Creek (Remley, 2008). The Haines Highway, often referred to as the ‘Haines Road’, is a 256 km stretch that connects the village of Haines Junction to Haines, Alaska (Yukon Government, 2015a).

Situated around 60° to 62° latitude north, the Kluane Region is a subarctic environment with discontinuous permafrost. Complex mountain and glacial processes dominate this landscape because of two main fault systems, Denali and Shakhwak, that cut through the region (Krebs, 2001). These faults create the St. Elias Mountains – North America’s youngest mountains; which are further divided into three main ranges – the Kluane Ranges, Alsek Ranges, and Icefield Ranges (Appendix 1, Map 4) (Danby, et. al. 2003). The St. Elias Ranges contribute to the region’s semi-arid conditions, as they cast a rain shadow effect over the landscape (Krebs, 2001).

The Yukon’s largest lake, Kluane Lake is situated within the Shakhwak Trench and is created by water and sediment that is normally discharged from the Kaskawalsh glacier into the Slims River. Kluane Lake drains into the Kluane River, Yukon River, and ultimately into the Bering Sea (Brahney et al., 2008).

Kluane National Park and Reserve

Situated within the Kluane Region is Kluane National Park and Reserve (KNPR), an area that protects 21,980 km² of land (Parks Canada, 2014). On the traditional territory of the CAFN, KFN and WRFN, this area was first set aside as the Kluane Game Sanctuary in 1943 when the Alaska Highway was being constructed – and later became a National Park Reserve in 1976.

Whereas the southeastern portion of the National Park Reserve gained National Park Status when the Champagne and Aishihik First Nation Final Agreement was signed in 1993, the northern portion of the reserve will continue to have its park reserve status until the WRFN ratifies their Final Agreement. KNPR is therefore cooperatively managed between Parks Canada, the Kluane Park Management Board, KFN, and CAFN (Parks Canada, 2010).

Together with Alaska's Wrangell-St. Elias National Park and Preserve, Glacier Bay National Park and Preserve, and British Columbia's Tatshenshini-Alsek Provincial Park, KNPR is part of the world's largest internationally connected protected area – approximately 100,000 km² (Parks Canada, 2008). KNPR and Wrangell-St. Elias National Park were jointly declared as the first International UNESCO World Heritage Site in 1980, with Tatshenshini-Alsek Provincial Park and Glacier Bay National Park added to this designation later in the 1990's (Parks Canada, 2008) (Appendix 1, Map 2).

The St. Elias Mountain Ranges and immense landscapes of glaciers and ice fields dominate a large portion of the KNPR - 80%. In addition to having the world's largest non-polar ice field (Parks Canada, 2010), the park is home to seventeen of Canada's twenty highest mountain peaks (Parks Canada, 2015). The tallest of these mountains (Canada's tallest), is Mount Logan, which climbs to 5,959 m. Canada's second tallest mountain, Mount St. Elias, is also within KNPR (bordering the United States of America), and rises to 5,489m. The most productive landscape within the park is the remaining 20% of vegetated land, freshwater lakes and rivers along the eastern boundary of the park. It is in this area that boreal forests, tundra, wetlands and freshwater environments support the majority of the park's biodiversity (Parks Canada, 2010).

In 1986, the Alsekh/Alsek River within KNPR was one of the first rivers to be designated as a Canadian Heritage River. Although it originally gained this classification because of its natural

values, its wilderness recreation and cultural values have become more prominently recognized (Parks Canada, 2010).

There are three primary user groups that visit KNPR – First Nations citizens, local users, and tourists (Parks Canada, 2008). Whereas the First Nations were originally excluded from KNPR during its establishment until the mid-1970's, strong efforts have been made to heal relationships with the First Nations and encourage them to reconnect with the land again. An initiative called 'Healing Broken Connections' occurred between 2004-2009, aimed at providing First Nations with camps, workshops and Traditional Knowledge (TK) sharing opportunities inside the park. This initiative also encouraged First Nations to resume their traditional harvesting activities (Parks Canada, 2010).

Many visitors come to the park because of the high-quality wilderness character that provides ample opportunity to engage in outdoor recreational activities and wildlife viewing. Backcountry hiking, mountaineering, rafting and camping are among the most desired visitor experiences, with front-country day trips, glacial flight seeing tours, wildlife viewing and winter activities becoming increasingly desired. With a 97% visitor satisfaction rate (Parks Canada, 2008), the sensory experience, coupled with KNPR's northern environment features are the cause of the satisfaction that is felt (Prazeres & Donohoe, 2014).

Parks Canada prides itself on its efforts towards maintaining and monitoring KNPR's state of ecological integrity (EI), as it provides information about the area's ecosystems. To monitor this, they use qualitative, quantitative, and TK integration methods for five key bioregional indicators: wetlands; forests; tundra; freshwater (rivers, streams and lakes); and icefields and glaciers. In the 2008 State of the Park Report, the EI of icefields and glaciers was rated as fair. Forests were also rated as fair, though it was declining due to the spruce beetle outbreak that began in the early 1990's, killing approximately 64% of the spruce trees in the park

by 2005. The tundra bioregion had a good EI rating, while wetlands and freshwater ecosystems had not yet been rated (Parks Canada, 2008).

Wildlife of the Kluane Region

The Kluane Region contains a variety of habitats that contribute to a significant diversity of fauna. Much of the wildlife – particularly the large mammals (ungulates and bears) are highly valued for their tourism potential, the park’s EI goals, as well as for maintaining the culture and subsistence lifestyles of local First Nations and citizens. In addition to these mega-fauna, there are a number of smaller species that constitute key components of the area’s boreal and subarctic ecosystem (Krebs, 2001).

One of the most prominent species that draws a number of visitors to this area is the grizzly bear. The grizzly bear (northwestern population) was designated in 2012 as a species of ‘special concern’ by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) (Government of Canada, 2015), and is considered to be an indicator and umbrella species for KNPR (Parks Canada, 2008). Not only does the Kluane Region provide key habitat for around 200 individuals of this species, it also acts as a source population for outlying regions (Gilbert, 2014). For this reason, KNPR has the most genetically diverse population of grizzly bears in North America, and forms one of the most viable populations of this species in any Canadian national park (Parks Canada 2010). This population is susceptible to declining numbers because of an increase in human-caused grizzly bear mortalities (McCann, 2001). In the Kluane Region, these mortalities are usually attributed to negative encounters, and are often a result of a person feeling the need to defend their life or property (MacDougall, 2010). Recently, these mortalities are believed to have a negative effect on grizzly bear numbers, leading to a decline in their population (Maraj, 2010).

In addition to grizzly bears that typically prefer the alpine meadows and valleys, the vegetated green belt of boreal forest also provides important habitat for around 100 black bears. (Parks Canada, 2014).

The Kluane area is home to a number of large ungulates. The Dall's sheep is the most abundant large mammal within KNPR and has one of the world's largest population concentrations of around 4,000 individuals. They are not the only ungulate that occupies the park's northern subalpine and alpine zones – so does a population of mountain goats (Parks Canada, 2008).

The most prominent ungulate in the area's forests is North America's largest subspecies of moose. This species is of particular interest to local wildlife managers because of its significant role in subsistence harvesting diets (Parks Canada, 2008). Elk, the second largest species of deer are also found in the region. Introduced in the Takhini Valley in 1990, they have one of the most northern ranges of elk in North America (Environment Yukon, 2008).

There are also two other ungulates in the Kluane Region that are listed under COSEWIC – the woodland caribou (special concern), and wood bison (threatened) (Parks Canada, 2008). The Kluane woodland caribou herd (Aishihik and Chisana herds) is one of the smallest caribou herds in the Yukon, with less than 200 animals (Environment Yukon, 2015a). Within KNPR, a small group of this herd occasionally roams through the Duke River area (Parks Canada, 2014). The woodland bison disappeared from the Yukon about 350 years ago, but were re-introduced between 1988-1992 in the Nisling River Valley (Environment Yukon, 2011). More calves of the wood bison Aishihik herd were observed in 2014 than in 2011 (Jung and Egli, 2014), showing that their population is expected to continue growing. Their range continues to expand and now extends south to the Dezadeash River, and west to the Ruby Ranges (Environment Yukon, 2012).

There are also a variety of other mammals in the Kluane Region that tend to be a focus for research and harvesting, rather than management. These species include mink, muskrat, beaver, otter, marmot, wolf, lynx, coyote, red fox, snowshoe hare, red squirrel and the arctic ground squirrel (Parks Canada, 2010). As in most boreal forest communities, red squirrels and snowshoe hares are the dominant small mammal, with the arctic ground squirrel being a unique herbivore addition in the Kluane Region food web. Many of these smaller herbivores significantly influence the population of larger carnivores, such as the nine to ten-year cycle experienced between the snowshoe hare and lynx (Krebs, 2001).

The wolverine (western population) is another species within the Kluane Region that is listed by COSEWIC as a species of special concern (Parks Canada, 2008). They are opportunistic feeders that typically occupy a large range and consume many of Kluane's herbivores (Krebs, 2001).

As a result of the variation of landscapes within the Kluane Region, birds constitute the greatest diversity of vertebrate species. There are over 200 species of birds that have been reported in KNPR (Parks Canada, 2008), including about 120 species that actively breed there (Parks Canada, 2014).

Besides birds and mammals, Kluane National Park and Reserve is the only National Park with a population of naturally occurring kokanee salmon. Other fish within the park include lake trout, arctic grayling, and several other species (Parks Canada, 2010).

Cumulative Effects on Wildlife in the Kluane Region

A significant amount of social, cultural and environmental change occurred in the Kluane Region after the opening of the Alaska Highway in 1942 (Canadian Heritage, 2014), and during its continued reconstruction and rerouting afterwards (Krebs, 2001). The construction of the

highway provided an opportunity for an increased number of visitors, researchers, Yukoners, and government agency personnel to travel into and utilize the area (Parks Canada, 2010).

There are a number of small and large-scale developments and activities occurring and proposed in the Kluane Region that have the potential to contribute significant effects on wildlife and their habitats (Appendix 5). While project specific assessments are occurring through YESAB, it is currently challenging to determine the cumulative effects (combined effects) of these multiple land use activities (Francis et al. 2013b). The activities that have potential to contribute the most to cumulative effects in the Kluane Region include exploration and extraction of minerals (placer mining and quartz exploration) (Environment Yukon, 2015a), land development for timber harvesting, agriculture, or community growth, the proliferation of access roads, hunting, recreational activities, research, as well as tourism (Parks Canada, 2010).

An activity that is a specific cumulative effect concern in the Kluane Region is the use of low-flying aircraft for mineral exploration, hunting trips, research and glacier sightseeing (Parks Canada, 2008). Aircraft-based tourism has steadily increased in recent years, increasing the disturbance of sheep populations (Laberge Environmental Services, 2006). High frequencies of low-flying planes and helicopters in mountainous areas can have detrimental behavioral and reproduction impacts on Dall's sheep (Frid, 2003) and mountain goats (Stankowich, 2008). Sheep in the Yukon are particularly susceptible to helicopter and aircraft activity because of the remote environments they are found in. The disturbance interrupts their regular behavior or routine, and has been shown to cause them to react in ways that cost the animal substantial energy, such as standing up, stopping eating, or fleeing. It can often take up to forty-five minutes after the disturbance for the ungulate to resume their regular behavior, and has been shown to affect their body weight and breeding success (Laberge Environmental Services, 2006). Similarly, studies have revealed that low flying aircraft and helicopters can have detrimental

effects on caribou, causing increased energy expenditures, physical injury and long-term behavior changes. Cumulative exposure to this type of disturbance can cause the caribou to abandon habitat that has high quality food and increase their metabolism – which causes them to lose weight and become more susceptible to predation and disease (Environment Yukon, 2006).

In addition to human-caused effects on wildlife, cumulative effects can also occur when the effects are combined with natural disturbances. In the Kluane Region, the main natural disturbances in the consideration of CEA are forest fires, spruce beetle outbreaks and climatic change.

Wildlife Management, Research, and Monitoring in the Kluane Region

Due to the Kluane Region's unique ice, mountain and boreal ecosystems, this area has been heavily studied by a variety of researchers from around the world. Situated along the south shore of Kluane Lake, the Kluane Lake Research Station (KLRS) was established in 1961 by Walter Wood and the Arctic Institute of North America as the base camp for Walter Woods's Icefield Ranges Research Project (Clarke, 2014). Although the KLRS had its beginning in glaciology, it now provides a base camp for researchers working on projects that span the fields of biology, geomorphology, geology, botany, hydrology, zoology, limnology, climatology, social studies, high-altitude physiology, anthropology and archeology. Research projects out of the KLRS have resulted in approximately 1500 publications (Arctic Institute of North America, 2015).

One of the most prominent long-term monitoring research projects within the Kluane Region is the Kluane Ecological Monitoring Program (KEMP). KEMP began in 1973 by University of British Columbia professor and ecologist Charley Krebs, and continues to monitor the trends and health of the boreal ecosystem in this region (Krebs, 2014).

Citizen-based monitoring also occurs in the Kluane Region through a variety of initiatives at the KNPR Visitor Centre, such as species watch initiatives and bear observation forms. In the community, the Yukon Bird Club holds annual Christmas Bird Counts, and other data is collected through the Yukon's Conservation Data Centre (CDC). Through the Yukon's CDC, for example, individuals can submit wildlife observations (for species of special concern) on an online form, which is then made available for the active management and conservation of species (Environment Yukon, 2015b).

In addition to academic research and citizen-based programs, wildlife monitoring by a variety of Federal, Territorial, and First Nation Government institutions takes place to inform management decisions. Environment Yukon biologists, RRC's, the Yukon Fish and Wildlife Management Board, and First Nations monitoring efforts often occur because of a need to obtain population data on edible species (such as moose, sheep and caribou). The monitoring is conducted to support harvest strategies, contribute to EIA's and provide recommendations for the sustainable management of species. With an increased concern for the impacts that future developments may have in the Kluane Region, some of the monitoring is occurring, such as on the Kluane caribou herd, to replace outdated data, and to gain a better understanding of the distribution and population characteristics of species (Environment Yukon, 2015a).

The two local RRC's in the Kluane Region – the Alsek Renewable Resource Council (ARRC) and the Dan Keyi Renewable Resource Council, play an important role in the management of wildlife and natural resources by being a voice for local community members. They often engage local citizens by listening to their concerns, and encourage them to provide wildlife observation data and reporting of harvest numbers (Alsek Renewable Resource Council, n.d.).

With a legal mandate to maintain or improve the ecological integrity of the park, monitoring has been occurring in KNPR since 1973. Dall sheep surveys have been the longest monitoring effort within KNPR, and moose in the Duke River area have been counted since 1982. After the spruce beetle outbreak, fifty plots were established around the park, with data being collected at these sites every five to ten years. In 2008, a monitoring framework was developed for the park. This framework includes the measurement of biodiversity (animals and plants), processes (fire, food webs and climate), as well as various stressors (climate change and invasive species) (Parks Canada, n.d).

5. Results

This chapter will synthesize the key points from the interview data. A comprehensive summary of the detailed responses can be found in Appendix 6. The structure of the chapter follows the questions and their order from the interview protocol. Although the analysis process described in Chapter 3 organised the responses and reduces repetition; there is inevitably some repetition in the answers to different questions, which serves to underscore common and important responses to questions.

1. How important do you feel the consideration of effects on wildlife is in environmental assessment, and why?

This initial question produced the most commonly agreed upon response. All of the individuals who were asked this question, regardless of their employer or personal background, concurred that wildlife effects are important to consider in the environmental assessment process within the Yukon. The reasoning behind this belief, however, did produce varying responses, including the values wildlife hold for humans, wildlife's larger role in sustaining ecosystems, legislative requirements, and the belief that we should stand up for wildlife because they cannot fight for their own protection.

It was most commonly recognized by respondents that wildlife has a number of significant inherent and cultural values for humans, including subsistence, viewing potential, and symbolic. Some respondents believed strongly that the Yukon is a unique area in the sense that many individuals, especially First Nations, rely on wildlife for traditional subsistence ways of life, such as hunting and trapping (A2, FN2, TG7, TG8, N2, Y1, Y2), and therefore feel that it is important to focus on wildlife as they are often affected the most when development occurs (TG8). Much of what makes the Yukon a unique place to live is its relatively intact wilderness character,

including healthy wildlife populations (Y2). Wildlife is also important to the Territory for its aesthetic values. Animals not only create wildlife viewing opportunities for locals and tourists, but can also act as a symbol for members of a community, concentrating human opinion (N2).

Many respondents also feel that wildlife needs to be considered in environmental assessments because of the fundamental role they play in maintaining the health of larger ecosystems. Wildlife species are important indicators for ecological systems and sustainability (A2). This reconfirms that effects assessments should not only be conducted on the larger edible species, but on the entire ecosystem (A3), which would help ensure that it remains fairly intact and functioning, with natural processes occurring (TG6). It is also important to understand what an animal is doing throughout the year, and the effects that any human project will have on them (FG2). If effects on wildlife are not evaluated effectively, habitats will begin to have diminished use and measureable consequences for the wildlife's population vitality (TG1). It is therefore important to determine both subtle and global effects on wildlife (A1), the significance of these effects (TG3), and to be able to separate impacts from natural variations in populations (A1). Knowing this will allow a clearer understanding of options for mitigation (TG3).

It is particularly important to consider wildlife effects in the Yukon Territory because the habitats are typically less productive, and therefore habitats and wildlife are more vulnerable to development and habitat changes (TG6). If the habitat of wildlife is protected, this will help to ensure that wildlife does not get pushed out of the area (FN2), and in turn will also help protect the species (N1). In the Kluane Region, it is especially important to consider the effects of wildlife in developments occurring along the borders of the protected area (FG1). We need to understand how wildlife interacts with humans and the area, and to be able to demonstrate these interactions in an assessment (FG2). On top of wildlife effects, the cumulative nature of various development projects also needs to be considered (TG2).

Another perspective provided about why wildlife is important to consider in the Yukon's environmental assessments is because evaluating the effects on wildlife is a mandated requirement under YESAA (A2, FN1, FN2, TG4, TG7). Not only does wildlife hold intrinsic and cultural values, but there are also legal requirements to assess potential impacts on it. This mandate is viewed as an exciting opportunity that provides managers with a chance to get ahead of the curve, getting processes in place that will reduce development effects, and help to maintain thresholds before it is too late (TG2, TG6).

The final perspective that was provided was one of stewardship. We need to consider wildlife effects because wildlife species do not have the ability to speak for themselves, and have nowhere else to go (TG5).

2. How effectively do you feel effects on wildlife are addressed in environmental assessments in the Yukon?

Building on the importance of considering wildlife effects in environmental assessments, the respondents were asked how effectively they feel these assessments are currently being done within the Yukon Territory. While some individuals felt that there is a reasonable effort being made to assess these effects, others believed that the current process is limited and lacks consistency.

Given the Yukon's large land mass, relatively new EIA process, and limited staff capacity, some respondents felt that assessing the current and future effects on wildlife is fairly well done in the territory (TG2, TG6, TG8, Y1). Reasonable efforts have been made to address these effects within the environmental impact assessment process (Y2) and have been effective when done properly (FG2). Some of the effectiveness of assessments is attributed to recent improvements in collaboration between departments (TG8) and more accessible YESAB tools (TG5). While the limited number of developments has also allowed for successful assessment of

wildlife effects, it must be noted that the territory may see an increase in large-scale developments in the future (FN1).

Successes aside, many of the respondents recognized that while effects assessments on wildlife are occurring, there are a number of limitations, such as the focus of assessments, data availability, and gaps in the process. Not only is current wildlife effects assessment primarily focused on key megafauna game species (A1, A3, TG2, N1) and species at risk (N1), but also the assessments that occur are usually too general (TG8, FG1) and often have little consideration of seasonality trends (TG5). This might be because environmental assessments are only as effective as the availability and interpretation of data (TG5, Y1). Currently there is a dearth of meaningful baseline data (TG3, TG4, FG1) and a lack of understanding about the causal relations between certain development activities and wildlife species effects (FN1). Determining disturbance thresholds has been a challenge for conducting proper assessments, because each species has a complex interaction with their habitat (TG3). The assessment process itself contains many gaps and is sometimes believed to be rubber-stamped (A3, FN2). Not only have few projects been turned down (FN2), mitigation suggestions are often not enforced or turned into regulations, and effectiveness monitoring rarely occurs (TG3, TG7, TG8).

While many of these limitations can be attributed to capacity and data (which will be later discussed), the current process has been criticized for its lack of consistency. The effectiveness of a wildlife effects assessment depends on the particular project, the priorities of the assessors, the location, and the anticipated impacts (A3, TG5, N1, Y1). There currently is no standardized assessment framework, guideline, or set of values that can be integrated to ensure a coherent, consistent approach (A2, N2).

3. Do you feel the consideration of cumulative effects on wildlife differs from the consideration of effects on wildlife in environmental assessment generally?

Shifting focus towards cumulative impacts assessment, respondents were asked whether they felt there is a difference between the way cumulative effects on wildlife are assessed and the way wildlife effects are being addressed in the Yukon Territory's basic environmental impact assessment process. There was a general consensus that the two assessments do differ in their approach, and even though it is mandated that cumulative effects be considered within YESAA, CEA is still an emerging discussion that rarely materializes on the ground. The lack of CEA is mostly attributed to its complexity, the lack of experience addressing it, and the limited political support.

When looking at the way wildlife effects are considered in the Yukon's environmental impact assessment process, many respondents agree that there is a substantial difference between individual project impacts and their cumulative impacts. These two types of project impacts differ in temporal and spatial scales (A2). Single project effects assessments are more site-specific and are considered at one specific point in time (A2). CEA on the other hand requires the project to be considered within a defined area, combining other past, current, and potential future projects (A2, TG4). From a wildlife perspective, CEA requires a strong understanding of the area and its species within a larger context (Y1). CEA can be further measured both on a landscape level (by measuring how much development is too much on a landscape or habitat), and on a species-specific level (A1).

Just as these two types of effects assessments differ in their approach, the way that they are currently being addressed is dramatically different. Despite the fact that CEA is a mandated requirement in the YESAA (FN2, TG6, TG8), the provisions are quite limiting in terms of what can be considered in the scope of CEA (FN1). There is currently a greater emphasis on single

project effects (TG4, TG6, TG7, N1), with cumulative effects assessment not occurring (A1) or rarely being considered (FN2, TG1, TG6, TG7, TG8, N1, FG1, FG2, Y2). Some respondents noted that CEA occasionally does occur in the Yukon, usually through land use plans (TG7), and is sometimes brought into assessments by individuals (N1). Recent mineral exploration booms, however, have been putting a stronger focus on CEA (TG1), and some work has been occurring to come up with an approach to identify values that vary from place to place (TG7). The CEA that is being done by YESAB is qualitative (N2) and is most easily and frequently done on larger projects (FG2) or on species that have large ranges (Y1). The Territory has also been incorporating CEA into their range assessments of individual species, to bring natural and anthropogenic disturbances together (TG6, TG8). There is also work being done on the development of a cumulative effects assessment and management (CEAM) process (Y2). Within the Kluane Region, an older CEA framework for the park has also been used (FG1). It is also argued by one respondent, that when a single project effects assessment is conducted, the impacts on affected wildlife populations are considered, which in itself is CEA (Y1).

While the majority of respondents agree that limited cumulative effects assessment is currently occurring, various obstacles to its implementation were provided (and are discussed more for Question 4, in the next section). CEA is often talked about as being important (A1), but is still only an emerging idea (TG7). Understanding cumulative effects on wildlife is a challenge (TG4) and is hard to measure (A1). It is difficult to understand the causal relationships because many different factors can affect wildlife populations in an area (FN1). Many individuals are currently trying to wrap their heads around how to do CEA and are having a hard time separating CEA from single project effects (TG2). It is often challenging to know which specific project is going to push the tipping point (A2, TG5). While there are some people who are working hard on trying to figure out how to address CEA (TG1), current policies are still encouraging people

to apply for land in close proximity to other developments (FN1). There has also been little pressure to do a great job with CEA (TG1) and some territorial government branches do not want to deal with it because they know it would make it more challenging to get projects through the assessment process (TG8).

4. What are some of the obstacles to better assessing environmental effects of projects, plans, etc. on wildlife?

With limited cumulative effects assessment occurring throughout the Yukon and Kluane Region, respondents were asked to identify the broad challenges that are preventing greater effectiveness of assessment of wildlife effects. The obstacles that were identified have been grouped into five key topics: baseline data, wildlife monitoring, limited capacity and time, effective communication and understanding of CEA, and politics and planning. Each of these topics will be discussed, with some elaborated in succeeding sections.

Baseline Data

Obstacles surrounding baseline data were the most prominent challenge hindering the effectiveness of wildlife effects assessments. Respondents placed emphasis on the lack of wildlife baseline data, a debate over who should collect data, the accessibility and management of available data, analytical challenges, and the need for relevant data sets.

The deficiency of baseline wildlife data was acknowledged as being one of the primary obstacles to better addressing wildlife effects (A1, A2, FN1, TG2, TG3, TG4, TG7, TG8, N1, N2, FG2, Y1, Y2). Even when data has been collected on wildlife populations, it is often not collected in a standardized format (A2), and information gaps still exist for some of the well-studied species (FN1). Wildlife baseline data collection is often only a focus for big game species, not the smaller ones (N1), as wildlife (as defined in the Yukon Wildlife Act), does not actually include many species (TG1). Even in the heavily studied Kluane Region, there is still a

paucity of baseline data (TG7), and large harvesting data gaps within and outside Kluane National Park and Reserve (N2, FG1, FG2). Having adequate baseline data is important, because without this knowledge, it is hard to determine specific impacts and their cumulative effects (TG1, TG3). This data is needed to know what species to protect and how to mitigate effects (TG4).

There is also a debate over who should be responsible for collecting this wildlife data (FN1, TG4, Y2). Especially where CEA is concerned, should a project proponent be responsible for acquiring baseline data on a regional scale (TG4, Y2), or should the Government provide mechanisms for funding and resources when the proponent is incapable of collecting their own data (FN2)?

Where wildlife data does exist, it is argued that this information is often hard to find and access (A2, FN2). There are issues surrounding how data is shared (TG4) and the information flow that occurs to assessors (TG3, Y1). It is also sometimes hard to find meaningful ways to get people to share their data (FG1). These obstacles can be attributed to a lack of a comprehensive data management system, which also includes recorded methodologies (TG7). Tied into the collection of wildlife data, is the challenge associated with interpreting and analyzing this data. Even with the presence of data, there is an analytic challenge (A2, A3). This can be particularly significant because we need to know how to treat observation data (which tends emphasize data along transportation corridors) (A2).

Another obstacle surrounding baseline data is the relevance of the data that is being collected and how existing data is being used. It can often be a challenge to encourage academics and scientists to work on projects and collect data that is immediately relevant to the needs of the region, resulting in an abundance of data that is not always useful (TG7). Much of the data that does exist for assessors to utilize is either too old (TG5, Y1, Y2), wrong (TG8), or is not used as

effectively as it could be (TG5, TG7).

Wildlife Monitoring

Recognizing that baseline data is a prominent obstacle for better assessing effects on wildlife, the ineffective monitoring of species, both before and after assessments, has proven to contribute to this challenge. There is a strong need for a comprehensive monitoring program that will increase the abundance of baseline data (A2). While there is a lot of data being collected (TG7), there are currently gaps in consistent (Y1), long-term monitoring (A3, TG7). It is often difficult to organize and gain support for monitoring programs (TG1), with less support provided to broader biodiversity studies (TG6).

Just as long-term monitoring programs can help build a repository of baseline data, it is also important that mechanisms are in place to monitor wildlife during and after impacts (FN1 and Y2). Often proponents only know what they are going to do on a year-to-year basis, so to properly conduct cumulative effects assessments; follow-up monitoring needs to occur (FN1). Currently, follow-up monitoring is limited, with few efforts made towards testing the effectiveness of the mitigation measures imposed as a result of the assessment process (Y2). Having strong monitoring mechanisms in place could allow for adaptive management to occur on projects that are not effectively mitigating effects (Y2).

Limited Capacity and Time

Many of the obstacles to better assessing wildlife effects can be attributed to the limited capacity within the Yukon Territory and the time-related challenges of effective data integration. Many of the respondents recognized that there is a limited financial capacity, with budgets often limiting the ability to fill data gaps (A3, FG1, FG2). Many of the wildlife studies that are needed to make proper management decisions are usually too costly to conduct (FN2, TG8, N2, Y1, Y2), preventing surveys from occurring because of resource restraints (FN2, TG7).

With a resource imbalance from being a smaller jurisdiction (TG7), the financial restraints are also coupled with human capacity challenges. Not only are there too few people (TG1, TG2, GRS4, Y2), but limitations often exist because there are not enough individuals with the necessary skills (TG8). Sometimes the individuals that are involved in the assessments do not always have the full appropriate technical background for what they are writing (TG8). In addition to these human challenges, employment contracts are often short-term, which reduces the consistency in the assessment process and monitoring (A3, Y1).

Time-related obstacles continue to emerge as another challenge for better assessing wildlife effects in an EIA. The limited time frames that are allocated within an assessment are often insufficient for collecting the amount of wildlife data that is necessary (TG1, TG2, TG8, N2). There is also not enough time provided for conducting the types of experiments that could help determine different disturbance effects (A3). The wildlife surveys that do end up being completed usually only produce short snapshots in time and are seasonally inaccurate (TG8). When a wildlife survey is conducted, there is also often a substantial time lag between the collection of data, and transferring this information into reports that can be used for assessments and management decisions (TG3). Not only does it take a long time to gain support for conducting a wildlife survey in the first place (FN2), but longer time frames would be required in order to properly collect and integrate traditional knowledge and community input (FN2).

During assessments, there often is not enough time to go through every application in as much detail as is needed, because of short time frames and the pure volume of applications (TG5). With CEA being more complex, addressing CEA for each project would require even more time (TG6). These time-related constraints are amplified because from a human-capacity view, the legislatively mandated time frames for assessments never stop, even for holidays (TG8).

Effective Communication and Knowledge of CEA

Within the environmental impact assessment process, there are a number of communication-related challenges that were highlighted by respondents. The obstacles that they felt limited effective CEA include the lack of knowledge and guidance for CEA, minimal transparency of compliance and monitoring reporting, gaps in key data, clarity of data needs, and the limited transfer of data and information to assessors.

Even though it is mandated under YESAA that cumulative effects are considered in the assessment process, there is still a lack of awareness about CEA (TG1) and little guidance provided for doing it effectively (A2). It is not only spatially challenging to relate specific information to a project area (TG2), but there is also uncertainty surrounding how to spatially define these boundaries (FN1). Cumulative effects are not only hard to predict (A1, TG4), but there are no commonly agreed upon thresholds of disturbance to help (TG6). It can be challenging to understand species disturbances (TG6) and to attribute certain wildlife changes to specific activities (TG7). Often, assumptions of wildlife effects are being made but are not being tested (FN1).

In order for cumulative effects assessment for wildlife to be effective, it is important to understand the entire scope of the project effects within an area. Feedback communication mechanisms by proponents and assessors are currently lacking, as proponents do not usually know exactly what they are going to do (TG3), or only know on a year-to-year basis (FN1). There is also uncertainty about what is actually occurring in the approved development (TG8). This is problematic because if information about the predicted project effects is not known, it is hard to determine their impacts, and in turn, understand their cumulative effects (TG3). With limited mechanisms for transparency of reports within the enforcement and monitoring process, it is hard to know whether expected impacts are occurring, and if the mitigations that were

recommended are taking place and are effective (FN1).

In the Kluane Region, it can be hard to address CEA on wildlife because it can be a challenge to get First Nations in the area to reveal their actual harvest numbers from within and around the park (N2, FG1, FG2). It is therefore important that we find a meaningful way to get people to share their information (FG1, FG2) and clearly communicate what the wildlife survey data is going to be used for (FN2).

Another challenge that was highlighted surrounds the communication of needs to assessors and proponents. Often proponents and consultants do not know what data and information YESAB and regulators require during the assessment process (TG4). Even when proponents and consultants collect data, this information does not always flow back to the assessors (TG3, Y1).

Politics and Planning

The final obstacle respondents felt was hindering effective wildlife effects assessment surrounds the lack of political will, gaps within the assessment process, and the absence of land use planning in the Kluane Region.

Having outlined some of the challenges that emerge when trying to make sense of the complexities of CEA, buy-in and agreement are essential in order to have an effective CEA process (A1). It is argued that there currently is no political will to consider CEA (TG1, TG8, FG1, FG2), nor is there an effort to decrease the amount of development in the Territory (TG6). It is the current political and economic drivers that are reducing the guidance provided for CEA (A2, FG2), especially since conducting a CEA can hamper projects from moving forward in the assessment process (A2). Not only is the Yukon Government not allocating funds towards CEA, but it is also not budgeting money towards filling the gaps that exist (FG2).

As a result of the current political will and the relatively new EIA process, there are a number of gaps that exist with how EIAs is being conducted in the Territory. To begin, the way

the Wildlife Act currently defines wildlife excludes a number of key smaller species that are vital to consider when conducting a cumulative effects assessment (TG1). The terms and conditions that are recommended and accepted into decision documents are not always meaningfully applied (TG4), and often lack enforcement and mitigation (TG3, TG4). Although mandatory, the reporting on projects by proponents is rarely happening, which can be a huge challenge for addressing CEA (A2). When inspections do occur on a development, their quality is sometimes questionable, with no strong incentives for proponents to follow the rules (FN1). There is also limited follow-up monitoring occurring to test the effectiveness of the mitigations that were imposed during the licencing process (Y2). It is also argued that the entire EIA process itself is simply a recommendation, with a lack of effort put into it (N1). When it comes to the process of addressing CEA, one respondent felt that CEA is not explicitly included in the current EIA framework (A2).

Within the Kluane Region, a substantial limitation to effective environmental impact assessments is the absence of a completed land use plan (FN1, TG5, TG6, FG1, FG2). Having a completed land use plan in the Kluane Region (which will be discussed later) would help to determine disturbance thresholds using key indicators (FN1).

5. Are there specific data sets relevant to wildlife that you are aware of, past or ongoing, that could be better used to support addressing environmental effects?

Focusing on the baseline data obstacles in the Kluane Region that were highlighted by numerous respondents, this question was asked to understand the current context of data in the region, and to determine data sets and approaches that could be better used to support assessing environmental effects on wildlife. The respondents identified three main data sets that could be utilized, past older data, data held by individuals, as well as newer database systems.

In the Kluane Region and surrounding area, there has been data collected on various species that could be better used, or framed differently, to be more useful (TG8). The data that was highlighted by respondents included digital seasonal ranges of caribou (A1), long-term wildlife surveys (TG1, FG1), such as the Kluane Ecological Monitoring Program (TG1, TG6), and wildlife data from regional biologists (TG3). Other less frequently mentioned data, such as RCMP reports, could also be utilized (N1). Conversely, TG8 feels that the past data on wildlife is currently being used as effectively as possible.

Some individuals believe that there is a great deal of data on wildlife out there, but feel it is not currently being transferred into the EIA process. For example, the data that is being collected by consultants could be better used (A2, TG1, TG2), archived, and worked into the permitting process (A2). Researchers also hold a lot of data that could be tapped into (A2, TG4, TG7, N2). For researchers, especially those who come from outside of the Territory, there could be follow-up mechanisms built into the Yukon Science Permitting Process to ensure that the data collected is provided back to the community (A2).

In addition to consultants and researchers, there are also many individuals living and working on the land that hold observational data and knowledge that could be better utilized (FG1) – such as trappers and outfitters (A2). First Nations traditional knowledge (A2, FN2, N2, FG2, Y1) and local knowledge surveys could be used (TG3 and TG7), and could be gathered into a database (FN2).

There are also a number of newer techniques to capture and utilize various wildlife data, which could be further explored or expanded. The global climate datasets, for example, could be expanded for the Yukon Territory (A1), and more utilization of the Northern Climate Exchange data could occur (N2). Other techniques could be expanded, such as the Land Registry System (FN2) and the Kluane First Nation's Harvesting Toolbox that tries to capture harvesting and

wildlife surveys with the potential of using this data to generate reports (FN2). Additionally, there are a variety of resources and habitat models that seek to determine key needs, that could be applied, and a review of indicator species habitat requirements and selections could also be completed (TG1).

The key respondents highlighted a variety of other existing data-related resources that could be better used. They feel it would be useful to continue a series of population trend analyses for assessing industrial effects (TG1), and to grow the rare species database (TG3). Data could also be collected on road kill, roadside wildlife data (N2), and other regional surveys from outside the park (FG1). Focus could be placed on the indicators from the forestry plan (TG7), using the wildlife habitat types as census data (Y2), and better utilizing the Ecological Land Classification System (Y2). The Yukon Government has a database (with online access) of wildlife key areas (FN1, FN2, TG2, TG3, Y2), although it is argued that it is not fully comprehensive (TG2). This database could be better used (TG6), though is not always useful for project-specific applications (FN1). While organizations such as Natureserve are trying to collect some of the missing data (A2), the Yukon Conservation Data Centre could be a useful tool for gathering data (TG6, Y2), but is also not currently fully comprehensive (TG6). Other emerging techniques that could be used to collect data include the use of wildlife trail cameras (N2) and citizen science (A2, TG1, TG7, N1, N2, FG1) – with quality control measures in place (TG1).

6. Are there data gaps around wildlife and their habitats that should be priorities for addressing?

Having explored data sets relevant to wildlife that exist within the Yukon Territory, respondents were asked to identify the wildlife data that is needed in order to make informed management decisions. The data that was emphasized as being a priority included broad long-term monitoring studies to understand cycles and trends, data that contributes to a comprehensive baseline

knowledge of an area, data that characterizes the demographics and behaviours of species, and data that can be tapped into from individuals that are spending time living on and researching the land.

While monitoring is occurring on particular populations of species, there is an expressed need to have more long-term (A3), standardized (TG6), and consistent monitoring to build comprehensive datasets that are not patchy in space and time, and are not only a response to a particular management or utilitarian need (A2). This monitoring needs to occur throughout the entire year (TG2), because multi-seasonal studies can lead to a greater understanding of the cycles of an ecosystem (A1, TG6) and annual variability (A1). This is particularly important because the management approach for certain species that are in the upswing of their cycle is different from how they should be managed when they are on the decline (A1). There is also a need for spatially distributed monitoring programs that can help determine drivers of change and their true linkages (TG1). In addition, while spatially large surveys of wildlife are needed, especially within Kluane National Park and Reserve (FG1), there is also a need for project-specific monitoring that looks at certain issues, such as forestry (FN1).

To increase the baseline data and knowledge of an area, a data gap analysis needs to occur (TG2). It is essential to have additional current wildlife data (Y2) to be able to make reliable predictions of harvest allowances and population dynamics (A2). Gaps currently exist surrounding biodiversity surveys (TG6) and data on smaller species (N1), so there is an emphasized need for studying the smaller components of boreal forests (A3), plants (N1), small mammals and their food sources (TG1). Additionally, surveys should also be focused on the non-hunted species (TG3, TG6). While some individuals feel that it is important to collect data on lesser-studied species, there is also a conveyed desire to focus efforts towards collecting data on indicator species (A3) and to increase the current data on some game species that have data

gaps (TG4). Within Kluane National Park and Reserve, there was an expressed need to increase the classification of vegetation, have larger spatial studies on wildlife, and conduct habitat studies (FG1). Along the border of the park, more studies are needed on the land use effects on wildlife (FG2), vegetation classifications (FG1) and larger spatial studies on wildlife (N1) – especially for areas that have not been identified already as key wildlife areas (TG4). It was proposed that this baseline data on wildlife could be collected with wildlife cameras (A2, FN1), through college programs (A2), and by ensuring that researchers are collecting data that fits the needs of the community and regional biologists (N2).

In addition to the expressed need for broader wildlife baseline data, there are also data gaps surrounding species demographics and behaviours. A focus should therefore be placed on studying the condition of wildlife (A2), their behaviour (FN1), demographics, and their interactions (TG5). Studies need to be expanded that seek to understand disturbance factors (TG8), linear density (Y2), and distribution data on species within a landscape (FG1).

Finally, an additional source of wildlife data that could contribute to a comprehensive baseline data set could be individuals who are currently living on the land in the Kluane Region. Locally based observation data (A3), and traditional knowledge (TG7, FG2), could be used to fill some of the harvest data gaps (A3, FG1, Y1). If traditional knowledge is used, there need to be mechanisms in place that ensures confidentiality (Y2), increased communication of what the wildlife survey data is going to be used for (FN2), and there needs to be stronger efforts made towards healing trust issues and relationships with the First Nations (FN1).

7. Are there particular policy or legislative gaps around wildlife effects assessment that need to be filled? If so, do you have any suggestions for how best to do it?

Having outlined some of the overall obstacles to better addressing cumulative effects on wildlife, respondents were asked to highlight policy and legislative gaps that they are aware of,

and to offer insight into how these gaps can be addressed. Respondents emphasised a variety of gaps surrounding the absence of frameworks, mechanisms, and acts, and they spoke to the lack of collaboration between departments within the Government. They also noted inconsistencies within the current EIA process. Some respondents offered solutions, including how to better address CEA and how to increase the capacity to address these gaps.

Within the current political process, there are a number of acts and mechanisms that could help improve the effectiveness of assessing wildlife effects. As it is only in draft form, the Territory does not have completed Species at Risk legislation (TG6, N1), and the Federal Fisheries Act, which was also once quite successful at turning down some projects during the assessment stage, is now weakened, reducing the hurdles of projects to get approved (FN2).

Policies within the Yukon could be improved to protect sensitive habitats (TG2) and could have more specific regulations and limitations surrounding the types of disturbances that can happen in specific areas. In addition, there is a need to define certain conditions, such as harassing wildlife and disturbing dens (TG3), and to do more broad species planning (TG6). While there is a draft wildlife guide in process, this guide will not be enforceable (Y2) and when it comes to addressing cumulative effects assessment, the current provisions under Section 42 of YESAA are limiting (FN1).

There needs to be a policy around CEA and a regulatory framework developed that supports it (A2, TG1). This framework needs to be flexible, with an adaptive management consideration included, to ensure that informed decisions are occurring and reliable responses provided (A2). The wildlife species that are usually selected as indicator species during an assessment are the high-valued wildlife species, which may not always be the best way to assess impacts. For CEA to be effective, a wider range of species will need to be covered as indicator species (TG1).

The numerous gaps surrounding wildlife effects assessment in the Yukon can be attributed to

the current political will that does not address the human capacity limitations. This has been causing increasing frustration for proponents and employees (TG8). In the Kluane Region, as alluded to in Question 4, a major policy gap is the lack of regional land use planning (TG3, TG5, N1, FG1). Having a regional land use plan would allow for a clearer definition of the allowable wildlife impacts within different land use designations (FG1).

Within the environmental impact assessment process itself under YESAA, there are a number of gaps and fragmentations that are occurring. There is a large disconnect between the mineral claim staking process and what is allowable under Class 1 activities, and what is being done to set guidelines for surface and linear disturbances (A2). Class 1 activities are defined as being “low level exploration activities, generally with low potential to cause adverse environmental effects, and where activities and reclamation are completed within a 12 month period”, and are not required to undertake an assessment by YESAB (Energy, Mines and Resources, 2015). When wildlife effects assessments do occur for projects, they are often done within a traditional territory context, which can be limiting (TG6).

When wildlife terms and conditions are specified in an assessment document, they do not always make their way into permits, and if they do get integrated, enforcement of the terms does not always occur (TG3, TG4). Often the individuals responsible for enforcing terms and conditions feel that wildlife enforcement is the responsibility of the Conservation Officers, and not theirs (TG4). This is further complicated because there is also no single owner of follow-up monitoring of projects (Y2). Additionally, it is argued that there is not currently a strong mechanism, once an area has been staked; to stop developments if a level of disturbance has been achieved that is no longer sustainable (A2).

The assessment process around Kluane National Park and Reserve has changed recently because of funding cuts, shifting its focus towards assessing wildlife populations with statistical

models and less frequent data (FG2). There is also concern surrounding the commenting process for assessments. Assessments that are occurring are often project-specific, with fewer wildlife comments received compared to the number that are provided for broader management objectives (Y1). The effectiveness of the comment submissions is therefore not consistent, and often depends on how certain people feel about the specific area or species affected (FG2). While YESAB does try to address comments on CEA, this is still being done on a piecemeal basis (Y1).

Many of these legislative and policy gaps are attributed to the lack of collaboration and disjunct nature of the current assessment process. Not only is there large segmentation in the EIA process (TG4, Y2), different departments, units, and agencies are doing various components of the assessment (Y2). There is a fundamental lack of clarity about what each board and department does (TG7), and a lack of collaboration between them (Y1). Since various departments are all doing different things, it can be challenging to determine where cumulative impact assessments should be coming from (FG1). There are also collaboration issues and conflict surrounding the YESAB recommendations, and the Yukon Government as a decision body.

In addition, there is not enough up-to-date discussion occurring on what disturbance is acceptable to people in an area (Y1), nor is there a strong effort to bring the three First Nations in the Kluane Region together for annual gatherings (TG6). There are limitations in the scope of wildlife studies when all parties do get together, as there is a sense that these plans should not be making definitive statements about how certain resources should be developed. There is also discomfort in having a mandate in Renewable Resource Councils, First Nations, and representatives from the Yukon Government to make explicit statements about development limits, as they only provide guidelines and recommendations, calling the utility of plans into

question (FN1).

While policy and legislative gaps to better addressing wildlife effects were highlighted, there were also a number of ideas presented about how they could be filled. Since capacity and data often limit the effectiveness of assessments, there should be stronger financial support provided for data collection and monitoring (A3). Mechanisms could be enforced that ensure mining companies pay for the collection of wildlife data and monitoring (A3), and/or revenue could be gathered by taxing visitors to the Territory – with that money allocated towards wildlife monitoring (A3). Resource royalties need to be reviewed, to ensure that the real costs of resource extraction and use are reflected, as there is currently no feedback for addressing key issues and costs associated with the resource development to First Nations royalties (FN1). There should also be a requirement built into an assessment licence for proponents to provide data back to the regulator, and a place for this data to be stored (Y2). YESAB should also formally address CEA (N1), with best management practices and gaps assessed (TG2).

8. Are there particular planning or assessment processes or Boards that could have a stronger role in assessing or monitoring cumulative effects on wildlife? What could these roles look like?

Focusing more on the process of conducting environmental impact assessments, respondents were asked about the roles of boards and processes that could be more substantial in assessing or monitoring cumulative effects on wildlife. Many respondents felt that the current process and roles within assessments are well defined through the Final Agreements (FN1, TG2, N2, FG2), with a key role for councils and boards to make recommendations to YESAB (FN1). Even though it is a fairly new process (N2), it is believed to be a good ground-up approach (FG2). That being said, although the roles are well laid out and have been working fairly well (TG6), more cooperation is still needed (TG8). The roles of the boards and councils could be expanded (TG3), but it was recognized that they cannot currently do everything that they are

mandated to do, because they are hampered by limited capacity and resources (A3, FN1, TG3, TG7). This not only reduces their power to do anything substantial (A3), but also causes the Renewable Resource Councils to burn out – limiting their comments to the proposals that seem the most important (Y1).

Capacity and resource hindrances aside, some individuals feel that boards could still improve their effectiveness of integrating community interests and biodiversity needs in the EIA process (TG6), and should focus on engaging the community more in these assessments. Some of the recommended ways of engaging the communities include through citizen science initiatives (A2), and through including them in the development of their Traditional Territory's wildlife management plans (FN1). They could also play a stronger role communicating information needs to the broader research community (TG7), collecting more baseline data (FG1), integrating more information into an EIA (N1), and responding to more applications (FN2).

It is argued that the councils and boards are not as familiar as they could be with the YESAB process (FN2) and that there is no strong means of tapping into the knowledge base of the Yukon Fish and Wildlife Management Board (YFWMB) and RRC's. This makes it challenging to understand what is going on in the regional context of a project (Y2). It was also believed that since the RRC's are focused more on their Traditional Territories, and the YFWMB is more broad, there is often an interplay to determine if an issue is a broader Yukon issue, or more specific (TG6). Councils and boards usually take their local knowledge and are asked to make assessment without always having the best background knowledge (TG5). It is therefore important that they come up with work plans (through planning with partners), to effectively gauge the interests of the public, and focus on educating the RRC's (TG6) so that they can share biodiversity data needs within their communities (TG6).

Comments were also made regarding the process of environmental impact assessments. Although YESAB has a mandated responsibility, as an assessment body, they have not taken a role of assessing in a scientific, structural way. YESAB is relying on data from various departments to give them an idea of what could be a problem, but does not have a standard framework to follow (TG1).

Other agencies could also increase their role in the EIA process. In the Kluane Region, Parks Canada, for example, could conduct more monitoring for EIA's (A3), First Nations could do more wildlife surveys (FG1), and the Yukon College could provide more climate change data into the assessments (N1).

9. Are there particular needs for coordination and integration of assessment and monitoring efforts around wildlife in the Yukon?

Since cumulative effects assessment is a more recent consideration for environmental impact assessments in the Yukon, more coordination surrounding its integration is required (FN2), especially because not much cooperation (Y1) or monitoring is currently occurring (TG3). The respondents provided insight into the need for stronger collaboration and communication, data coordination, acquisition and management, the possibilities for initiating new ways of filling baseline data gaps, and provide options for data integration and dissemination.

Having partnerships and collaboration is particularly important because of the resource imbalance of being in a smaller jurisdiction (TG7). Respondents noted numerous areas where communication and collaboration should be strengthened. There was an expressed need to increase the communication lines between departments (FG1, TG2, Y2), communities and boards (TG2), and for transferring information between them (Y2). First Nations need to collaborate more with these community organizations (FN1), with efforts also made by others to

incorporate First Nations into local projects (TG6, FG2). Efforts should also be placed on improving the relationship between the Government and hunters (N1). Better communication with Parks Canada is needed, as they can often make the environmental impact assessment process for projects in the Kluane Region more complex (TG5). Partnerships with non-policy researchers to tie in what people need for decision-making would also be useful, such as natural scientists (TG7). Moreover, within the EIA process itself, communication is required on effective mitigation approaches, with reporting needing to occur on what is being proposed for an assessment and what is actually transpiring on the ground level (Y1). In addition, cooperation between proponents and Environment Yukon could also help to refine wildlife datasets (Y2).

In the Southwest Yukon, where there are a number of individuals researching, collecting data and spending time on the land (Y1), there is an expressed need for coordination between these individuals and the assessors (A2, A3). Stronger communication between assessors and proponents is needed about what is required to conduct a cumulative effects assessment (TG8), and clarity on the values and management objectives of a particular region (TG7). Mechanisms such as permits (A3) and mandatory reporting of projects could be a way of acquiring additional data, especially from consultants (A2). Contractors, for example, who are collecting data for industry and Government, could have terms and conditions worked into their contracts to ensure that their data gets collected and put into a repository (TG3). In addition, individuals who are working on the land, such as surveyors, could be required to record GPS coordinates of the wildlife observed while in the field (A2).

How information is organized and shared also needs to be a focus (TG4), as there is currently a mismatch between the science that is being done, and the desired applied science that is targeted towards decision-making (TG7). Data collection is not currently standardized and proponents may not follow the same methods that departments use (TG4). A standardized set of

information to be collected should be mandated, (A2) with standardized protocols, (TG7) to build a picture that allows cumulative effects to be addressed over large areas (A2). There also needs to be an institutional way of keeping monitoring methodologies occurring, as well as a database with a data manager (A3). To increase data acquisition, partnerships and tools are needed. With data also comes the importance of communication and interpretation of raw data to help determine specific impacts of a proposed project (TG1).

In addition to the suggestions on how to acquire, coordinate and manage data, respondents also provided ideas on how to fill some of these baseline data gaps. There is a need for individuals who are willing to initiate (FN1) and commit (A3) to long-term wildlife monitoring, data collection (A3, FN1), and research in the area (A3). The Government could allocate more money towards monitoring (A3), especially community monitoring (A1). Encouraging more funded citizen science projects, which include industry, First Nations, and other partners, could help to fill data gaps and reduce the costs associated with CEA (A2). Additionally, First Nations need to be integrated into these local monitoring programs (A3). More local knowledge-based stewardship monitoring activities need to occur, because current decisions tend to be based only on expert scientific knowledge (FN1). The research community, such as the Yukon College, could play a larger role in collecting data, while researchers at the Kluane Lake Research Station could also work on projects that are more needed for the region (TG7). Another possibility for filling baseline data includes putting efforts into connecting experts of certain species with staff at the Yukon Government (N1).

The respondents provided various suggestions on how to strengthen the integration and dissemination of data. To begin, having increased literacy on cumulative effects assessment would be helpful (TG5). There need to be more opportunities for community interaction and result sharing for the researchers. Mechanisms could be put into place to ensure that data is being

disseminated back to the community – such as providing a final report, coupled with a webinar (A2). This is particularly important for local First Nations, where there is a social dimension of research in the area. There have been trust challenges for them with the research community, as monitoring and data collection is occurring in their Traditional Territory, often unknown to them. While there is an ethical guideline for researchers in the north that requires they work closely with First Nations, funding and resources often cannot support the amount of additional work this requires, reducing the long-term community connections that are needed. There is also a strong interest to increase the knowledge of CEA of the First Nations and share with people who can help them understand what is going on (FN1). It is important to build capacity within individual First Nations (Y2) and find ways to integrate traditional knowledge (TG6, N1, FG2, Y2). If this is to occur, it is also important to find ways to make that knowledge available for management decisions, while ensuring confidentiality and respect (Y2). Other organizations and outfitters could also integrate more data into monitoring and assessments (N2). It is also important that reports of results from scientists are provided back for use in assessments (A3) and given to YESAB (Y1).

10. Are there specific assessment or monitoring methods or approaches that could better help scientists and managers address cumulative effects on wildlife?

To understand what would be most useful for the individuals directly involved in the environmental impact assessment process to better address wildlife CEA, the respondents provided insight into the tools, methods and approaches, forms of data, as well as other resources that would be helpful to them.

A number of tools were highlighted as being important for effectively conducting a CEA. Models would be useful (A1, N2, FG1), especially frameworks and models for non-recognized hot spots (N2), for gaming (FG1), and predictive models for species that commonly appear in

EIAs (A2). Additionally, it would be beneficial to find methods that could give reasonable confidence intervals on different measurable components of the environment. A cumulative effects assessment framework for the region (FN1, FN2, TG8), which would include guidelines (FN2) and a rigorous flow chart for managers and assessors (TG5), would also be crucial. Other frameworks, such as range planning would provide YESAB with a scientific framework approach (TG1), and a linear disturbance framework would also help to establish parameters (Y1).

The YESAB wildlife guide will be useful for informing proponents about the baseline data that needs to be collected and for long-term monitoring planning (TG4). For the Kluane Region, a framework that could be used to monitor an increased number of activities within Kluane National Park and Reserve would be beneficial (FG2). Other tools, such as additional CEA literature (TG5), mitigation protocols (FG2), and State of the Yukon Reports (A3), would also help. In addition to more standardized baseline monitoring programs (A2) with an increased number of monitoring stations (N1), it would be useful to have an online centralized database warehouse (A2, TG7, Y2) that is accessible (A2), where researchers and assessors can download and upload data (TG7). In regards to the EIA process, having a tool that helps individuals submit their comments in the online registry in a more effective way (FN2), having a requirement that proponents fill out wildlife log books (Y1), as well as having an ecosystem-based mapping project that has a traditional knowledge layer (Y2), would all help managers make more effective cumulative effects decisions. For the Kluane Region, land use planning would be a beneficial tool (TG2, TG3, TG4, Y1) that could help managers visualize future states of wildlife (TG2), determine qualitative thresholds for different species (TG3, TG4, Y1), and allow for integrative management areas to be determined (TG4).

In addition to these tools, the respondents also spoke about a variety of methods and

approaches that could be used in the development of a new CEA framework, that would allow more effective consideration of wildlife. From the beginning of developing a CEA framework, it is important to recognize that there are a large number of experts out there that can be utilized in this process, and there is a strong need to ensure that the local First Nations are in a leading position to help design this (FN1). It would be important to choose indicator species (TG1, N2) because of their relevance to the larger food web (TG1), and set aside habitat protection areas (TG2). Integrating an ecosystem service perspective (TG5), with an adaptive approach (A1), and incorporating risk assessment models would help to understand cumulative effects (FG2). Another approach could be to integrate traditional knowledge to improve statistical models, coupling science with traditional knowledge to have more precise scientific results. An approach like this could create more support and understanding by locals, and in turn, increase trust (TG6).

With respect to monitoring approaches, it would be more proactive if proponents had all of their data before beginning the proposals (FG2). Follow-up monitoring would also be key to help conduct CEA's on other projects (Y2). By integrating more stakeholders into monitoring, costs associated with conducting an EIA could be reduced (TG2). Rigorous parameters for monitoring (A1) as well as a validation process (A2) could also help.

Respondents also provided insight into other data and resources that would help scientists and managers conduct CEA's. Having community observations of wildlife (A2), better spatial data (A2, A3), updated remote sensing data (Y1), as well as GIS tools and staff would help with spatial analysis (Y1). In addition, recognizing and utilizing experts (FN1), having more human capacity (A3) and resources (A3, Y1), and more buy-in from the Territorial Government (FN2) would be beneficial.

11. Are there aspects of assessing cumulative effects on wildlife that you feel are particularly well done in the Yukon?

The final question that respondents were asked was about success stories of cumulative effects assessment in the Yukon. While one individual felt that CEA is just in the beginning stages, and therefore there are not many examples of how it has been done well (TG5), there was also a belief that some larger projects seem to be demonstrating the right approach (FG2). It was also noted that while some respondents feel that nothing has been done well anywhere in the Yukon, there are some people within the assessment process that are currently trying to move CEA forward, and there have been good recommendations coming out of the YESAB forums (A2).

Other respondents noted some of the specific projects, areas or species where CEA has been well done. Projects that respondents felt are good examples of CEA work include linear disturbance aspects of the North Yukon Plan (N1) and the time lapse visuals of mining road increases that were produced (TG5), the CEA pilot project (Dawson area study) to address CEA in areas where there is no land use planning (TG4 and TG7), the White Gold Area (TG4, Y1, Y2), linear disturbance (Y1), and cumulative effects assessment model process (Y2), as well as the approach in the Territory for Ecological Land Classification (Y2). Also, work in Ross River has produced interesting ecosystem-based mapping that has a traditional knowledge overlay (Y2), and the Wellgreen mine is currently focusing strongly on CEA (FN2). Within Parks Canada the FRAGSTAT program has allowed them to evaluate changes in the landscape and make inferences on how these changes may affect wildlife (FG1). Some respondents also felt that the current CEA approaches of the Range Assessments are good (TG2, TG4, TG6), but time will tell if they are effective (TG2). In addition to specific projects and areas, many respondents felt that CEA is being done well in the Yukon on caribou (A1, TG1, TG4, N2), especially with

the Southern Lakes Caribou Recovery Plan (N1). It is also felt that fairly decent CEA work has been done on water, and that there is a strong knowledge of some time-sensitive species, but not data about this in every area (TG3).

7. Discussion

This section discusses the detailed results presented in the previous chapter and in Appendix 6. Part of the overall research goal of this thesis was to outline the needs and challenges for identifying and monitoring cumulative effects on wildlife in the Kluane Region. Each key respondent recognized that addressing cumulative effects on wildlife in the Southwest Yukon is imperative because of the important role healthy wildlife populations and functioning ecosystems play for the area's cultural and social values, ecological integrity, as well as tourism economy. Despite the CEA mandate within YESAA, many respondents still felt that cumulative effects on wildlife are not being addressed as effectively as impacts from single-projects.

Within this chapter, I will draw out six key themes in the needs, gaps and obstacles that are believed to be hindering effective CEA in the Kluane Region, situate them within the literature, and explore their implications for wildlife-related CEA in the southwest Yukon. The six key themes are: gaps surrounding baseline data and the management of available data, the lack of mechanisms to ensure that relevant research is occurring and disseminated back to communities and management institutions, the challenges surrounding consistent long-term wildlife monitoring and follow-up monitoring of assessments, human and financial capacity obstacles, as well as challenges associated with the political and land use planning context of the region.

Data

The most prominent theme that emerged as a challenge for effectively assessing cumulative effects on wildlife in the Southwest Yukon was the lack of baseline data. With uncertainty surrounding how the functioning of northern ecosystems will be impacted by environmental and human-induced changes (Government of Canada, 2014), having adequate

baseline data is the basis for properly assessing direct and indirect impacts that will arise from any proposed human activity (Canter and Atkinson, 2011). Baseline data can help describe the current environmental conditions of the area; providing insight into the sensitive components of an ecosystem that may be affected during a development or activity (Hanna, 2016). Deficiencies in baseline data have proven to be an on-going obstacle for environmental impact assessments in the Yukon and beyond, especially for cumulative effects assessments. This is, in part, because wildlife dynamics and thresholds require an understanding of numerous complex interactions, which comprehensive data can help provide clarity on. While this obstacle is not unique to the Southwest Yukon, the area's history, population, capacity and location contribute a unique complexity that seems to have highlighted this challenge.

The obstacle of not having sufficient baseline data on wildlife that my research revealed, is consistent with the YESAA Five-year Review, which indicated that one of the biggest issues leading to inadequate CEA in the Yukon is the lack of baseline data and mechanisms to collect it (SENES, 2009). While a lot of data is being collected in the Kluane Region by governments, researchers, consultants, and First Nations, there are still a number of data gaps. Data is still missing on specific species, seasonal data (to help assess annual variability), information on harvest numbers, and for a variety of locations in the region.

In the Southwest Yukon, most data is collected on species that are either significant for their tourism value, the ecological integrity goals of Kluane National Park and Reserve, or the edible species that First Nations and other local citizens rely on. These therefore include data from regular moose, caribou, sheep, and bear surveys. While it is important to have this data, and some individuals feel it is the best way to engage local citizens, it is also important to collect data on the smaller species that contribute to the overall functioning and health of an ecosystem. The importance of collecting broader biodiversity data is consistent with the idea that an area's

biodiversity can be used as an indicator for determining the health and conservation priorities for an ecosystem, and can be used to shape the directions of a cumulative effects assessment in a region (Canter and Atkinson, 2011).

The Southwest Yukon presents unique opportunities for capturing and integrating data that is held by those living and working on the land. Many individuals in the Kluane Region spend extensive time outside, observing wildlife. These individuals hold an important form of knowledge – traditional and local knowledge that can provide an additional insight into specific ecological trends, changes and conditions of the areas wildlife and habitats (Krzyzanowski and Almuedo, 2010). While the concept of tapping into local and traditional knowledge is not new – researchers in the north have often utilized public participation during the development of baseline knowledge (Brunet et al., 2014), this particular information is often lacking in assessments, and could be better utilized to fill some of the existing data gaps. It is the scientific data that tends to be used to inform management decisions, because it is usually quantitative in nature (Nadasdy 2003). Traditional and local knowledge on the other hand, tends to be qualitative, but at the least could corroborate these scientific findings (Gilchrist et al., 2005).

For local and traditional knowledge integration to be successful in the Kluane Region, a system would need to be developed to effectively capture and archive this information, with useful tools developed to transfer this data into the permitting process for CEAs. If done in a sensitive manner that respects confidentiality and ownership, this additional information could be especially useful in providing insight into the harvesting numbers that are currently unknown.

My research has also revealed that there is still a debate over who should be responsible for collecting data for a cumulative effects assessment, and how the data should be managed. Whether existing tools could be explored further, or new ones developed, it is evident that the issues surrounding CEA will remain stagnant unless efforts are made to fill data gaps and

contribute meaningful data to a comprehensive baseline database that is effectively managed. This resonates with other sectors and parts of Canada that feel that considerable time and effort needs to be devoted towards both collecting, verifying and managing baseline data (e.g. Forest Practices Board, 2011).

Undertaking a data gap analysis for the Southwest Yukon could help increase awareness about the data that is currently available, and what additional data is needed for imminent assessments (Arino, et al., 2015). In the Kluane Region, a data gap analysis is not only desired, but could help shape data collection. This information could determine the data characteristics to focus on that would be most useful for assessors and managers.

Research

Connected to the challenges of baseline data gaps in the Southwest Yukon, is the expressed opportunity that research can play in helping to address these information gaps. As alluded to earlier, the Kluane Region abounds with researchers, most of whom are based out of the Arctic Institute of North America's Kluane Lake Research Station, and the University of Guelph's squirrel camp. Despite the large amount of data being produced in this region, my research indicates that many of the projects being conducted are not necessarily relevant to the community and management needs of the region, especially for CEA on wildlife. This is especially significant because academic researchers could potentially fill some of these data gaps.

Many of the key respondents felt that the Southwest Yukon would benefit from having more long-term commitment by researchers. This has continued to be an obstacle for the Kluane Region, and elsewhere, as the majority of researchers are from institutions outside of the territory, and it is often too costly and remote for them to spend longer than one, or even a few,

field season in this area for their project. It has been heavily critiqued that researchers often come into the region, working on projects that the local citizens are not informed about, and then travel back home with their data and results, never to be seen again. For relevant research projects to be used as an effective tool for informing cumulative effects assessments, more effort needs to be given towards collaborating with local agencies and community members to determine research needs. These research needs should be properly disseminated to institutions, so that the most useful research projects are more likely to occur.

In addition to ensuring that community research needs are met, some of the key informants emphasized that local citizens and First Nations in the Kluane Region need to be involved with every stage of the research process. Not only should they be consulted to inform what the research needs of the area are, but they should also be provided with regular updates on the progress of individual projects. Before beginning, researchers should create and implement clear strategies for engaging local community members with the data, and follow through with disseminating and helping community members interpret the results. This expressed need also mirrors the ethical principles that have been encouraged for researchers in the north. These ethics state that community consultation needs to occur at every stage of the research, including both its design and its practice. Additionally, this research should provide benefit for all parties, including enhancing the local community (Association of Canadian Universities for Northern Studies, 2003).

While it is argued that students are not adequately disseminating their research back to the communities in the Southwest Yukon, attention is also brought to the gaps in effective mechanisms that would allow this to happen. Recognizing the inability of most researchers to stay or return to the community to present their key findings, tools need to be developed that provide opportunities for researchers to present online – such as webinars and conferences calls.

This would be similar to efforts being made by the Yukon Government to try to encourage the researcher to provide an interim report that reflects the status of the work on the project, as well as a final report within a year of completion that highlights key findings and the significance of the work (Government of the Yukon, 2013). Though this approach has been encouraged, a compliance mechanism, such as a specific research permitting process, is still needed to ensure that results of the research are disseminated back to the community and relevant stakeholders.

Monitoring

Since the establishment of a formal environmental impact assessment process in Canada, monitoring has been a key requirement of it (Nobel, 2010). There is a strong need across northern Canada to increase monitoring efforts that capture data on the population sizes, trends, and geographic ranges of terrestrial wildlife. Having these monitoring programs could help to detect rapid declines of populations before they become too threatened. Dedicating long-term funding towards the maintenance and operations of these northern monitoring programs would help to ensure the most useful baseline data is produced that can assist with sound-decision making (Government of Canada, 2014). Not only can monitoring programs contribute to an area's baseline data; but the follow-up monitoring of an assessment can also help ensure that compliance is occurring on agreed conditions. Follow-up monitoring can help determine if the impact management measures in place are effective, and can provide accurate knowledge of impact predictions (Noble, 2010). Having an increase in these monitoring programs would be particularly useful within CEAs, to see if the management of effects is successful, and if any adaptive management strategies need to be implemented (Therivel and Ross, 2007).

Despite the obvious benefits of having monitoring mechanisms in the CEA process, insufficient practices of monitoring continues to be one of the primary impediments to

improving CEA effectiveness (Schultz, 2010). This resonates with my research in the Southwest Yukon, which also suggests that it is impossible to fully predict the cumulative effects that will occur for a proposed activity, if the true effects of other surrounding activities are not understood.

In the Kluane Region, a shortage of consistent standardized, and relevant long-term monitoring programs on wildlife continues to hinder the ability to integrate meaningful data into the assessment process. This, in part, is attributed to the lack of support provided towards broader biodiversity studies, the current political will, and the capacity of the region. There is an expressed need to develop long-term monitoring programs that are not only in response to particular management or utilitarian needs, as many of the current projects are. These programs would help to fill baseline data gaps, and help determine drivers of change and their true linkages.

My research also suggests that there are a number of stakeholders, agencies and boards within the Southwest Yukon that could play a stronger role in ensuring that these long-term monitoring programs are established and maintained. Recognizing that many of these boards and agencies have limited capacity, and structures are already clearly outlined by the Umbrella Final Agreement, there are still ways that their contribution to local monitoring can be improved. Parks Canada and the Yukon Government could take a leading role in establishing additional long-term wildlife monitoring programs, while the Yukon Fish and Wildlife Management Board and the local Renewable Resource Councils could respond to more assessment applications, placing a stronger emphasis on integrating community interests into these comments. Additionally, all of these boards and agencies should focus on building stronger partnerships with each other, effectively collaborating throughout the entire process. YESAB needs to take a stronger role in ensuring that the proponents follow through with monitoring, before and after

the assessment, employing enforcement consequences if the proponent fails to withhold their obligations.

Due to the size and population context of the Southwest Yukon, citizens could also play a larger role in monitoring programs. Larger areas, such as the Kluane Region, can increase the need for citizen involvement, due to the limited capacity and resources of the scientists (Paul et al., 2014). By utilizing the public, citizen-based studies can increase the number of observations that are possible under conventional methods, producing a large and comprehensive dataset (Devictor, 2010). It has also been shown that data generated through participatory processes can help to build trust in a community, and can lead to applied results that stakeholders feel they were part of creating (Brunet et al., 2014). If more citizen-based monitoring programs were developed in the Southwest Yukon, local RRC's and First Nation Governments would need to play an active role in engaging community members in these initiatives.

Limited Capacity and Time

While it is important to recognize that limited baseline data, research and monitoring has been a challenge for addressing cumulative effects assessment in the Southwest Yukon, these deficiencies are often linked to the context of the region, which consists of a large geographic planning area and relatively small population. In the past, it has been extremely costly to conduct wildlife studies and to maintain long-term monitoring programs. To get an accurate population estimate of some species, multiple days of air time (via helicopter or small aircraft) are essential. In addition to this, it is not always realistic to send employees out in the field to collect data when they already have a backload of other projects and deadlines that they must meet. Agencies and organizations often only have one person assigned to a role, making it hard to take them

away from that. Regardless of who I interviewed, the capacity of staff was highlighted as a key hindrance to being able to conduct effective CEA.

Following up on the limitations of staff capacity, my research also revealed that conducting CEAs has also been a challenge because of their additional complexities. Single project EIAs themselves are intricate processes that require a lot of commitment and time on behalf of the employees. Cumulative effects assessments, because of their complexities, which are still not fully understood, require an even larger amount of time and more specialized expertise.

In the Yukon, individuals are often employed for short contracts, and tend to move around from job to job because of professional development opportunities. While this is an aspect that makes the Yukon (and other similar places) unique, especially for young professionals, if progress is to occur on how to effectively conduct CEAs, there need to be more people dedicated to CEA positions. Right now, it seems that work being done on CEA is by individuals who have a particular interest in this, and push it forward into their work agendas. Because of the transient nature of employment in the Yukon, a lot of time and money disappears while transitioning knowledge and projects to other individuals who may also only be in their role for a limited amount of time. Having more individuals in permanent positions that focus on CEA would allow stronger development of adaptive management approaches, effective monitoring, as well as dissemination of results.

Continuing with the implications of time, the time frames of conducting an EIA are too short. Understanding ecological systems, and especially human-ecological impacts requires a lot of time for conducting surveys and entering data. Even when data is being collected, there are large time lags between when the data is attained and when they are turned into reports that are meaningful for EIA's. With cumulative effects assessment, and its related approaches (such as

threshold-based approaches), large time lags between the idea itself, and its actual implementation are an unfortunate reality. This is, in part because for disturbance limits to be socially and politically acceptable, a lot of time and resources need to be allocated towards strengthening support from various managers and local citizens (Kennett, 2006). Especially in the Yukon, being able to integrate traditional and local knowledge into the assessment process requires far more time than the time frames that are currently provided by YESAB. With the amount of detail that needs to go towards the cumulative effects requirement of each application, the volume of applications makes it very challenging to properly review each proposal with the amount of detail that is necessary.

Political Context

Having highlighted most of the key obstacles and gaps for effectively addressing cumulative effects on wildlife in the Southwest Yukon, I am now going to narrow in on specific obstacles that have been experienced by some of the key informants with the internal process of assessments. This section will therefore cover the challenges associated with the lack of communication and understanding of CEA, critiques surrounding the political will to fill data and knowledge gaps, the disjunct nature of the assessment process, and concerns for projects that do not get subjected to an assessment.

The effective communication and understanding of cumulative effects assessments in the Southwest Yukon was expressed as being a challenge for a number of the key informants. Recognizing that the mandate to include cumulative effects within the assessment process has only been in place since YESAA's enactment in November 2005, communication between managers and proponents on the information needs for CEA, and effective tools to help assessors understand how to mitigate cumulative effects has continued to be an obstacle. Many people are

trying to understand the concept of CEA, but have very little experience separating cumulative effects from single-project effects. This obstacle was acknowledged in 2009 within the Five-Year Review – stating that there were concerns that the scope and approach of CEA is not always consistent or clear (SENES, 2009). This continues to be a reality in the Yukon and hinders the efficiency of money, resources and time. This, in part, may be linked to the fact that there is still a lack of clarity surrounding the YESAB CEA mandate, including who is responsible for taking the lead on cumulative effects assessment management in the Territory (Francis et al., 2013b).

For cumulative effects to be effectively assessed, and within the short designated time frames, a number of key informants felt that more specific assistance should be provided to proponents, before and during the assessment. In 2006, YESAB created an assessor's guide to CEA that aimed to provide guidance on what should be taken into account during different phases of an assessment. While similar CEA practitioners' guides and educational tools have been developed elsewhere in Canada, if they were truly effective tools, there would be more examples of successful CEA occurring across the country (Duinker and Greig, 2006). While there has been progress made towards CEA in the Yukon, notably the range assessments that have been conducted on certain species and are aimed at facilitating the improvement of CEA (Francis et al., 2013a), it was already easier to do cumulative effects assessment on species that have distinct ranges, such as caribou. For successful CEA to occur in the Southwest Yukon, it was expressed that an updated CEA guidebook would be useful. It would be incredibly valuable if this guidebook included a rigorous flowchart for managers and assessors, as well as frameworks for linear disturbance, baseline data needs, and a breakdown of the common set of values that are consistently brought forward in an assessment. I will go more in depth on some of the specific recommendations for assessment tools in the next chapter (Chapter 7), but it is

important to note here that having additional tools available to proponents, managers, and assessors would allow proponents to take a proactive approach (as opposed to reactive) for cumulative effects assessments.

Another obstacle raised by some of the key informants is that there does not seem to be the political will to address the data and knowledge gaps surrounding cumulative effects assessments, nor to reduce the number of development proposals currently occurring. This ties directly into the previous obstacle surrounding the limitations of baseline data, and the expressed need to conduct gap analysis studies. While it is recognized by most informants that this is a key need for better addressing CEA on wildlife, Government money and resources is not being allocated for data collection and to staff positions that would focus on this. This lack of political will and spending has been a cause of frustration for proponents and managers because they are not able to attain information for assessments fast enough.

CEA will occur more in the Southwest Yukon if there is strong push and buy-in to do so, however some key informants believe that the Territorial Government does not want to focus on CEAs because of their complex nature and the increased probability that a project will be declined. This belief is not unique to the Yukon, and is seen in other areas where the implementation of CEA has been a struggle. Conducting CEA on a development project requires a lot of time and money, often delaying the execution of a project. This is rarely favoured by Governments, as the window for an economic opportunity can often close before the project even gets the approval to be built (Hegmann and Yarranton, 2011).

In addition to obstacles surrounding the political will for strengthening CEA in the Southwest Yukon, there are additional struggles because of the disjunctive nature of the assessment process. As noted in a recent Environment Yukon report that highlights some of the key challenges for effective CEA in the Yukon, while CEA is mandated within YESAA,

YESAB is only an assessment board, and relies on a variety of other departments and boards to provide information to assist management decisions. (Francis et al., 2013b). Currently, various assessors, regulatory agencies, departments, and branches are doing different components of the assessment. While this approach can have the potential to work well, this segmented process is seen by many of the key respondents as a large challenge for effective CEA, because not enough communication, collaboration, and transparency is occurring. Some concerns have also been raised over the challenge of obtaining information from different branches, and the transparency of reports from those doing the compliance and enforcement of project mitigations. This makes it difficult to know whether YESAB's recommended mitigations are actually effective, which is information that could help determine future potential cumulative effects of other projects.

A final concern that was raised as a gap for effective cumulative effects assessment on wildlife, is the current disconnect between the mineral claim staking process, what is allowable under Class 1 activities, and what is being done to set guidelines for surface and linear disturbance. While my thesis was not meant to evaluate how different classes of mining operate, the contribution that Class 1 activities can have to cumulative effects was a specific concern for some of the key respondents. Activities within the Class 1 program are defined as being “low level exploration activities, generally with low potential to cause adverse environmental effects, and where activities and reclamation are completed within a 12 month period”, and are not required to undertake an assessment by YESAB (Energy, Mines and Resources, 2015). Many feel these types of small projects in the Southwest Yukon, when combined, can cause substantial adverse cumulative effects on wildlife.

Land Use Planning

The final obstacle I am going to address in my research proved to be one of the most complex challenges expressed during the key informant interviews – the lack of land use

planning in the Southwest Yukon. As alluded to in an earlier section, Chapter 11 of the Umbrella Final Agreement (UFA) set out to define how land use planning was to occur in the Yukon, including the establishment of regional plans that would lay out where and how certain areas could be used (Council of Yukon First Nations and Government of Yukon, 1997). This is significant for the Southwest Yukon because even though the Kluane Region is one of the eight recommended land use planning regions, land use planning cannot legally occur in a region where land claims are not settled. The White River First Nation, whose Traditional Territory is within this planning region, has yet to finalize their land claims, so land use planning is not currently present in this region (Yukon Land Use Planning Council, 2015).

Some of the key respondents felt that the absence of land use planning in the region has created large hurdles for managing and monitoring cumulative effects on wildlife. Land use planning was expressed as an effective tool for assessors and managers to help visualize the future states of wildlife, allowing them to better protect areas where habitats and wildlife populations are known to be sensitive to disturbance. Without land use planning, it was felt that approaches, such as having integrative management zones, would be too difficult to implement and determine. This is, in part, because land use planning in a region can help determine agreed upon disturbance thresholds, using quantifiable indicators. These indicators can then gauge the management performance of CEA and provide a good picture of what is occurring in the regions overall ecological system (Macleod Institute, 2002).

The benefits of having clearly defined resource thresholds have been well known in the Yukon for some time, as it allows for informed decision making to occur. When assessors are aware of the regional objectives for the management of resources, it helps provide both the project proponents and the regulators with a foundation for evaluating the significance of the projects effects (AXYS, Environmental Consulting Ltd., 2001).

7. Conclusion

To conclude, this chapter includes a summary of the thesis, highlights key contributions, presents several priority recommendations, discusses future research possibilities, and concludes with some final thoughts on the research.

Summary

The process of conducting environmental impact assessments in the Yukon is still relatively new, with a formalized, Yukon-based process only being enacted in 2005. The Yukon Environmental and Socio-Economic Assessment Act (YESAA), was developed as a requirement of the Umbrella Final Agreement, which was signed between the Council of Yukon First Nations (then the Council of Yukon Indians), the Government of Yukon, and the Government of Canada. While the evaluation of potential cumulative effects of a project or activity is mandated within YESAA, little CEA is actually transpiring, despite the respondents' shared agreement of its importance.

This is a large concern for the Southwest Yukon because wildlife and their habitats hold significant values for the cultural and substance lifestyles of many First Nations and other local residents. Healthy wildlife populations also contribute to the local economy of the region, bringing in thousands of visitors each year. Additionally, Kluane National Park and Reserve (KNPR), which encompasses around 22,000 km² of this region, has a Federal mandate to ensure that the ecological integrity of species and habitats is being actively managed.

Development activities in the Southwest Yukon have typically been minimal, mostly because of restrictions within KNPR. There are, however, increasing concerns surrounding the recent and potential proliferation of small and large-scale activities. While single-project

developments and activities are assessed for their adverse effects on wildlife, there is also the possibility that impacts from these activities can interact with other past, present and future projects in the area, contributing to greater cumulative impacts. Within the Southwest Yukon, the activities that are most common, and have particular concern for cumulative effects, include mineral exploration and extraction, road construction, timber harvesting, consumptive and subsistence harvesting, agriculture and land development, flightseeing, and recreational activities.

Through a comprehensive literature review, analysis of documents, and a series of key informant interviews with individuals who are involved, to some extent, with cumulative effects assessments or wildlife management and monitoring in the Yukon, my research revealed some of the varying opinions pertaining to the key gaps, obstacles and needs for better addressing CEA of wildlife in the Southwest Yukon. While some of the challenges that were emphasized are not unique to this region, the Southwest Yukon proved to have a number of distinct characteristics that both contribute to the wilderness context of the region and also heighten the obstacles to effective CEA.

Despite the Southwest Yukon being the most heavily studied region in the Yukon, the availability, usefulness, interpretation, and dissemination of baseline data was highlighted as being the most common challenge encountered for conducting CEAs. This obstacle is directly correlated to the lack of long-term wildlife monitoring programs that exist – especially on non-consumptive fauna that also play a vital role in the healthy functioning of an ecosystem. While these baseline data and research gaps are not unique to this part of the Yukon, it was argued that in the Kluane Region, not enough focus is being placed on ensuring that data needs of the area are properly communicated to the research community.

Some of the challenges were highlighted as being distinctive to the Southwest Yukon include its context of being a large region with a very small population. This has opened up a variety of obstacles associated with the high costs that are connected with conducting wildlife surveys in remote areas, the limited amount of human and resource capacity for conducting CEA's, the transient nature of staff (frequently moving between contracts and positions), as well as challenges of integrating traditional and local knowledge into the short assessment time frames.

Some of the other challenges that were revealed by key informants pertain to the political context and EIA processes in the Yukon. While it was believed by some respondents that there is a limited political will to address some of the challenges of CEA, there are key obstacles, such as the disjunctive nature of the EIA process, lack of collaboration and transparency, and the shortage of mechanisms for follow-up enforcement and monitoring of development activities that, if addressed, would help assessors better manage cumulative effects. In addition, it was argued that there are also challenges surrounding how CEA is communicated in the Yukon. Many individuals felt that not enough is being done to ensure that proponents understand the information needs for CEA, and relevant stakeholders are still unclear about how the CEA process occurs. While some of these challenges can be addressed with the proper amount of attention and time, one of the largest hindrances to cumulative effects assessment in the Yukon is the absence of land use planning, which is a far more complex challenge to tackle.

Key contributions

In beginning this thesis, I found there were a number of resources and papers written on the complexity of cumulative effects assessments, however there was less literature on the obstacles that are more specific to northern regions. This thesis therefore provides an additional

resource for future CEA in the Yukon and northern Canada. As my research was in direct response to an expressed community need for better understanding the challenges of CEA in the Southwest Yukon, I am confident that this thesis will contribute to a greater awareness of various stakeholders' concerns in the area. I was able to capture a wide range of perspectives, including those directly involved with conducting the assessments, those affected by developments on their land, and those advocating for the improvement of EIA's in the Yukon. This thesis will be disseminated back to each key informant, the First Nation communities whose traditional territory this research is based in, and will be made publically available to anyone who is interested in reading it, or using it to support their work. More broadly, I am hoping that the gaps highlighted in the discussion, and the recommendations presented in the succeeding section will be meaningful and broadly applicable for improving consideration of wildlife for CEA in Yukon and elsewhere.

Recommendations

Having assessed the key gaps and obstacles impeding cumulative effects assessment on wildlife, my final thesis objective was to provide specific recommendations that could help improve CEA effectiveness in the Southwest Yukon. These recommendations are therefore directly in response to the information that was provided to me by the key informants. My aim here is not to say how these recommendations should be implemented within the region, but to communicate what various stakeholders who are directly involved in aspects of EIA in the Yukon would find useful, to assist them in solving some of these challenges and gaps. My recommendations therefore include providing more guidance for useful and relevant research projects; increasing the number of long-term standardised monitoring programs in the area; developing a comprehensive data management system with a practical and meaningful way for

people to share their data; increasing collaboration between departments, boards and stakeholder; developing a common guide for CEA with supporting resources and tools, as well as focusing on developing a land use planning context for the region.

The first recommendation I am going to present directly relates to the baseline data gaps that many of the managers and assessors expressed. In order for CEA to be effectively conducted on wildlife species, information needs to be known about the population dynamics of the species. I would therefore recommend that a gap analysis be a priority for moving forward with CEA. A data gap analysis that is specific to the Southwest Yukon could help determine what baseline data is missing, or what data needs to be updated. These data gaps should not only be identified by the assessors within YESAB, but should be a collaborative approach between all of the stakeholders that contribute to the wildlife management and environmental impact assessment processes.

Once a gap analysis is conducted, the appropriate time and money needs to be allocated toward working with First Nations, academic institutions and boards, such as the Renewable Resource Councils, to ensure that a list of community research needs is developed. This list, if distributed along with institutional guidance, can help ensure that research projects are conducted that directly help to fill the area's baseline data gaps that are hindering effective CEA. In order for this approach to be useful for CEA, mechanisms also need to be developed that ensure that the research results and data being collected are properly disseminated and provided back to the community and assessors.

My second recommendation is linked to my previous suggestion, and addresses further gaps that were revealed by the key informants. In order to determine how developments affect wildlife, and the effectiveness of CEA mitigation measures that are integrated into the assessment agreement, it is important that there is an increase in the number of long-term,

standardised monitoring programs in the Southwest Yukon. At the moment, there are some monitoring programs occurring on species that tend to be of particular concern to local citizens (such as moose and sheep), but focus also needs to be placed on the smaller species that contribute significant roles in the functioning of ecosystems. This long term monitoring should be the responsibility of multiple stakeholders, including proponents, First Nations and the Federal and Territorial Government. Long-term monitoring in the area can also be used as a tool to engage community members, allowing them to contribute to the monitoring and indirectly into the decision-making processes of assessments.

My third recommendation directly concerns the management of all of the data that has been, or will be, collected through research projects, wildlife surveys, traditional/local knowledge, and monitoring programs. It is essential that a comprehensive, centralized and inter-jurisdictional data management system is developed that is easily accessible, and easy to contribute to. This database should be broken down into regions and species, and should be actively managed by a team of individuals. This team of individuals could validate data, and work directly with the assessors to transfer the data that is required for assessments.

While a similar database has been developed – the Yukon Biodiversity Database through the Conservation Data Centre (CDC), either the CDC needs to be more fully mainstreamed and encouraged amongst various sectors, or a more comprehensive one needs to be developed that includes mechanisms for researchers to submit their reports. It is also important that this database includes the ability for individuals to submit citizen-based wildlife observations and qualitative remarks, as well as the ability to submit sensitive traditional and local knowledge (which may not have the same accessibility for the public). A critical component of this database would be the training provided to users. Adequate training and resources need to be

developed that will help stakeholders, the public and assessors understand how to input and access information within this database.

Another recommendation I would like to make directly pertains to the EIA process itself. As it currently stands, there are multiple different departments and stakeholders involved with various stages of the assessment. While this is not necessarily a bad thing, my key respondents have revealed that the lack of collaboration and transparency between these departments has been an issue for effectively assessing cumulative effects. I am therefore suggesting that frequent training sessions and meetings be developed that bring together everyone involved in a region's EIA process, ensuring that everyone is on the same page. Stricter enforcement of effects monitoring reporting also needs to occur, to ensure that assessors and managers know whether approved anticipated effects are actually occurring. Ultimately, mechanisms to improve communications and transparency between those involved in an assessment need to be developed and enforced.

Acknowledging that CEA continues to be a complex idea that is hard to fully integrate and grasp, I would like to recommend that further focus be provided to ensure that those involved in the EIA process understand what is needed to successfully conduct a cumulative effects assessment. While resources are currently available, development of a new common and accessible CEA guide, that also has supporting documents and tools, needs to occur. While I feel that YESAB should be responsible for developing and distributing this guide, it needs to be built through collaboration, where those who will use the guide are able to express the specific information that it should contain. From the interviews that I conducted, it seemed that this updated CEA guide would be especially useful if it provided guidance on the information and baseline data needs that proponents will need to submit, and a clear outline of the common wildlife values that frequently arise in assessments – so that proponent can properly prepare for

this. This would help save proponents and assessors valuable time and money. It is important to note that some advances have been made for addressing CEA, including range assessments, but the Kluane Region could especially benefit from more of these types of models and tools, because of the absence of land use planning. Additional tools and resources, especially those that relate to increased GIS capacity, models, validation processes, management plans for specific species, flow charts, and methods that try to couple traditional/local knowledge with science, were among the suggestions that key informants provided.

The final recommendation I would like to provide is not a new recommendation – developing a land use-planning context for the Southwest Yukon. While I am not suggesting that efforts should be made to push White River First Nation to settle their land claims, I am trying to encourage problem solving and progress, as possible, in the currently complex and uncertain legal and procedural context of Yukon regional land use planning. Meanwhile, management practices could occur that will increase managers and assessors understanding of wildlife and habitat disturbance thresholds. I am therefore suggesting that an increased number of range assessments occur in this region, and that more attention is provided to the obstacles that I alluded to earlier, including baseline data gaps, and ensuring that community research needs are being communicated. I think it is particularly valuable to focus our attention on determining indicator species for the region, and developing stronger adaptive management approaches to wildlife management. It should not be impossible to address CEA in areas without formal land use planning mechanisms, but progress will not be made until existing obstacles and gaps in this region are addressed.

Future Research

While my research goal was to outline the needs and challenges for identifying and monitoring cumulative effects on wildlife in the Kluane Region, and to review and assess relevant tools/approaches for this in the Yukon's institutional, policy and legislative context, the results uncovered a number of opportunities for further research. Admittedly, this thesis took longer than I expected to analyze because of the complex nature of cumulative effects assessment in the Yukon. I would therefore like to recognize that while I have highlighted criticisms surrounding key challenges, and have provided a number of recommendations for addressing these challenges, there has been additional work that has been done to advance CEA since my research concluded. I therefore think that it would be interesting to further assess the work that has been done for CEA in the Southwest Yukon, since this research took place, and evaluate the progress and effectiveness of these approaches, as well as, in the longer term, effects of changes in the Territorial and Federal governments, and revisions to YESAA.

Due to the limited time frame that I had for collecting data, I realized, upon evaluation of the interviews, that there were a number of perspectives that would have been useful to incorporate into this study. Some of the key stakeholders involved in CEA in the Southwest Yukon, including White River First Nation, local outfitters, the Yukon Fish and Wildlife Management Board, and the local Renewable Resource Councils, would have provided additional insight into some of the key obstacles of CEA. I would therefore encourage further dialogue between these groups, to ensure that their perspectives are also captured and included. These stakeholders are especially valuable for providing additional insight into the approaches that could help to better address community needs, data acquisition, and approaches for disseminating research results.

I also feel that it would be useful to compare the results that I obtained, with other case studies from the north, and other parts of Canada. Since the EIA system in the Yukon is relatively new, there are many things that we can learn from other parts of Canada, especially where CEA has been more successfully integrated into project assessments. One of the questions within my interviews that I did not fully address, that could be further explored, pertained to examples within the Yukon where CEA has been successfully done. While a large number of the individuals felt strongly that CEA has not been well done anywhere in the Yukon, some other key respondents provided insight into land use plans, project proposals, and tools that have aimed to address CEA. An evaluation of these tools and approaches, using a comparative case study approach, could be useful for determining what makes for successful CEA implementation.

A topic that would be incredibly valuable to explore further would be the specific obstacles that various stakeholders face in achieving their mandated obligations for CEA. When I designed the interviews for this research project, the same set of questions were asked to each key informant, regardless of their affiliation. These questions were fairly broad, and left room for respondents to comment on general obstacles, not specific obstacles to whom they were representing. I therefore feel that conducting a series of stakeholder specific gap analyses would provide further insight into CEA challenges.

Additionally, it would be useful to further explore some of the opportunities surrounding data and research needs in this region. Additional research could be conducted on determining how to capture citizen and local wildlife observations, including the integration of other individuals that are spending time on the land – such as Parks Canada visitors, outfitters and guides, as well as researchers. To follow up with this, research could also be conducted on determining the most effective methods for baseline data acquisition, management and

accessibility, and determining what the research and information needs are of the region. Tied directly into this could be a project that evaluates effective approaches to communicating these needs, including a system that evaluates the progress of fulfilling these information gaps.

Final Thoughts

The Yukon presents a unique opportunity in that the wilderness values and populations of wildlife are relatively intact, with fewer development pressures occurring compared to many of the southern parts of the country. There is also an exhilarating consensus that wildlife must be the main consideration within any development activity assessment because of the acknowledged variety of values that wildlife holds for individuals. I am therefore delighted to see that despite the complexities and challenges associated with conducting cumulative effects assessments in the Southwest Yukon, these challenges are on the radar of many of the key stakeholders, and progress is trying to be made towards addressing many of these challenges. With a relatively new system of conducting environmental impact assessments in the Yukon, there is still a prime opportunity to develop effective mechanisms, tools, and approaches that will help to ensure that cumulative effects on wildlife are properly monitored and mitigated in the future.

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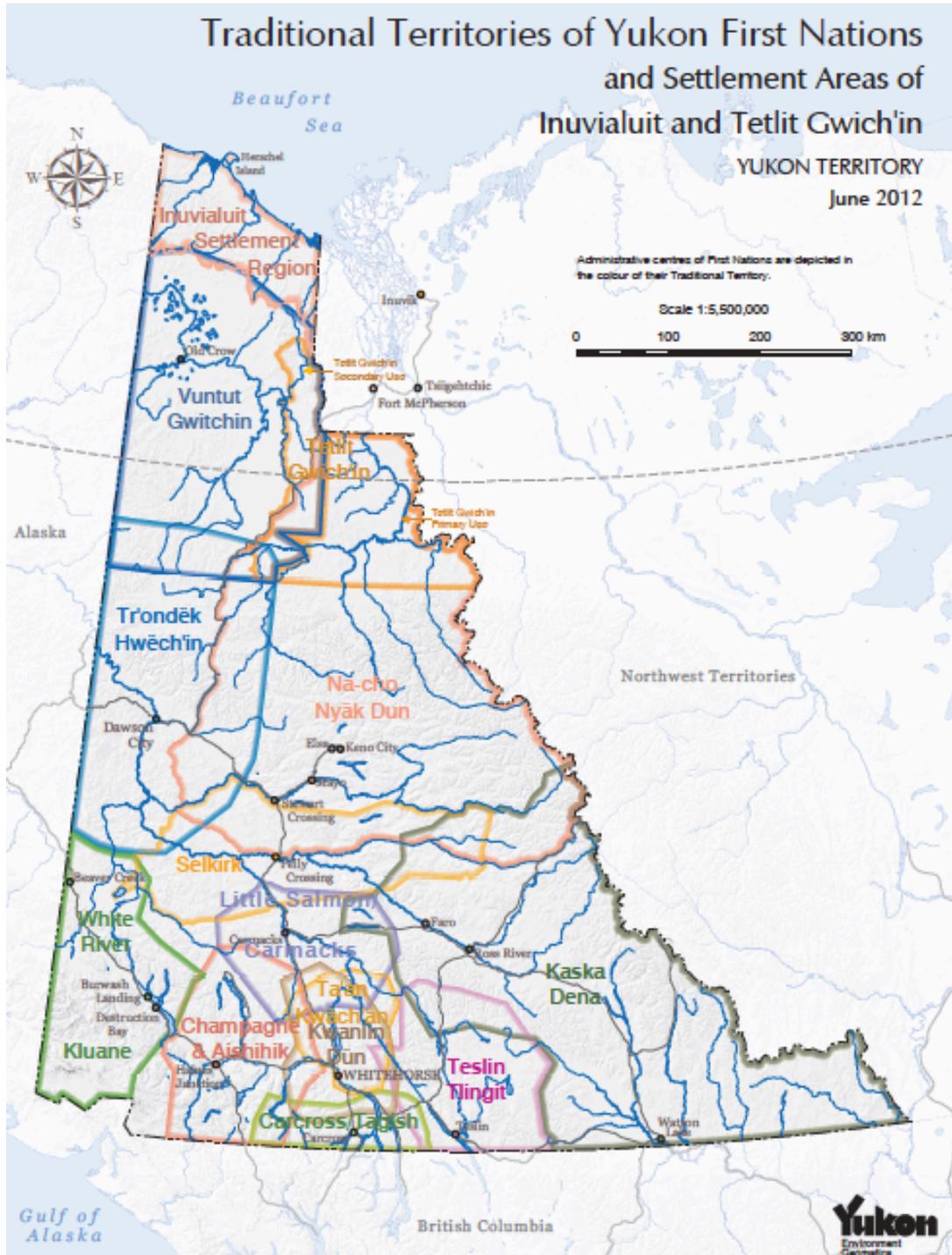
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Appendix 1 – Maps

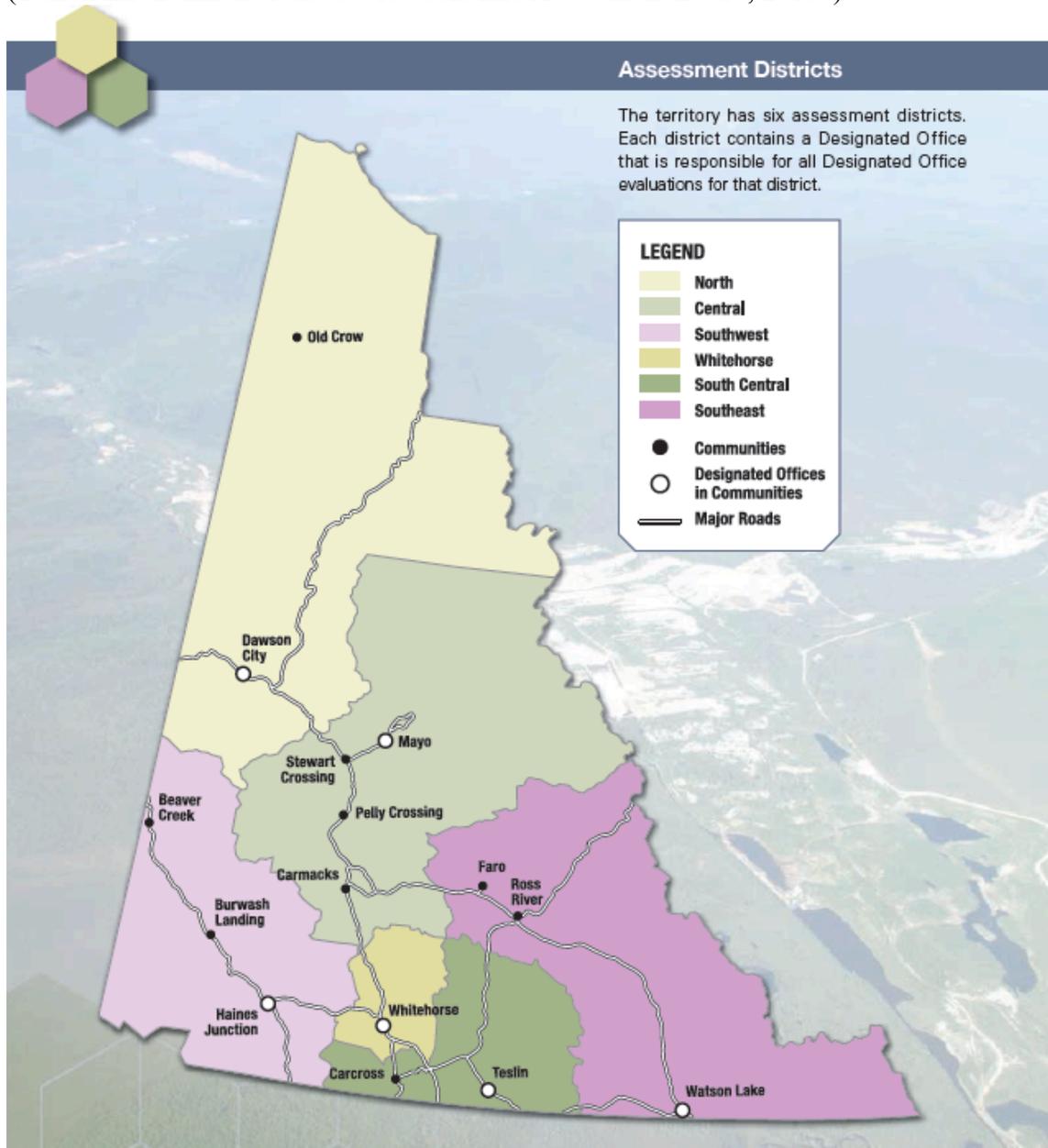
Map 1 First Nations Traditional Territories in the Yukon
(Government of the Yukon, 2015)



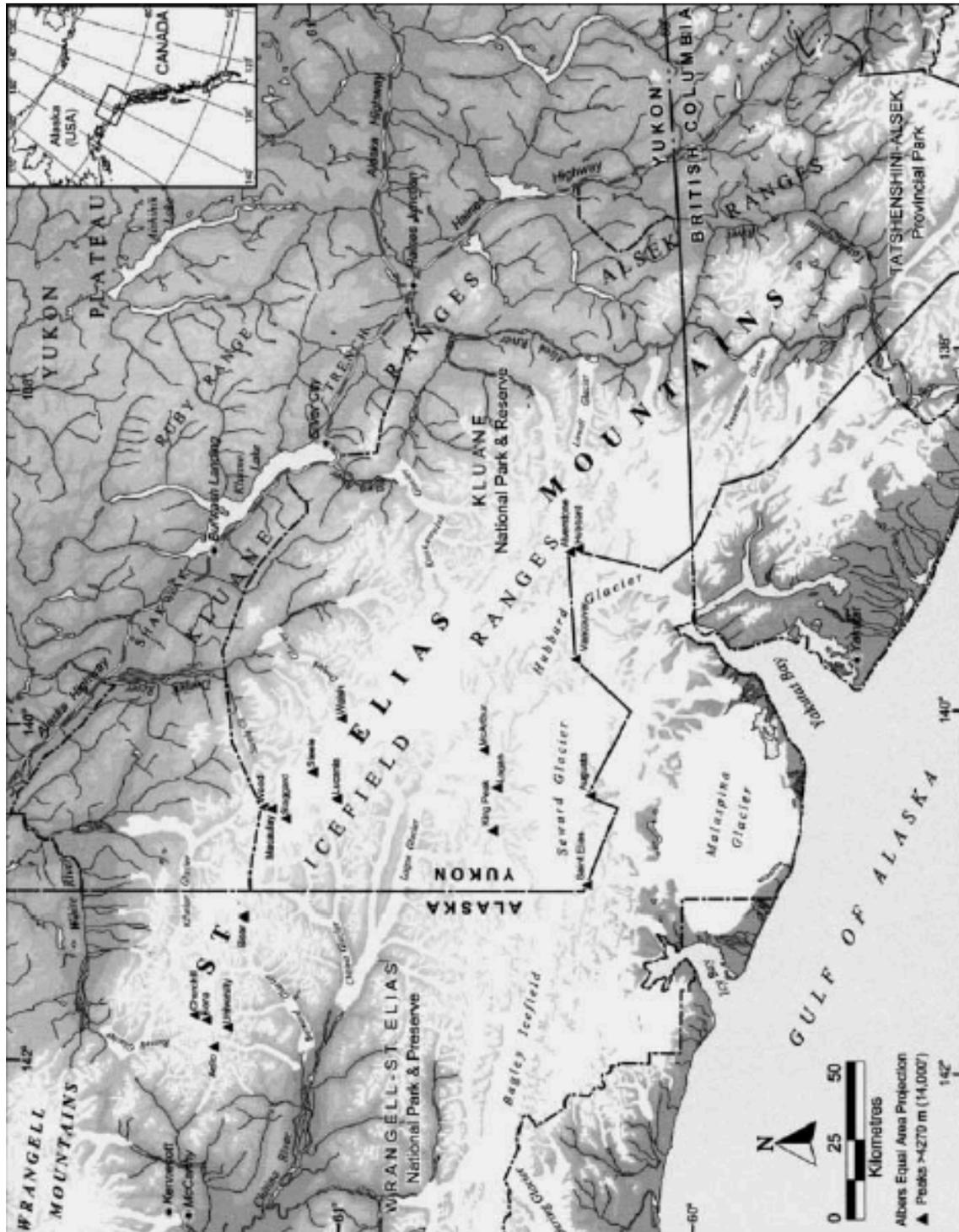
Map 2 Map of the Southwest Yukon
 (Parks Canada, 2010)



Map 3 Kluane Region, defined by YESAB. (Yukon Environmental and Socio-economic Assessment Board, 2015a)



Map 4 The St. Elias Mountain Ranges.
 (Danby, et.al., 2013)



Appendix 2 – Contact Script

WILFRID LAURIER UNIVERSITY
CONTACT SCRIPT

Wildlife in Cumulative Effects Assessment: Assessing Needs and Processes in Southwest Yukon

Shailyn K. Drukis

Wilfrid Laurier University, Geography & Environmental Studies,
75 University Ave. W., Waterloo, ON, N2L 3C5

Dear *name*:

My name is Shailyn Drukis and I am an undergraduate student in Geography and Environmental Studies at Wilfrid Laurier University, in Waterloo, ON, working with Dr. Scott Slocombe. I am working on my undergraduate honours thesis. If you participate in this research, I will provide you with an executive summary of the research upon completion, and you can request a copy of the thesis and other research products.

I am writing to invite you to participate in a research study. The purpose of this study is to outline the needs and challenges for identifying and monitoring cumulative effects on wildlife in the Kluane Region of Southwest Yukon, and to review and assess relevant technical tools and approaches for this in the Yukon's institutional, policy and legislative context.

I am seeking to do 10-15 approximately one hour interviews with professional land, resource and wildlife managers with expertise on the Southwest Yukon, and am hoping you would agree to be one of those participants. I do not anticipate any risks to you from your participation, as this research topic is not contentious, and indeed could have benefits in identifying opportunities to improve the practice and process of consideration of wildlife in cumulative effects assessment in Yukon.

If you participate, only I and my supervisor will have access to the data. Research data will be kept confidential, on a secured laptop and external storage media, or in a secured filing cabinet. You will not be identified in any research products, and the key linking you and your interview data will be destroyed upon completion of the research.

Participation is voluntary, and if you agree to participate you have the right to refuse to answer any question and can end the conversation at any time. With your permission I may digitally record the interview, but that is not necessary for your participation. **THIS PROJECT HAS RECEIVED APPROVAL FROM THE WLU RESEARCH ETHICS BOARD, REB 3889.** If you agree to participate we will go over and complete an Informed Consent Statement prior to conducting the interview.

I hope that you will be willing to participate and look forward to hearing from you. I would be happy to meet with you at a convenient time and place while I am in the Yukon *over the next few weeks*.

Sincerely, Shailyn Drukis

Appendix 3 – Interview Script

WILFRID LAURIER UNIVERSITY INTERVIEW SCRIPT

Wildlife in Cumulative Effects Assessment: Assessing Needs and Processes in Southwest Yukon

Shailyn K. Drukis

Wilfrid Laurier University, Geography & Environmental Studies,
75 University Ave. W., Waterloo, ON, N2L 3C5

Hello:

Thank you very much for agreeing to participate. I'm Shailyn Drukis and I am an undergraduate student in Geography and Environmental Studies at Wilfrid Laurier University, in Waterloo, ON, working with Dr. Scott Slocombe. As you may recall from my email, I am working on my undergraduate honours thesis on the needs and challenges for identifying and monitoring cumulative effects on wildlife in the Kluane Region of Southwest Yukon, and to review and assess relevant technical tools and approaches for this in the Yukon's institutional, policy and legislative context.

This should take about an hour, depending on your responses, but first we need to go over and complete the WLU REB Informed Consent Statement....

Okay, thank you again. We will start with some broader questions and move on to more specific ones. For all these questions, the primary focus is Southwest Yukon, or Yukon as a whole if that is easier.

1. How important do you feel the consideration of effects on wildlife is in environmental assessment, and why?
2. How effectively do you feel effects on wildlife are addressed in environmental assessment in Yukon?
3. Do you feel the consideration of cumulative effects on wildlife differs from the consideration of effects on wildlife in environmental assessment generally?
4. What are some of the obstacles to better assessing environmental effects of projects, plans, etc on wildlife?
5. Are there specific data sets relevant to wildlife that you are aware of, past or ongoing, that could be better used to support addressing environmental effects?
6. Are there data gaps around wildlife and their habitats that should be priorities for addressing?

7. Are there particular policy or legislative gaps around wildlife effects assessment that need to be filled? If so, do you have any suggestions for how best to do it?
8. Are there particular planning or assessment processes or Boards that could have a stronger role in assessing or monitoring cumulative effects on wildlife? What could these roles look like?
9. Are there particular needs for coordination and integration of assessment and monitoring efforts around wildlife in the Yukon?
10. Are there specific assessment or monitoring methods or approaches that could better help scientists and managers address cumulative effects on wildlife?
11. Are there aspects of assessing cumulative effects on wildlife that you feel are particularly well done in the Yukon?
12. Can you recommend any other people who may also be useful for me to interview?

Thank you very much for your time and involvement with my research.

Appendix 4 – Informed Consent Statement

WILFRID LAURIER UNIVERSITY
INFORMED CONSENT STATEMENT

Wildlife in Cumulative Effects Assessment: Assessing Needs and Processes in Southwest Yukon

Shailyn K. Drukis

Wilfrid Laurier University, Geography & Environmental Studies,
75 University Ave. W., Waterloo, ON, N2L 3C5

You are invited to participate in a research study. The purpose of this study is to outline the needs and challenges of identifying and monitoring cumulative effects on wildlife in the Kluane Region of Southwest Yukon, and to review and assess relevant technical tools and approaches for this in the Yukon's institutional, policy and legislative context.

I am an undergraduate student in Geography and Environmental Studies at Wilfrid Laurier University, working on my undergraduate honours thesis.

INFORMATION

This interview will involve a series of questions with open-ended, qualitative answers. There will only be one interview, and it should take about 45 minutes to an hour to complete.

I expect to be interviewing about 15-20 professional land and resource managers for this study. With your permission, I may digitally record our interview, but that is not a requirement for you to participate.

RISKS and BENEFITS

This study does not pose any physical, social, or psychological risks beyond the normal conduct of your professional position. Topics to be discussed in the interview and focus group include: cumulative effects assessment, wildlife management, data and monitoring needs. The topics being discussed are not contentious in nature, but in any event your identity will remain confidential and separate from your responses.

CONFIDENTIALITY

Participants will not be identified at any point in the analysis or presentation of results. Data will only be accessible to the researcher and her supervisor. Participants will be assigned a code and their interview results identified with that code. The key linking participants and codes will be kept confidential, maintained separately from the data in a secure location. Digital data will be kept only on secured laptops and/or external storage media. All information linking participants and their interview data will be destroyed at the completion of my thesis research. Quotations may be used in the thesis or other publications, but not without explicit permission for the specific quotes proposed for use. If we wish to use a specific quote from your interview, we will send it to you and seek your permission to use it by email (or other means as necessary). Any

quotations used will not contain identifying information.

Results will be published in an undergraduate thesis, and possibly in academic or professional journals and conferences. Participants will be sent a summary of the results upon completion of the researcher's thesis, about October 2014. If you would like a copy of the full thesis, please email me or my supervisor to request one.

_____ **Participant's**

initials

CONTACT

If you have questions at any time about the study or the procedures, (or you experience adverse effects as a result of participating in this study) you may contact the researcher, Shailyn Drukis, at druk9200@mylaurier.ca, and 519 807-3525; or her supervisor, Dr. Scott Slocombe, sslocomb@wlu.ca, 519 897-7504. This project has received approval from the WLU Research Ethics Board, REV 3889. If you feel you have not been treated according to the descriptions in this form, or your rights as a participant in research have been violated during the course of this project, you may contact Dr. Robert Basso, Chair, University Research Ethics Board, Wilfrid Laurier University, (519) 884-1970, extension 4994 or rbasso@wlu.ca.

PARTICIPATION

Your participation in this study is voluntary; you may decline to participate without penalty. If you decide to participate, you may withdraw from the study at any time without penalty and without loss of benefits to which you are otherwise entitled. If you withdraw from the study, every attempt will be made to remove your data from the study, and have it destroyed. You have the right to omit any questions you choose.

CONSENT

I have read and understand the above information. I have received a copy of this form. I agree to participate in this study.

Participant's signature _____ Date _____

Investigator's signature _____ Date _____

I allow the use of anonymous quotes from my interview in the thesis, presentation or other publications.

Participant's signature _____ Date _____

I allow permission for this interview to be recorded via an audio recording device.

Participant's signature _____ Date _____

Appendix 5 – Proposals Submitted to YESAB Haines Junction District Office in 2013, 2014 and 2015

(Yukon Environmental and Socio-economic Assessment Board, 2015b).

Sector	2015	2014	2013
Forestry	3	2	2
Energy transmission (gas, electricity)	0	0	1
Residential, commercial, and industrial land development	6	2	6
Camps	0	2	0
Transportation – roads, access roads and trails	1	1	6
Waste Management – solid waste	0	8	0
Recreation and tourism	5	4	6
Mining-placer	5	5	3
Mining - quartz	4	1	1
Agriculture and aquaculture	3	0	0
Other industrial activities	1	3	2
Utilities – water and wastewater	0	0	1
Scientific research/ wildlife management	1	0	0
Total	29	28	28

Appendix 6 – Results Summary Table

1. How important do you feel the consideration of effects on wildlife is in environmental assessment, and why?	
A1	<ul style="list-style-type: none"> • It is important to determine both subtle and global effects on wildlife, and to be able to separate impacts from natural variations. • It is also important to understand how wildlife copes with various environmental conditions and disturbances.
A2	<ul style="list-style-type: none"> • It is very important to consider the effects on wildlife in the environmental impact assessment. • In the Yukon and beyond, wildlife represents a lot of values for many people. Wildlife is significant for cultural-social reasons (subsistence and existent). • Wildlife can be an important indicator for ecological systems and sustainability. • There is a legislative mandate to consider effects on wildlife in the EIA process.
A3	<ul style="list-style-type: none"> • When looking at effects, it is important to look at the entire ecosystem. Too often effects are only considered for the edible larger species.
FN1	<ul style="list-style-type: none"> • Health and wellbeing of wildlife is a key core value. • Must consider effects of wildlife and values associated with them when making decisions about resource management and assessments.
FN2	<ul style="list-style-type: none"> • It is very important to consider effects on wildlife because wildlife sustains people (subsistence harvesting). • It is also important to protect their habitat so that wildlife do not get pushed out of the area. • Must evaluate impacts because it is outlined under YESAA.
TG1	<ul style="list-style-type: none"> • Wildlife effects are an important consideration. • Wildlife individuals are usually robust enough to withstand a certain level of disturbance in a certain portion of their range or their population. Combining habitat alteration (on going or periodic disturbance, alteration of habitat structures, and fragmentation), all contribute to cumulative effects. • At a certain level, these diminished uses will have measurable consequences on wildlife population vitality. • Planning has failed to mitigate effects if vital rate changes from project developments can be measured.
TG2	<ul style="list-style-type: none"> • It is very important to consider wildlife effects, especially because we currently have fairly healthy wildlife populations in the Territory. • Since there is not a lot of development in the Yukon (compared to other places), we have the opportunity to manage developments and their

	<p>effects before it is too late.</p> <ul style="list-style-type: none"> • The cumulative nature of the various development projects needs to be considered, especially for a broad range of wildlife, not just the tasty mega fauna.
TG3	<ul style="list-style-type: none"> • It is very important, and is the main consideration. • Important to look at the significance of effects on wildlife and mitigation options.
TG4	<ul style="list-style-type: none"> • Wildlife is valued for a number of reasons in the Territory. They have inherent values. • It is mandated to consider wildlife impacts in the assessment process, and to recommend mitigation when necessary. The critical values are identified and looked at, to ensure that values of wildlife continue in the future.
TG5	<ul style="list-style-type: none"> • The consideration of wildlife is very important, and is front and center. • Since wildlife have nowhere else to go, and cannot speak for themselves, we have to accommodate them and work around them.
TG6	<ul style="list-style-type: none"> • It is very important. • Also need to ensure that there is a fairly intact and functioning landscape with natural processes occurring. • Many other provinces and territories have less functioning intact ecosystems (more development). We need to look at these to get ahead of the curve, and get processes in place that will reduce development effects, and maintain thresholds so that wildlife are not as affected. • The Yukon is not a very productive environment, so some of our habitats and wildlife are more vulnerable to development, habitat changes and climate change.
TG7	<ul style="list-style-type: none"> • It is critical that wildlife effects are addressed. • Having healthy game and wildlife is important for cultural and subsistence reasons because many individuals rely on wildlife for their diets. • Wildlife is a key component of the EIA process of developments.
TG8	<ul style="list-style-type: none"> • It is very important to consider wildlife effects as they get hit the most with developments. • The consideration of wildlife in the Yukon is different than in most provinces because there are many people (especially First Nations) who rely heavily on wildlife for subsistence.
N1	<ul style="list-style-type: none"> • Wildlife can become an indicator for a whole region. • Often people only pay attention to the charismatic mega fauna, but by caring for species habitats, you also help to protect the species.
N2	<ul style="list-style-type: none"> • It is very important to understand how wildlife is impacted by proposed developments. • Wildlife in the Yukon has both intrinsic and cultural values. • Lifestyles in the Yukon depend around wildlife (wildlife viewing, hunting, subsistence). • Wildlife can serve as a visual symbol that people can rally around

	(concentrating human opinion).
FG1	<ul style="list-style-type: none"> • It is very important to consider, especially because there is a lot of development and action occurring along the borders of protected areas. • Harvesting is allowed now in the park, wildlife is therefore very valuable.
FG2	<ul style="list-style-type: none"> • Wildlife is key. Need to understand how wildlife interacts with humans and the area. It is important to be able to demonstrate these interactions in assessments. • It is important to understand what an animal is doing throughout the year and the effect that any human introduced project will have on them. • Need to be able to identify wildlife values. • Important to share this information (both scientific and traditional knowledge data) for cumulative effects assessments of a development.
Y1	<ul style="list-style-type: none"> • Wildlife effects are a central concern in the Yukon. Most comments in an assessment pertain to wildlife. • Cannot separate the wildlife out of the environmental assessment because wildlife is a part of the environment. • Since traditional land use is key in the Yukon, wildlife is a significant component of environmental impact assessments. • There are many fragile species in the Yukon, due to the areas unproductive ecosystems.
Y2	<ul style="list-style-type: none"> • Wildlife effects consideration is central because of the role that species play in traditional land use and culture. • Wildlife has a role in maintaining the wilderness character that is part of the lifestyle and fabric of Yukon society.
2. How effectively do you feel effects on wildlife are addressed in environmental assessment in Yukon?	
A1	<ul style="list-style-type: none"> • Environmental impact assessment usually only focuses on consumptive species.
A2	<ul style="list-style-type: none"> • Effects on wildlife are currently limited. • The way EIA is currently set up, there is no standard set of values .It is usually left up to individuals and agencies to bring forward concerns each time, which is limiting. • A framework of common set of values could be consistently brought forward by assessors to ensure a cohesive and consistent approach. • There is no consistency in the application or approach in assessment because the EIA process was set up from the UFA, which assumed there would be land use planning and defined disturbance thresholds.
A3	<ul style="list-style-type: none"> • EIA's are a good idea, but are ruled by Government and industry interests. • Wildlife effects are rubber stamped in the EIA process. Not much is actually occurring. There is a mentality that nature will heal itself. • The bigger edible wildlife is the center of attention.
FN1	<ul style="list-style-type: none"> • There is currently a lack of understanding of the potential effects and

	<p>casual relationships between a certain development activity and whether it has an impact on a particular wildlife species. It is hard to determine if thresholds are being pushed.</p> <ul style="list-style-type: none"> • There is a potential for more disturbance in the future. There are currently not many large-scale developments occurring. • Conservative approach is being taken to set aside large areas for conservation purposes.
FN2	<ul style="list-style-type: none"> • Wildlife effects are not really being address in the environmental impact assessment process. Material is being quoted, but that is about it. • Very few projects have been turned down. • Mitigation recommendations are provided for assessments.
TG1	<ul style="list-style-type: none"> • EIA on wildlife works in conceptual circumstances, not empirical data. Once they get to the empirical data stage, the ability to considered planning for those effects is already past. • When projects are assessed, they are assessed on an individual project basis. The framework to do proper CEA is still in the creation stage.
TG2	<ul style="list-style-type: none"> • Effects on wildlife are dealt with fairly well in the environmental impact assessment process, but there is room for improvement. • The Yukon has a large landmass, but a small Government capacity; therefore it is hard to fully understand project effects. • Assessment of wildlife effects is more successfully being addressed on larger species (umbrella species and mega fauna).
TG3	<ul style="list-style-type: none"> • Effects on wildlife are poorly addressed because of the lack of baseline data and strong focus on big game species. • In areas where there is actually baseline data, it is hard to quantify effects on wildlife. Wildlife thresholds are hard to determine because many complex interactions occur. • Wildlife effects mitigation is often a challenge for decision bodies. Even if mitigation conditions make it into the permit, it is often not enforced. • Effects monitoring is non-existent.
TG4	<ul style="list-style-type: none"> • There are some issues with wildlife effects assessment in the Yukon. • The current EIA process is project-driven. • Often there is not enough wildlife data in areas where development applications occur. If a project is submitted outside of a wildlife key area, it does not mean that there are no wildlife values there, it might mean that the areas has not been studied yet.
TG5	<ul style="list-style-type: none"> • They try to address wildlife in the environmental impact assessment, but parameters for assessment do not always take into consideration seasonal impacts. • YESAB has improved assessments. The process is more accessible and open. • The interpretation of data is hard to incorporate into the assessment. • Priorities of assessments are constantly changing.

TG6	<ul style="list-style-type: none"> • The current environmental impact assessment process is fairly good at identifying current and future risks of single projects. • Range assessments are being done on some caribou herds, with the goal that they will become more broad and capable of determining targets.
TG7	<ul style="list-style-type: none"> • Assessments occur well with the wildlife information that they have, but there are areas that could be improved. • EIA looks at the impacts of a development on wildlife. There are some mitigation recommendations, but gaps occur, and they often end up getting addressed through the decision makers making modifications. • Mitigation suggestions and effectiveness monitoring (to determine if mitigation is successful or if modifications need to occur), is rarely occurring.
TG8	<ul style="list-style-type: none"> • YESAB recognizes that wildlife needs to be considered and is addressing it effectively on a broad scale. • Specific effects are not determined as well. • Wildlife effects identification does not always translate into regulation. There is often no onus on proponents to do anything, and implementation is often lacking. • The assessment process has improved because there have been stronger ties recently amongst departments.
N1	<ul style="list-style-type: none"> • Wildlife effects assessment occurs on a case-by-case basis. • There are occasions where wildlife effects are addressed, but they don't get addressed well. There are not many guidelines. • There is an attitude that it is just one small project in a vast landscape, and that wildlife can just move around the development. • Assessment also depends on what species is most at risk. If it is a species that people depend on for food, then it is addressed better.
N2	<ul style="list-style-type: none"> • Wildlife assessments are very linear with the consideration of CEA hardly occurring. • There is a lack of consistency for addressing wildlife.
FG1	<ul style="list-style-type: none"> • The effects of wildlife are assessed too generally in the environmental impact assessment process. • Values are assigned for wildlife in the assessment process. • There are some models that look at changes to habitats. • There is not enough wildlife data to address/assess effects more effectively.
FG2	<ul style="list-style-type: none"> • Environmental impact assessments can be very effective for wildlife if done properly.
Y1	<ul style="list-style-type: none"> • The effectiveness of addressing wildlife impacts in the environmental impact assessment process depends on the project, the location, and the impact. • Assessments are only as good as the data that is available. Understanding the significance of effects requires good data. • Most of the effects that are considered are auditory or visual displacement, and lack of habitat/fragmentation.

	<ul style="list-style-type: none"> • Scientific, and local/traditional knowledge is equally important for assessments on wildlife effects. • Overall, considering the large geographic area and small financial and staff capacity, effects on wildlife are considered well. • Projects are piecemeal. It is a first-come first serve basis until the effect is too significant. • In absence of quantitative thresholds, forced to discuss qualitative understanding that threshold has been breached.
Y2	<ul style="list-style-type: none"> • Through the YESAA process, there is a reasonable effort to address project related impacts on wildlife.
3. Do you feel the consideration of cumulative effects on wildlife differs from the consideration of effects on wildlife in environmental assessment generally?	
A1	<ul style="list-style-type: none"> • CEA is something that is always talked about as being important, but does not go further than that. There is no progress or action for CEA. • It is hard to measure CEA. • Two main types of CEA: Landscape level CEA (how much development is too much on a landscape/habitat) and species specific CEA.
A2	<ul style="list-style-type: none"> • The time and spatial scales are different for CEA. • Single project effects are site specific, and are considered in that specific point in time. CEA on the other hand needs to consider the past, present, and potential future. • Death by a thousand cuts. It is important to consider CEA because if you only make decisions on a project by project basis, the effects will add up, changing the ecological system, and will become hard to mitigate.
A3	<ul style="list-style-type: none"> • NA
FN1	<ul style="list-style-type: none"> • The approach to CEA is very general, needs to be approved, and needs to be more future looking. • Provisions in YESAA are quite limiting in terms of what can be considered in the scope of CEA. • It is hard to understand the causal relationships because multiple factors can all affect wildlife populations in an area. • There are concerns for CEA, but the current policies in place encourage people to apply for land in close proximity of nodes (eg. land dispositions). As long as one person gets approved, there is a much more likely chance of another being approved within close proximity.
FN2	<ul style="list-style-type: none"> • Under YESAA, CEA has not been addressed much.
TG1	<ul style="list-style-type: none"> • Currently there is not a great system in place for CEA, but people are working hard on it. • Within the Yukon, there has not been much pressure to do a great job with CEA, but there has been some pressure from recent exploration that has been putting a bit of focus on it. • There is the ability do a good job at assessing the mechanisms that are causing change in a system.

	<ul style="list-style-type: none"> • The assessment body is mandated to consider CEA in their decision process, but departments do not have jurisdictional based decision-making process.
TG2	<ul style="list-style-type: none"> • There is a significant difference with the way they have been addressed. • Everyone is trying to wrap their heads around the concept of CEA and has little experience separating CEA and single project effects. • Best Management Plans are only for single projects.
TG3	<ul style="list-style-type: none"> • Yes there is a difference. Most of the time the impacts of developments are low, so cumulative impacts are hard to determine.
TG4	<ul style="list-style-type: none"> • Understanding CEA on wildlife is a challenge. • YESAB looks at impacts based on a project-by-project basis. To look at CEA, they try to consider the project in a defined area (combined with other current and potential future projects). • It has been recognized that the project-by-project approach does not work for CEA, and that in order to provide more meaningful guidance, a regional approach is needed.
TG5	<ul style="list-style-type: none"> • Yes there is a difference. It is hard to determine what single project is going to push the tipping point.
TG6	<ul style="list-style-type: none"> • Very little practical cumulative effects considered. Statements are made, and there is a need to address this, but YESBAB does not have a way of addressing this right now. • Much greater consideration is given to single project effects. • Range assessments are occurring for individual species, which includes an analysis of habitat requirements and a spatial threshold of development that the species can accommodate before the population feels the effects.
TG7	<ul style="list-style-type: none"> • The consideration of single project effects is done much better than CEA. There have been some recommendations for CEA (mostly in land use plans). • CEA in the Yukon is emerging, not existing. There is work being done to come up with an approach to identify values (which vary from place to place).
TG8	<ul style="list-style-type: none"> • CEA has to be considered under YESAA, but it very hard to address CEA, and no one knows how to do it. • Some branches do not want to deal with CEA because it makes it more challenging to put projects through. • Many people talk about the needs to do CEA, but when it comes to actually doing it, it is not occurring. • Current Range Assessments are looking at CEA by bringing in natural and anthropogenic disturbances together. This type of framework will hopefully become more broadly applicable.
N1	<ul style="list-style-type: none"> • CEA is not being considered (except in some land use plans). • CEA is sometimes brought into an assessment by individuals (often by outfitters).

	<ul style="list-style-type: none"> • Wildlife effects are only being looked at on a project-by-project basis.
N2	<ul style="list-style-type: none"> • Most CEA by YESAB is done qualitatively, weighing input and then making decisions. • Need to start looking at quantity indicators, which could be used to approach assessments more consistently.
FG1	<ul style="list-style-type: none"> • In Kluane, CEA is not being considered. • Older CEA framework for the park has been used for CEA in the Kluane region.
FG2	<ul style="list-style-type: none"> • CEA does not occur enough. CEA statements are dumbed down with little guidelines. • CEA is addressed more for larger projects, but not for smaller ones.
Y1	<ul style="list-style-type: none"> • When they do project effects assessments, often it is the impacts to a population that is considered, which in itself is CEA. • Wildlife effects assessment depends on the species and what the issues are. • CEA has been more easily and frequently done on species that have ranges. • It is meaningless to look at just auditory impacts. • Often will not do a separate CEA because it would be too repetitious. • CEA tries to understand the context of that area and species population within a larger context, trying to understand the significance of the effects. • A highly articulated precautionary approach is taken with CEA.
Y2	<ul style="list-style-type: none"> • There is currently an absence of clear CEA and management process in the Yukon. There are substantial issues to deal with to ensure the long-term sustainability of wildlife populations. • The Yukon is developing a CEAM process.
4. What are some of the obstacles to better assessing environmental effects of projects, plans, etc on wildlife?	
A1	<ul style="list-style-type: none"> • No thresholds determined (societal and biological). • Hard to predict total cumulative impacts. • The lack of baseline wildlife data is an obstacle. • Need buy-in and agreement for effective CEA.
A2	<ul style="list-style-type: none"> • CEA is not explicitly included in the current EIA Framework. • Lack of guidance for effective CEA, which could be linked to political and economic drivers, not wanting to hamper projects from moving forward. • There is a paucity of data that has been collected in a standardized format across the north. Availability of data has also been an obstacle. • There is a strong need for a comprehensive monitoring program, not just in association with individual projects, but to have more comprehensive baseline data. • Data analytical challenge. Need to know how to treat observation data (eg. Lots of observation data along transportation corridors, which may provide false data).

	<ul style="list-style-type: none"> • Lack of mandatory reporting of projects by proponents- challenge for CEA.
A3	<ul style="list-style-type: none"> • Short time frames limit experiments to occur to better determine disturbances. • Too narrow of an assessment scope/focus • Staff often has short contracts, which reduces consistency in assessment and monitoring. • Limited funding. • Long term monitoring data gaps. • Analysis of data.
FN1	<ul style="list-style-type: none"> • There is a significant gap of information on current wildlife populations for a variety of species (even those that are well studied). • Defining spatial boundaries- how broad and where to draw the line? • Responsibility – is it appropriate to link one single proponent to the burden of all future development afterwards? • Absence of completed land use plans (which would help determine thresholds with key indicators). • Feedback and monitoring mechanisms are lacking. Proponents usually only know what they are going to do on a year-to-year basis. To do effective CEA, this information on what is actually being done needs to be known. • Compliance and enforcement of projects- no mechanisms of transparency to see reports. Hard to know what mitigations are recommended by YESAB, if they were followed through, and if mitigation was effective. • Quality of inspections is also questionable. No strong disincentive for proponents to not follow the rules. • Debate over who should be responsible for collecting the data. Most proponents of small-scale developments have the ability or level of knowledge to do or oversee monitoring projects. It should be a Government’s responsibility to have a mechanism for funding monitoring, unless proponent has adequate resources! • Assumptions of effects have been made but not tested.
FN2	<ul style="list-style-type: none"> • Hard to access and find data/information. • Getting traditional knowledge and input from the community is hard because of short time frames. • It is often takes a long time for surveys to receive support to take place. • Wildlife surveys often cost the First Nations a lot of money. • Funding prevents surveys from occurring. • Clarity on what wildlife survey data is going to be used for.
TG1	<ul style="list-style-type: none"> • Wildlife, defined in the wildlife act, does not include many species, such as invertebrates and flora, which is critical to properly assessing CEA. • Yukon looks at biodiversity based on what is invasive, SAR, natural expansion.

	<ul style="list-style-type: none"> • Political will- if there is no push it will not occur. • Awareness of CEA. • Limited time and resources. • Wildlife studies are difficult to organize and fund.
TG2	<ul style="list-style-type: none"> • Human capacity. • Hard to spatially relate information to the project area. • Limited data. • Wildlife surveys are costly and time consuming.
TG3	<ul style="list-style-type: none"> • Lack of baseline data is a huge obstacle. • Proponents do not always know what exactly they are going to do, which makes it hard to determine their impact and CEA. • Lack of mitigation and enforcement. • The time lag between when data is collected and when it is transferred into reports. • Information flow of data to assessors.
TG4	<ul style="list-style-type: none"> • Lack of baseline data that qualifies the value of the land for various species. Makes it hard to know what to protect and how to mitigate effects. • Enforcement of terms is a challenge. Terms and conditions are often recommended and accepted into decision documents, but are not always meaningfully applied and enforced. • Hard to determine thresholds. • Communication of needs- proponents do not always know what YESAB and regulators need. • Baseline data. • How information is organized and shared. • Responsibility debate- who should collect the baseline data, what boundaries can you ask for? Should proponents collect data for other projects because of CEA?
TG5	<ul style="list-style-type: none"> • Short time frames are an obstacle. Not enough time to go through everything in the amount of detail that is needed, especially because of the volume of applications. • Lack of land use planning. • A will to consider CEA- some people just do not care. • Use of the data that does exist.
TG6	<ul style="list-style-type: none"> • There is no commonly agreed upon thresholds of disturbances that would affect species. • Political will to reduce the number of developments. • Addressing CEA for each project would require a lot of time and money. • Land use planning. • Understanding of species and disturbances. It is easier to understand wildlife effects on species that have been heavily studied. • Pressure to monitor wildlife.

	<ul style="list-style-type: none"> • Spatial timing gaps (time specific species timing). • Less support for broader biodiversity studies. • Community support.
TG7	<ul style="list-style-type: none"> • Understanding impacts comprehensively and attributing changes to specific activities (such as harvesting, development, and climate change). • Baseline data. Even though Kluane is heavily studied, still a paucity of data. • Lots of data being collected but no long-term data. • Lack of data management and recorded methodologies. • Accessibility of data is an obstacle. Need a repository for data. • Resource restraints for research and monitoring. • The data that does exist is not always used effectively. • Hard to convince academics and scientists to work on projects more relevant to the needs of the region. • Some data that is being collected is not always useful data. • Resource imbalance of being in a smaller jurisdiction.
TG8	<ul style="list-style-type: none"> • Proponents do not always provide enough mitigation options. • Political will. • Not enough data, or outdated/wrong data. • Lack of certainty about what is actually occurring in approved development. • Inadequate time to collect data, resulting in small snapshots that are usually not seasonally accurate. • Human capacity (numbers, time, and skill). Sometimes people writing the assessments do not always understand the biology of species. • Time ticker of assessments never stops. • Communication of information needs from YESAB to proponents to consultants. • Consultants are not always experienced or have the required knowledge. • Useful data is often expensive to obtain (eg. Radio collars).
N1	<ul style="list-style-type: none"> • The consultants that collect data do not always spend the proper amount of money or time that is needed for adequate data. • The data that is collected is always only on big game species, not on smaller species or plants (which is important for adequately addressing CEA). • EIA process is just a recommendation. There is a lack of effort put into it. • Baseline data gaps.
N2	<ul style="list-style-type: none"> • Lack of wildlife data. • Expensive and time consuming to assess many of the wildlife populations. • No management plan for certain species.

	<ul style="list-style-type: none"> • First Nations do not always reveal their actual harvest numbers.
FG1	<ul style="list-style-type: none"> • Tools exist elsewhere (such as B.C) but info for base layer data has gaps. • Initiatives are lacking (eg. no land use planning in region). • Current Government. • Getting people to submit data on their harvests within the park. • Finding a meaningful way to get people (Especially First Nations) to share information. • Budget limits to fill data gaps. • Harvesting data gaps. • It is hard to get people engaged/interested to volunteer their time in citizen science data collection. • Species usually only studied when they are species at risk.
FG2	<ul style="list-style-type: none"> • Base layer data has gaps. • No land use planning. • Political will/spending/focus. • Getting individuals to submit their harvest data within the park. • Finding meaningful ways to get people to share information. • Budget limits to fill data gaps.
Y1	<ul style="list-style-type: none"> • Staffs switch over too frequently- lack of consistency in assessment, methodologies and monitoring. • Not having up-to-date or enough wildlife data. • There is data, but it is not always provided to assessors. • Human and financial limitations. • Obstacles to doing fair and long-term CEA. Need to think about what you want it to look like. It is better done not only in the EA process, but outside it too, so you can see how the EA fits into it.
Y2	<ul style="list-style-type: none"> • Investment of baseline data. • Human capacity. • Follow-up monitoring is limited. Limited efforts to test effectiveness of mitigations that were imposed as a result of assessment and licensing process. • Governance question- who is responsible for CEA and management? Assessment agencies? Regulators? Industry? All the players together? • Baseline data acquisition- it is not reasonable to impose burden of acquiring baseline data on a regional scale on a single proponent. But it should also not be the public who pays. • No focus on follow-up monitoring and adaptive management. • Adaptive management seems to be only applied in the assessment process to deal with uncertainty. It should be used to test effectiveness, and then have an adaptive management plan that kicks in if not effective. • Knowledge gap. • Some wildlife key areas data is based on data that is over 40 years old.

5. Are there specific data sets relevant to wildlife that you are aware of, past or ongoing, that could be better used to support addressing environmental effects?	
A1	<ul style="list-style-type: none"> • Digitalized seasonal ranges of caribou. • The global climate datasets could be expanded for the Yukon Territory.
A2	<ul style="list-style-type: none"> • There is a lot of research being conducted from people outside of the Yukon that could be better assessed. Information is not always given back to the community. This is more acute in the Yukon because it is far away from most researchers home base. It is often too expensive to come back to the north to engage people in research results. Sending a report coupled with a webinar could be useful. Follow-up mechanisms could be built into the Yukon Science Permitting process to ensure information is provided back. • Efforts such as Natureserve is trying to collect some of this missing data. • Compiling data at broader scale could be useful. • The data collected by consultants could be better used and worked into the permitting process that the data and reports are archived. • Citizen science data (such as bird club and eBird could be better tapped into). • The knowledge of people living and working on the land (trappers, outfitters). • First Nations traditional knowledge (through citizen science).
A3	<ul style="list-style-type: none"> • No answer provided.
FN1	<ul style="list-style-type: none"> • There are aerial surveys conducted periodically (snapshots in time) to map wildlife key areas and the health of populations. They are not usually useful for project specific applications.
FN2	<ul style="list-style-type: none"> • Land registry system. • Harvesting toolbox is being developed to capture harvesting and wildlife surveys. Could be used to generate reports. • Yukon Government has wildlife key area maps and wildlife surveys. • It would be useful to gather Traditional Knowledge into a database.
TG1	<ul style="list-style-type: none"> • Indicator species review of habitat requirements and selection. • Long-term datasets are available for moose, caribou, elk, bears, sheep, goats, bison, and wolves. • There are a variety of resource and habitat models to determine key needs. • Population-trend analysis could be used to assess industrial effects. • Kluane Ecological Monitoring Program data. • Contractor data. • Citizen science data needs to have quality control to be used.
TG2	<ul style="list-style-type: none"> • Wildlife key areas database (Territory wide) – online access although not fully comprehensive. • Wildlife data from regional biologists. • Consultant data could be better used.
TG3	<ul style="list-style-type: none"> • Wildlife key areas database.

	<ul style="list-style-type: none"> • Rare species database. • Local knowledge surveys.
TG4	<ul style="list-style-type: none"> • Data from researcher projects.
TG5	<ul style="list-style-type: none"> • Historic data could be better used. • Existing data could be framed differently to be more useful.
TG6	<ul style="list-style-type: none"> • Wildlife key area databases could be better used. • KEMP data needs to be as relevant to management as possible. • Monitoring can look at cycles. • Broader info can be used if standardized.
TG7	<ul style="list-style-type: none"> • Indicators from the forestry plan (community-directed planning process). There are 96 indicators. • Citizen science could be better used. • Local knowledge surveys. • Conservation Data Centre is useful although not comprehensive. • Students working on local research projects have data that could be tapped into.
TG8	<ul style="list-style-type: none"> • Past data is being used as effectively as possible.
N1	<ul style="list-style-type: none"> • RCMP Reports. • Christmas Bird Counts and Yukon Bird Club observation data. • Wildlife photographs from local citizens.
N2	<ul style="list-style-type: none"> • Yukon Biodiversity Database (public can submit data/observations). • Road kill and roadside wildlife data. • Traditional Knowledge could be better used. • Northern Climate Exchange data. • Citizen science. • Trail camera data. • Researcher data. • Outfitters and other organizations have data that could be used.
FG1	<ul style="list-style-type: none"> • Long-term park monitoring data on Dall Sheep, Moose, mountain goats, and kokanee. • Regional Surveys that are being done outside the park are valuable. • Observation data from the people who are well connected to the land. • Christmas bird counts. • Harvesting data gaps.
FG2	<ul style="list-style-type: none"> • Traditional knowledge. • Data from outside the park.
Y1	<ul style="list-style-type: none"> • First Nations data.
Y2	<ul style="list-style-type: none"> • Wildlife Key Areas. • Conservation Data Centre. • Ecological Land Classification System. • Wildlife habitat type as census data.
6. Are there data gaps around wildlife and their habitats that should be priorities for addressing?	
A1	<ul style="list-style-type: none"> • There is a need to monitor species and ecosystems throughout their

	<p>cycles. How you should manage a species that is on the incline is different than how you should manage on the decline.</p> <ul style="list-style-type: none"> • Annual variability data (full seasonal monitoring).
A2	<ul style="list-style-type: none"> • Basis and consistent monitoring that is not focused on utilitarian values. • Comprehensive baseline data – basic and consistent. It has been patchy in space and time, and a response to particular management needs. • Data to make reliable harvest or population dynamic predictions. • Wildlife camera data. • Wildlife data collected by college programs. • Condition, spatial, frequency and distribution wildlife data.
A3	<ul style="list-style-type: none"> • The smaller components of boreal forest health. • Indicator species monitoring (over broad scale). • Harvest data. • Long-term data.
FN1	<ul style="list-style-type: none"> • Behavioral studies on wildlife are needed. • Project specific monitoring activities or studies that look at a specific issue (such as forestry). • Local-based observations. • Other techniques, such as wildlife cameras along trails.
FN2	<ul style="list-style-type: none"> • Traditional knowledge.
TG1	<ul style="list-style-type: none"> • Detailed time and space scale relationships to do true linkages. • Spatially distributed monitoring program to determine drivers of change and if they are spatially related. • Small mammals and their food sources monitored annually to determine associations of likely causes of change.
TG2	<ul style="list-style-type: none"> • A data gap analysis is needed. • Seasonality monitoring.
TG3	<ul style="list-style-type: none"> • Surveys on non-hunted species. • Current data on some game species.
TG4	<ul style="list-style-type: none"> • Data in non-wildlife key areas.
TG5	<ul style="list-style-type: none"> • Data on species interactions.
TG6	<ul style="list-style-type: none"> • Data on non-consumptive species. • Data on biodiversity.
TG7	<ul style="list-style-type: none"> • Directly applicable Kluane Lake Research Station studies for the Kluane region. • Traditional knowledge data.
TG8	<ul style="list-style-type: none"> • Broad scale wildlife distribution data (long-term). • Wildlife demographic data. • More information on disturbance factors.
N1	<ul style="list-style-type: none"> • Smaller species and plants. • Wildlife outside of Kluane National Park and Reserve.
N2	<ul style="list-style-type: none"> • Relevant research by students (that fits the needs of regional biologist).
FG1	<ul style="list-style-type: none"> • Stronger classification of vegetation in the Territory and Kluane

	<p>National Park and Reserve.</p> <ul style="list-style-type: none"> • Habitat studies of animals inside and outside of the park. • Population data on highly focused species (such as moose). • Larger spatial surveys of wildlife within Kluane National Park and Reserve. • Population data on smaller species. • Distribution data on species within the landscape.
FG2	<ul style="list-style-type: none"> • Data on the effects of wildlife along the border of the park. • Traditional knowledge.
Y1	<ul style="list-style-type: none"> • Harvest data. • Moose surveys along the highways (especially where land depositions are occurring).
Y2	<ul style="list-style-type: none"> • Linear density data. • More current wildlife data.
7. Are there particular policy or legislative gaps around wildlife effects assessment that need to be filled? If so, do you have any suggestions for how best to do it?	
A1	<ul style="list-style-type: none"> • No answer provided.
A2	<ul style="list-style-type: none"> • Development of a policy around CEA and a regulatory framework that supports it. Framework needs to be flexible. • Adaptive management to improve information base, make more informed decisions, and have a system that is more reliable and responsive. • Disconnect between claim staking process, what is allowable under Class 1 activities, and what is being done to set guidelines for surface and linear disturbance. • No mechanism once an area has been staked to then stop once a level that is not sustainable has been reached.
A3	<ul style="list-style-type: none"> • Mechanisms to ensure that mining companies pay for wildlife data collection and monitoring. • Enforcement and funding for data collection and monitoring. • Taxing visitors (with money going to wildlife monitoring).
FN1	<ul style="list-style-type: none"> • Provisions under Section 42 of YESAA are limiting. • Resource royalties need to be reviewed to ensure that the real costs of resource extraction and use are reflected in royalties. • There is currently no feedback for addressing key issues and costs associated with resource development to First Nations royalties. • There are limitations on the scope of wildlife studies when all parties get together because there is a sense that these plans should not be making definitive statements about how certain resources should be developed. • There is a discomfort in having a mandate in Renewable Resource Councils, First Nations, and representatives from Environment Yukon to make explicit statements about development limits. They only provide guidelines and recommendations, therefore utility of plans often come into question.

FN2	<ul style="list-style-type: none"> • There is not a Kluane First Nation wildlife policy (draft form only). • The Fisheries Act use to shut down proposals but is not around anymore.
TG1	<ul style="list-style-type: none"> • The species indicators that are always selected are the high-valued wildlife species, which may not always be the best species to assess. CEA needs to cover a broader range of species as indicators. • Need a CEA framework in place.
TG2	<ul style="list-style-type: none"> • Policies could be improved to protect habitats, especially sensitive habitats. • Policies reflect current Government. • Best management practices – gaps need to be assessed.
TG3	<ul style="list-style-type: none"> • Wildlife terms and recommendations in an assessment do not always get put into permits. If they do, they are often not enforced. • There is no policy for defining certain conditions (such as harassing wildlife, disturbing dens, etc.). • Regional land use plan.
TG4	<ul style="list-style-type: none"> • There is a disconnect between the EIA process. • Terms and conditions accepted out of a decision document may not make its way to a permit. If it makes it to a permit, enforcement often does not occur. The enforcement agent may not have the power to enforce around wildlife and often feels that wildlife is not their job, but the responsibility of the Conservation Officers.
TG5	<ul style="list-style-type: none"> • Kluane region lacks a land use plan.
TG6	<ul style="list-style-type: none"> • Could have more specific limitations and regulations on the types of disturbances that can happen in specific areas. • Species at Risk legislation is still in the works. • Wildlife effects assessments are often traditional territory based. • Broader species planning is needed. • Not much political interest in getting the three First Nations in the Kluane region together for annual gatherings.
TG7	<ul style="list-style-type: none"> • There is a fundamental misunderstanding about what each board and department does.
TG8	<ul style="list-style-type: none"> • No political will to address the human capacity gap. Can be frustrating for proponents and for employees, as information is not attained fast enough.
N1	<ul style="list-style-type: none"> • YESAB should formally address CEA. • Institutional conflict between YESAB recommendations and the Yukon Territorial Government as a decision body. • Land use planning. • No Species at Risk Act.
N2	<ul style="list-style-type: none"> • There is no one within the city that looks primarily at habitat and wildlife impacts.
FG1	<ul style="list-style-type: none"> • No CEA initiatives to fill data gaps.

	<ul style="list-style-type: none"> • A land use plan (land use designations) would allow a clearer understanding of overall wildlife impacts within land use designations. • Different departments are often disjunctive from one another. Hard to therefore determine where the cumulative impacts are coming from.
FG2	<ul style="list-style-type: none"> • Assessments have had to become more scientific because of funding cuts. Have had to shift towards assessing a population and using models of statistics with less frequent data. • The effectiveness of comment submissions is not consistent. It depends on how specific people feel about the species and area.
Y1	<ul style="list-style-type: none"> • Lack of collaboration between Governments, boards, departments and YESAB. • Assessments are project specific, so less public comments than on bigger picture management objectives. • Tries to address CEA comments, but it is still done on a piecemeal basis. • There are not enough up-to-date discussions on what disturbance is acceptable by people.
Y2	<ul style="list-style-type: none"> • Cooperation between departments, boards, YESAB, and proponents to refine and transfer data and to communicate data expectations. • Draft wildlife guide in in process (non-enforceable). • No one owner of follow-up monitoring. • The EIA process is segmented-- independent assessor, regulatory agency, separate compliance and monitoring unit. • No one place for data. If the data collection is a proponent requirement built into license, the data will come back to regulator, but what does regulator do with this data?
8. Are there particular planning or assessment processes or Boards that could have a stronger role in assessing or monitoring cumulative effects on wildlife? What could these roles look like?	
A1	<ul style="list-style-type: none"> • No answer provided.
A2	<ul style="list-style-type: none"> • Wildlife management boards would need to play a role in engaging communities if there was a push to develop more citizen science initiatives (providing information and contributing to the monitoring).
A3	<ul style="list-style-type: none"> • They do not have the power to do anything substantial because they have limited capacity. • Parks Canada could do more monitoring.
FN1	<ul style="list-style-type: none"> • Wildlife management and research is well defined through treaty process, therefore there is a key role for councils and boards to make recommendations to YESAB. • Could play a role in developing a wildlife management plan for their traditional territory. • If boards and councils tried to do everything that they were mandated to do, they would not have the resources to do it.
FN2	<ul style="list-style-type: none"> • Councils and boards could respond more to applications. • They are not as familiar with the YESAB process.

TG1	<ul style="list-style-type: none"> • YESAB has a mandated responsibility, but as an assessment body they have not undertaken a role of assessing in a scientific structural way. • YESAB is relying on data from various departments to give them an idea of what could be a problem. They do not have a rigid framework to follow.
TG2	<ul style="list-style-type: none"> • Final agreements have spelled these roles out quite clearly and well.
TG3	<ul style="list-style-type: none"> • Role of First Nations Governments and Renewable Resource Councils could be expanded, but they are limited by capacity.
TG4	<ul style="list-style-type: none"> • No answer provided.
TG5	<ul style="list-style-type: none"> • Councils and boards usually just take their local knowledge, and are asked to make assessments without having the best background knowledge.
TG6	<ul style="list-style-type: none"> • Need to educate Renewable Resource Councils so that greater biodiversity needs can be accepted by communities. • Shared role between Renewable Resource Councils and Fish and Wildlife Board that has been working fairly well. • Renewable Resource Councils are focused more on traditional territory needs, while Fish and Wildlife Board is broader. It is always interplay to determine if one issue is a broader Yukon issue or specific issue. • They need to come up with work plans through planning with partners to effectively gauge the interests of the public. • They can find effective ways to integrate community interests.
TG7	<ul style="list-style-type: none"> • There are a ton of Government structures, but they are all hampered by resource restraints. • Need more science and technical focus. • Boards could communicate information needs to broader research community.
TG8	<ul style="list-style-type: none"> • Stronger cooperation between departments, contractors, and proponents.
N1	<ul style="list-style-type: none"> • Boards could integrate more information into an EIA eg. Climate change and pollution. • Yukon College could provide more climate change data into EIA • If YESAB were less of a recommendation body it could have more impact.
N2	<ul style="list-style-type: none"> • Structure exists from UFA, but it is still fairly new.
FG1	<ul style="list-style-type: none"> • There are a lot of organizations with interests in the region. • Champagne and Aishihik First Nations and Kluane First Nation have the ability to do surveys and collect data.
FG2	<ul style="list-style-type: none"> • The Yukon has a good template of boards and councils. It is a good ground up approach.
Y1	<ul style="list-style-type: none"> • No problem with YESAB. It has tried to be the venue for land use planning, but is not the substitute. • Renewable Resource Councils burn out and comment on the things that seem the most important.
Y2	<ul style="list-style-type: none"> • Yukon Fish and Wildlife Management Board and other assessors are

	<p>often challenged to understand what else is going on in regional context of project. No good means of tapping into knowledge base of Renewable Resource Councils.</p> <ul style="list-style-type: none"> • More emphasis is needed on Renewable Resource Councils and the Fish and Wildlife Board.
9. Are there particular needs for coordination and integration of assessment and monitoring efforts around wildlife in the Yukon?	
A1	<ul style="list-style-type: none"> • Community monitoring could help.
A2	<ul style="list-style-type: none"> • Individuals working on the land (eg. conducting surveys) could be required to record GPS coordinates of wildlife observations while in the field. • A standardized set of information needs to be collected (mandated to build a picture that allows CEA to be addressed over large areas). • Mandatory reporting of projects. • Opportunity for the interaction and outreach of researchers. Mechanism for researcher to send a report coupled with a webinar could be useful to disseminate data. • Encouraging more citizen science, encouraging industry, First Nations, etc. to fill gaps (with funded effort). Could reduce costs of CEA. • Opportunity to coordinate data collection that is occurring -- especially from consultants.
A3	<ul style="list-style-type: none"> • Government needs to allocate more money towards monitoring. • Need an institutional way of keeping monitoring methodologies going. • A need to integrate First Nations into local monitoring programs. • A need to coordinate between data collectors and assessors. Permits of scientists need to ensure result reports are provided. • Database for data with a data manager. • Long-term research/monitoring commitments from student researchers, consultants, Government.
FN1	<ul style="list-style-type: none"> • There is a need for individuals who are willing to initiate or continue long-term wildlife monitoring and data collection in the area. • There have been issues where monitoring/data collection that is taking place in the traditional territory is unknown to the First Nation, creating trust issues. • Challenges of working with research community- social dimension of research in the area. Healing needs to occur. • Strong interests to increase the knowledge of First Nations and share with people who can help them understand what is going on. • Ethical guidelines for researchers in the north (require close work with First Nations), however reality is that sources of funding cannot support that amount of work. Short-term researchers just go and write up their findings- and there often is not a long-term community connection. This connection is needed. • Need more local knowledge-based stewardship monitoring activities. Currently decisions tend to be based on expert science knowledge.

	<ul style="list-style-type: none"> • First Nations need to collaborate more with these community organizations.
FN2	<ul style="list-style-type: none"> • CEA is new, therefore coordination is needed.
TG1	<ul style="list-style-type: none"> • Communication and interpretation of raw data is needed to help determine impacts.
TG2	<ul style="list-style-type: none"> • There is a need for increased communication between departments, communities, and boards.
TG3	<ul style="list-style-type: none"> • Lots of consultants collecting data for industry and Government. Could have terms and conditions on these contracts to put the data into a repository. • There is a need for coordination because not much monitoring occurs.
TG4	<ul style="list-style-type: none"> • A need for how coordination of information is organized and shared. It is not currently standardized. Proponents may not follow the same methods that the departments use.
TG5	<ul style="list-style-type: none"> • Better coordination with Parks Canada is needed as they can often make the EIA process more complex. • Increased literacy on CEA would be helpful.
TG6	<ul style="list-style-type: none"> • Finding ways to integrate traditional knowledge and engage local people into science.
TG7	<ul style="list-style-type: none"> • There is a mismatch between the science that is being done and the applied science that is targeted towards decision-making. • Partnerships with non-policy researchers to tie in what people need for decision-making. • Researchers at the Kluane Lake Research Station could work on projects that are more needed for the region. • College could play larger role in collecting data. • There is a need to standardize data collection protocols. • Stronger partnerships needed because of resource imbalance of being in a smaller jurisdiction. • Clearer understanding of values and management objectives of a particular region.
TG8	<ul style="list-style-type: none"> • Stronger communication/coordination between assessors and proponents with respect to what is required for the assessment.
N1	<ul style="list-style-type: none"> • Relationship between hunters and Governments could be improved. • Integration of traditional knowledge. • Experts of certain species could be linked up with Yukon Government.
N2	<ul style="list-style-type: none"> • Outfitters and other organizations could integrate more data into monitoring and assessment.
FG1	<ul style="list-style-type: none"> • Department collaboration is necessary
FG2	<ul style="list-style-type: none"> • Incorporating traditional knowledge. • Cooperation with First Nations and integrating them into local projects.
Y1	<ul style="list-style-type: none"> • Lots of people are collecting data but not much cooperation occurs. Data needs to be collected and given to YESAB. • More communication is needed on effective mitigation approaches.

	<ul style="list-style-type: none"> • Reporting on what is being proposed for assessment and what is actually occurring.
Y2	<ul style="list-style-type: none"> • Partnerships and tools are needed for the acquisition of that data. • There is a need for facilitating communication lines and the transfer of information between departments and boards. • Traditional knowledge integration. • Need to figure out a way to build capacity with an individual First Nations and to document their traditional knowledge and then figure out how to make that available and ensure confidentiality. • Stronger cooperation between proponents and Environment Yukon to refine wildlife datasets.
10. Are there specific assessment or monitoring methods or approaches that could better help scientists and managers address cumulative effects on wildlife?	
A1	<ul style="list-style-type: none"> • Models. • Rigorous parameters for monitoring. • Adaptive approach. • Community observations.
A2	<ul style="list-style-type: none"> • Better spatial data. • Online database with access. • Validation process. • Predictive models for species that keep coming up in assessments. • Standardized baseline monitoring programs.
A3	<ul style="list-style-type: none"> • Developing State of the Yukon Reports. • More basic monitoring programs. • Satellite data (although not always useful). • More human capacity and resources – such as Green teams.
FN1	<ul style="list-style-type: none"> • Recognizing that there are a lot of experts out there. • CEA framework for the region. • Important to identify that Champagne and Aishihik First Nations need to be in a leading position early on, in the designing of this CEA framework.
FN2	<ul style="list-style-type: none"> • Guideline for CEA. • A tool to get people to submit comments in a more effective way. • More buy-in from Government.
TG1	<ul style="list-style-type: none"> • Indicators need to be selected for their relevance of larger food web. • Range planning will give YESAB a scientific framework approach.
TG2	<ul style="list-style-type: none"> • Land use planning can help visualize future states of wildlife. • Habitat protection areas. • Developing management plans with parks. • Integrating more stakeholders in monitoring could reduce CEA costs.
TG3	<ul style="list-style-type: none"> • Land use planning to determine thresholds.
TG4	<ul style="list-style-type: none"> • The draft YESAB wildlife guide that guides proponents on baseline information collection and long-term monitoring planning. • Land use planning (integrative management areas, thresholds).

TG5	<ul style="list-style-type: none"> • More literature. • Rigorous flow chart for managers and assessors. • Integrating an ecosystem services perspective.
TG6	<ul style="list-style-type: none"> • Founding methods that could give reasonable confidence intervals on different things to measure in the environment. • Integrating traditional knowledge to improve statistical models. • Methods that couple science with traditional knowledge can result in more precise scientific data, more understanding by locals, more trust, and support.
TG7	<ul style="list-style-type: none"> • Data warehouse where researchers and assessors can download and upload data.
TG8	<ul style="list-style-type: none"> • A CEA framework.
N1	<ul style="list-style-type: none"> • More monitoring stations.
N2	<ul style="list-style-type: none"> • Identification of indicator species. • Frameworks/models for non-hot spots.
FG1	<ul style="list-style-type: none"> • Gaming/ modeling tool is needed to assess CEA.
FG2	<ul style="list-style-type: none"> • Having proponents do everything up front (proactive, not reactive). • Framework to monitor an increased number of activities within the park. • Mitigation protocols. • CEA report. • Incorporating Risk Assessment models (helps understand CEA).
Y1	<ul style="list-style-type: none"> • Proponent wildlife log books. • GIS tools and staff (spatial analysis). • Qualitative thresholds for different species. • Linear disturbance frameworks to establish parameters. • Updated remote sensing data. • More resources.
Y2	<ul style="list-style-type: none"> • Ecosystem-based mapping project with traditional knowledge Layer. • Centralized database. • Follow-up monitoring.
11. Are there aspects of assessing cumulative effects on wildlife that you feel are particularly well done in the Yukon?	
A1	<ul style="list-style-type: none"> • Caribou in the Yukon.
A2	<ul style="list-style-type: none"> • Some people within the assessment are trying to move CEA forward. • Nothing has been done well anywhere. • Good recommendations coming out of YESAB forum.
A3	<ul style="list-style-type: none"> • No answer provided.
FN1	<ul style="list-style-type: none"> • No answer provided.
FN2	<ul style="list-style-type: none"> • Wellgreen is focusing on this.
TG1	<ul style="list-style-type: none"> • Best caribou CEA work in the country.
TG2	<ul style="list-style-type: none"> • CEA approach at Range Assessments is good, but time will tell if it is effective.
TG3	<ul style="list-style-type: none"> • Strong knowledge of some time-sensitive species, but no data from

	every area.
TG4	<ul style="list-style-type: none"> • White Gold area. • CEA Process Pilot Project to address CEA in areas where there is no land use planning (Dawson study). • Range assessments. CEA on individual species (Caribou).
TG5	<ul style="list-style-type: none"> • CEA is just starting, so not many success stories. • Some good visuals have been produced (like mining road time lapse around Dawson).
TG6	<ul style="list-style-type: none"> • Range Assessments.
TG7	<ul style="list-style-type: none"> • Pilot study around Dawson.
TG8	<ul style="list-style-type: none"> • Range planning frameworks (though only on individual easy species that come in discrete packages).
N1	<ul style="list-style-type: none"> • Aspects of the North Yukon Plan worked well—linear disturbances.
N2	<ul style="list-style-type: none"> • Southern Lakes Caribou recovery plan. • CEA of water has been fairly good in the Territory.
FG1	<ul style="list-style-type: none"> • Within Parks Canada there is ‘FRAGSTAT’ - also used outside of Parks Canada- evaluates changes in the landscape and how that might affect different things (wildlife).
FG2	<ul style="list-style-type: none"> • No, but some of the larger projects seem to have the right approach.
Y1	<ul style="list-style-type: none"> • White Gold (linear disturbances).
Y2	<ul style="list-style-type: none"> • CEAM Process of White Gold Area. • Ross River Ecosystem Based mapping with traditional knowledge overlay. • Ecological Land Classification.