

Cultural and Ecological Value of Boreal Woodland Caribou Habitat

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David
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The Cultural and Ecological Value of Boreal Woodland Caribou Habitat

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Executive Summary

Traditionally, socio-economic assessments related to nature have focused primarily on the potential economic impacts on industry from actions to protect species or habitat. The narrow scope of such analyses reduces the natural world to its value as a resource, and overlooks the ecological and cultural benefits that healthy, functioning ecosystems provide.

Since time immemorial, First Nations have searched out caribou for sustenance and nutrition. Caribou are a cornerstone of their culture and history. Across Canada today, boreal woodland caribou herds share the land with approximately 300 First Nation communities. Thus Aboriginal perspectives and cultural values are essential to determine the true value of this important animal.

Amid overwhelming evidence of the loss of species and wild spaces throughout Canada, a growing chorus of advocates is pushing governments and businesses to broaden the scope of economic assessment in their decision-making.

What is a forest worth? What is the value of naturalized wetlands and shorelines in protecting our coastal communities and marine life? Can you estimate the economic value of a single bee or the cultural value of a caribou in its lifetime?

Until recently, these types of questions were seldom asked, and even more rarely accounted for in decisions about how to manage the growth of our communities and industries. Thus these benefits have been neglected.

However, there is a growing interest in assessing the economic and cultural value of nature by academics, economists, and influential government agencies such as United Nations and World Bank.

This report provides a preliminary discussion of cultural and ecological values related to Canada's boreal woodland caribou, and provides references to existing methodologies for assessing these values.

Based on these findings, the report's co-authors, the David Suzuki Foundation and the Assembly of First Nations, are calling upon decision makers from all levels of government to broaden their approaches to socio-economic assessments to include both cultural and ecological values.

Introduction

The Species at Risk Act (SARA) is unique: it was the first Canadian legislation to acknowledge Aboriginal peoples role in the conservation of species and recognition of Aboriginal Traditional Knowledge. The Act created the National Aboriginal Council On Species At Risk (NACOSAR) to provide advice to the Minister of Environment on the administration of the Act and to the Canadian Endangered Species Conservation Council. The Act also created a sub-committee on Aboriginal Traditional Knowledge to provide input to the assessment process of species status reports completed by the Committee On Status of Endangered Wildlife In Canada (COSEWIC).

Under SARA, the recovery of species at risk is a two-part process. First, Recovery Strategies are developed, which identify both the habitat that is critical to the survival and recovery of a species (called its 'critical habitat,') and mitigation measures for addressing the primary threats facing the species. Action Plans are then developed to implement the recovery measures identified in the Recovery Strategy, leading to the recovery of the species (or multiple species, if a multi-species Action Plan is developed).

For most of Canada's species at risk, the primary means to facilitate species' survival and recovery is habitat maintenance, restoration and protection. This is because for 84% of Canada's species at risk, the primary cause of decline is habitat loss and degradation.¹

As provinces have jurisdiction over their public lands, it is anticipated that provinces will take the lead in Action Plan development. But these Action Plans will have to be SARA-compliant, lest they fail to live up to the standards set by the federal Act and be vulnerable to legal challenge. The Act mandates that Action Plans should be developed in cooperation with every aboriginal organization that will be directly affected by the action plan.²

Section 35 of the Canadian Constitution recognizes and affirms Aboriginal and treaty rights. Canadian case law has further defined the Aboriginal right to fish for food, social and ceremonial purposes in the 1990 Sparrow decision and found that only conservation can take precedent. There has been numerous case law (Delgamuukw, Haida and Taku) that further defined the duty to accommodate and consult with First Nations.

¹ Venter, O. Brodeur, N., Nemiroff, L., Belland, B., Dolinsek, I.J. & Grant, J.W. "Threats to Endangered Species in Canada," 56 Bioscience 903 (2006).

² SARA, section 48.1

The Action Plan is mandated to include a statement of the measures that are proposed to be taken to protect the species' critical habitat, and an evaluation of the socio-economic costs of the action plan and the benefits to be derived from its implementation. (Note that socio-economic considerations are NOT a part of the Recovery Strategy process, as the identification of critical habitat is intended to be informed by science and traditional ecological knowledge, not socio-economic values.)

Traditionally, socio-economic impact assessments related to species and habitat protection have focused primarily on the potential economic impacts to industry from species or habitat protection. Very rarely are the cultural or ecological benefits of habitat maintenance, protection or restoration taken into account.

For example, despite an independent scientific assessment that the Okanagan Chinook Salmon was threatened with extinction, and the input from Aboriginal groups and the David Suzuki Foundation that the non-market value of the salmon be taken in to account,³ the Minister of the Department of Fisheries and Oceans (DFO) recommended that the species not be added to the SARA list due to an analysis that focused on economic impacts.

The narrow scope of such analyses reduces the natural world to its value as a resource, and overlooks the ecological and cultural values that these healthy ecosystems provide.

The David Suzuki Foundation and the Assembly of First Nations are calling upon governments to broaden their approaches to socio-economic valuation, to ensure that the assessments include both cultural and ecological values.

This report, although by no means conclusive, outlines some of the cultural and ecological values that could be assessed in the Action Planning process for boreal woodland caribou, and provides references to existing methodologies for assessing these values.

³ The Regulatory Impact Assessment Statement under the SARA states: 'Both stakeholder groups expressed their belief that the potential socioeconomic impacts on their sectors had been underestimated. In contrast, feedback and consultations with ENGOs such as the David Suzuki Foundation and Aboriginal groups such as the Okanagan Nation Alliance revealed their belief that the estimated socio-economic costs of listing were too high and the non-market valuation too low.' (2009, Canada Gazette Part I Vol. 143, No. 49, http://www.registrelep-sararegistry.gc.ca/virtual_sara/files/orders/g1-14349ii_e.pdf)

Cultural and Ecological Values Defined

Types of cultural values

Cultural values are a set of values shared and defined by a group or community.⁴ The values themselves derive their meaning from this particular group or community, and whether First Nation or Canadian, they are spoken in a particular language, and are based in a specific local context. Cultural values are the foundation of a community's identity, comprising their language, knowledge, practices, relationships, wellness, cultural products and laws.⁵

For First Nations, these features are interrelated in the deepest of ways, and are often referred to as Aboriginal Traditional Knowledge (ATK) or Traditional Ecological Knowledge (TEK). The meaning of a particular value will change from community to community and within a community, from person to person. As a result, assessing these cultural values, due to their very community specific nature, requires a process of dialogue and consultation with the local communities.

Many of the features understood to be cultural values are often associated by researchers only with those features distinct from economic, environmental or social values, rather than holistically.

Additionally, cultural values are sometimes reserved only for the values thought to be unique to First Nation people, such as ceremonial practices;⁶ whereas a practice such as hunting can be lumped in with recreational or commercial hunters. A subsistence hunter, however, will have different values and will no doubt incorporate a variety of interrelated values into his or her understanding of this activity. Hunting is often integral to many First Nations as much for its role in strengthening knowledge and relationships, as for providing nutrition and recreation.

While many cultural values can be considered tangible, meaning that they are measurable through economic measures, still more cultural values are intangible, meaning that they can only be measured with indirect techniques and in some cases are not measurable at all. As many Aboriginal communities will articulate the inter-related nature of their cultural values, many values will be both tangible and intangible. To help distinguish between the two and provide guidance on the appropriate methodology, categories are used. The

⁴ Stephenson, Janet, 2008. The Cultural Values Model: An integrated approach to values in landscapes. *Landscape and Urban Planning* 84: 129

⁵ Beverly and Qamanirjuaq Caribou Management Board, 2008. Economic Valuation and Socio-Cultural Perspectives of the Estimated Harvest of the Beverly and Qamanirjuaq Caribou Herds. Winnipeg, Manitoba: 11

⁶ Jackson, S., 2006. Compartmentalising Culture: The Articulation and Consideration of Indigenous Values in Water Resource Management. *Australian Geographer*, 37(1): 26

cultural heritage value system,⁷ for instance, includes both economic and cultural values as part of cultural heritage. Economic values in this sense are captured by different economic valuation techniques, whereas cultural values require a combination of techniques and may not be as easily calculated. This system adapts broad categories of cultural values that suit cultural heritage sites, such as:⁸

- Aesthetic value
- Spiritual value
- Social value
- Historical value
- Symbolic value
- Authenticity/integrity value

Other researchers have noticed additional values⁹ such as: human health, recreation, inspiration, knowledge, existence, sense of place and relationship, sense of reciprocity and reconciliation.

Types of ecological values

Natural capital is a term that refers to the Earth's land, water, atmosphere and resources. This capital is organized and bundled within the earth's natural ecosystems. Ecosystems provide numerous resources and services such as the regulation of water through the storage of floodwaters in wetlands, and clean air undertaken by trees that filter or absorb pollutants. These services are essential to life on earth, however, because we do not pay directly for them, our market economy does not assign value for them. As a result, although human life and societies depend on the ability of the natural environment to function, ecosystems and the services provided are generally not monitored, measured, nor accounted for in decision-making and land use planning. Losses in natural capital result in economic impacts that threaten health, food production, climate stability and basic needs such as clean air and water.

Ecosystem services (ES) are the benefits derived from ecosystems. These benefits are dependent on ecosystem functions, which are the processes (physical, chemical and biological) or attributes that maintain ecosystems and the people and wildlife that live within them. ES can include products received from ecosystems (e.g. food, fibre, clean air and water), benefits derived from processes (e.g. nutrient cycling, water purification, climate regulation), and non-material benefits (e.g. recreation and aesthetic benefits).

⁷ Zhang, Yan. 2010. Rethinking Cultural Heritage: Valuations and Dilemmas:3

⁸ Throsby, D., 2001. Economics and Culture. Cambridge, Cambridge University Press: 209

⁹ Verschuuren, Bas. 2006. Sociocultural Importance of Wetlands in northern Australia. *In* Conserving Cultural and Biological Diversity: The Role of Sacred Natural Sites and Cultural Landscapes. Tokyo, Japan: 6

The Economics of Ecosystems and Biodiversity (TEEB) – an international initiative led by the United Nations, the European Commission, and the German and UK government - has developed a state-of-the-art foundation to link economics, society and ecology.¹⁰ The 2010 TEEB framework emphasizes the difference between ecological phenomena (functions), their contribution to human well-being (i.e., services) and the welfare gains they generate (i.e., benefits; Table 1). As a subset, cultural services include aesthetic information, recreation and tourism, culture and art, spiritual experience and education. This category has been well explored in the preceding sections.

Table 1: Typology of Benefits from Ecosystem Services

Provisioning Services/Benefits	Regulating Services/Benefits	Habitat Services/Benefits	Cultural Services/Benefits
Food Water Raw materials Genetic Resources Medicinal resources Ornamental Resources	Air quality regulation; climate regulation; moderation of extreme events Regulation of water flows Waste treatment Erosion prevention Maintenance of soil fertility Pollination Biological control	Maintenance of life cycles of migratory species Maintenance of genetic diversity	Aesthetic information Opportunities for recreation & tourism Inspiration for culture, art, and design Spiritual experience Information for cognitive development

The value of goods that have a market-determined price such as timber can be valued based on this market price, however, determining the non-market ecological values for ecosystem services is much more difficult because they do not have an established price. There are several techniques that have been developed to determine economic values for non-market ecosystem services (or ecological values). These include:

- 1) direct market valuation approaches such as market-based, cost-based, and production-based valuations;
- 2) revealed preference approaches such as travel cost and hedonic pricing methods; and,
- 3) stated preference approaches such as contingent valuation, choice modeling, and group valuation methods.¹¹

¹⁰ <http://www.teebweb.org/Home/tabid/924/Default.aspx> (accessed June 2010)

¹¹ Pascual, U., and Muradian, R., 2010. "The Economics of Valuing Ecosystem Services and Biodiversity." (Chpt. 5) in: The Economics of Ecosystems and Biodiversity: The Ecological and Economic Foundation. <http://www.teebweb.org/EcologicalandEconomicFoundation/tabid/1018/Default.aspx> (accessed Aug. 2010)

Direct market valuation methods use data from actual markets and thus reflect preferences or costs to individuals, such as the avoided environmental, economic and social costs when an ecosystem or service is protected. Revealed preference techniques are based on the observation of individual choices that are related to the ecosystem service under study, such as how much an individual or household spends on travel to experience a natural area. Stated preference methods simulate a market and demand for ecosystem services using surveys providing hypothetical scenarios of changes in the supply of ecosystem services. These surveys assess the willingness to pay for or accept compensation for a good or service, such as how much a household is willing to pay for the protection of a specific natural area or species.

Boreal Woodland Caribou in Canada

Boreal woodland caribou--a shy and highly secretive animal that live in the boreal forest—are in trouble.

This report focuses on the ecological and cultural values of the critical habitat for boreal woodland caribou as they are dependent upon healthy, intact forest ecosystems—the loss and fragmentation of which has led to their imperiled status.

Under the SARA, boreal woodland caribou are assessed as threatened with extinction nationally. To date, boreal woodland caribou have lost more than half of their historic extent of occurrence on the continent.¹² Across Canada-- ranges of threatened boreal woodland caribou exist in British Columbia, the Yukon, the Northwest Territories, Alberta, Saskatchewan, Manitoba, Ontario, Quebec and Labrador—boreal caribou have receded from the south, coincident with the expansion of development such as roads and the impact from industrial resource extraction operations.¹³

As mentioned above, the primary cause for the decline of boreal woodland caribou is habitat loss and fragmentation,¹⁴ which leads to increased predation, caused by roads and by changes in forest composition and age class (after forests have been impacted by industrial activity, regrowth attracts deer and moose, which attract predators like wolves--indiscriminate in the prey that they kill.)¹⁵

The trends in caribou populations are, at present, deeply worrisome: boreal woodland caribou are expected to be virtually extirpated from Alberta in less than forty years and from Ontario by the end of the century if status quo industrial operations and the pace of

¹² Hummell, Monte, and Ray, Justina, *Caribou and the North: A Shared Future*, Dundurn Press, Toronto, 2008, p. 229.

¹³ *Ibid.* (Hummell, Monte, and Ray, Justina, *Caribou and the North: A Shared Future*, Dundurn Press, Toronto, 2008, p. 229.)

¹⁴ COSEWIC status report

¹⁵ Hummell, Monte, and Ray, Justina, *Caribou and the North: A Shared Future*, Dundurn Press, Toronto, 2008, p. 229.

industrial expansion into intact habitat continues.¹⁶ Unless there are significant efforts made to maintain, protect and restore boreal forest ecosystems in Canada's provinces and territories, boreal woodland caribou face a highly uncertain future; at present, less than half of the ranges of boreal woodland caribou identified by Environment Canada have over a 50% probability of persisting in 100 years.¹⁷

The Cultural Value of Boreal Woodland Caribou and Caribou Habitat for First Nations in Canada

Background

The boreal woodland caribou herds¹⁸ share the land with approximately 300 First Nation communities.¹⁹ First Nation linguistic groups that co-exist with woodland caribou habitat include:

- Abitibiwinni, Bush Cree
- Eastern Montagnais
- East Swampy Cree
- Innu, James Bay Cree
- Moose Cree
- Muskwacis Cree
- Ojibwe, Oji-Cree
- Plains Cree
- Plains Saulteaux
- Rocky Cree
- Saulteaux
- Western Montagnais
- West Swampy Cree
- Labrador Inuit
- Dunne-za
- Dene-Tha
- Decho Dene

¹⁶ Hummell, Monte, and Ray, Justina, *Caribou and the North: A Shared Future*, Dundurn Press, Toronto, 2008, p. 233.

¹⁷ Environment Canada, 2008. *Scientific Review of Critical Habitat for Woodland caribou (Rangifer tarandus caribou)*, Boreal Population, in Canada. Environment Canada, Ottawa, Ontario, vi

¹⁸ Environment Canada, 2008. *Scientific Review of Critical Habitat for Woodland caribou (Rangifer tarandus caribou)*, Boreal Population, in Canada. Environment Canada, Ottawa, Ontario: 19

¹⁹ Canada Lands Survey System, 2009. *Canada Lands in Google Earth*. Accessed on November 10, 2010. <http://clss.nrcan.gc.ca/data-donnees-eng.php>

- Sahtu
- Tlicho
- Chipewyan
- Gwich'in
- Hare.²⁰

For many of these groups boreal woodland caribou has many different meanings: as food, as spiritual ancestor, as a gift from the creator, as a totem spirit and as a neighbor. The caribou has recently become an important species for other peoples as well, and conservation efforts are increasingly including, if not featuring, caribou in their plans. As such, the numerous Aboriginal perspectives and their cultural values are essential to determine the true value of this important animal.

Environment Canada approached the National Aboriginal Council on Species At Risk (NACOSAR) in 2009 for suggestions on the inclusion of ATK into the recovery strategy required under SARA for the boreal woodland caribou. NACOSAR suggested that each of the National Aboriginal Organizations (Assembly of First Nations, Metis National Council, Inuit Tapiriit Kanatami, Native Women's Association of Canada and the Congress of Aboriginal Peoples) should nominate individuals to an Aboriginal Advisory Group (AAG) to provide advice to Environment Canada on the preparation of a national recovery strategy. Environment Canada underwent regional information sessions with First Nations advice and input into the national recovery strategy.²¹

First Nations' Cultural Values Relating to Boreal Woodland Caribou

First Nations have many cultural values ascribed to boreal woodland caribou. This section describes some of these cultural values, and presents methods for their valuation.

Overall, First Nation cultural values must be evaluated through a combination of economic and descriptive methods in order to avoid underestimating or excluding intangible values.²² The various value systems tend to have a specific focus and are applicable to their particular context only, and require adaptation in order to meet the needs of Aboriginal communities.

Aboriginal communities in Canada though, have begun to articulate their own cultural values and relationships, such as with woodland caribou and the land. These relationships

²⁰ Environment Canada, 2008:19; and Strome, Bryan, 2010. Directory of North American Indian Portal Websites: Nations Grouped Linguistically. Accessed on November 10, 2010. <http://www.firstnationsseeker.ca/>

²¹ See the results at: http://www.sararegistry.gc.ca/document/default_e.cfm?documentID=2306

²² Zhang, 2010:13

can be found in land-use plans, community visions, and co-management plans.²³ These variable resources also offer a sense of the diversity of perspectives across Aboriginal communities in Canada.

The following is a preliminary summary of seven values associated with caribou and where possible, the methods of determining their monetary or relative worth.

1. Subsistence

“The value of caribou consumed for subsistence has not been precisely calculated for each of the northern territories, but is probably in the realm of tens of millions of dollars per year.”²⁴

Since time immemorial, First Nation hunters have searched out caribou for sustenance and nutrition. Despite early predictions that this cultural practice would disappear, First Nations continue to hunt for a source of food,²⁵ even with accessible protein at the local store. Many remote Northern First Nation communities due to the high cost of store bought foods rely on hunting for subsistence. While generational disparities in the harvest of wild foods do exist, with some youth choosing not to pursue subsistence hunting, the practice persists.²⁶

The primary method of determining the value of caribou for sustenance is by applying the cost of imported meats.²⁷ However, this application ignores the qualitative differences between meats, notably related to flavor and nutrition. “Country food not only tastes better, but it is also more satisfying and nutritious. There is no satisfactory substitute for it; hence the acceptance of anything which might be substituted for it entails an absolute loss of welfare of incalculable proportions for native people.”²⁸ Satisfaction along with less tangible or passive values create the need to combine economic valuation with a descriptive approach.²⁹

Since caribou meat is not sold in a market, a replacement value is often used to determine monetary equivalents.³⁰ To make a comparison with beef purchased from local stores, the Beverly and Qamanirjuaq Caribou Management Board (BQCMB) used a nutritional

²³ Whitefeather Forest Management Corporation. 2006. Keeping Woodland Caribou on the Land: Cross-Cultural Research in the Whitefeather Forest. Pikangikum, Ontario; and Beverly and Qamanirjuaq Caribou Management Board, 2008

²⁴ Tesar, C. 2007. What Price the Caribou?, Northern Perspectives: 2

²⁵ Natcher, David C., 2009. Subsistence and the Social Economy of Canada’s Aboriginal North. The Northern Review, 30: 2

²⁶ Natcher, 2008: 3

²⁷ Beverly and Qamanirjuaq Caribou Management Board, 2008

²⁸ Usher, 1976: 117

²⁹ Beverly and Qamanirjuaq Caribou Management Board, 2008: 11

³⁰ For example with barren ground caribou, Usher, 1976: 109

conversional factor determined by the Department of Renewable Resources,³¹ subtracted the costs of equipment and supplies, and added the value of hides and other products sold. Without any records of harvest in Aboriginal communities, the amount of caribou harvested for subsistence purposes could only be estimated. For the BQCMB, the yearly value of the subsistence or domestic harvest of two barren ground caribou herds was approximately \$14,779,651.³²

The value determined for the two caribou herds excluded the cultural practices and other passive values described in interviews with community members. The BQCMB could not directly measure passive values that could be compared to the replacement cost of meat. Instead, through a description of cultural values they were able to convey that replacement costs were a conservative estimate of the total cultural value.

The production and use of clothing and tools is another important direct use of caribou resulting from the subsistence harvest.³³ However, there are complications from using a replacement value of actual products or materials, such as caribou hides, brains, and bones. Clothing and tools made from other animals are not necessarily of the same quality and in some cases analogous parts do not serve the same functions.³⁴

2. Enjoyment of the Land

While the subsistence harvest of caribou is not a recreational activity, due to its spiritual and social importance, enjoyment is an important component of subsistence practices on the land.³⁵ Enjoyment, or recreation, has been fairly well documented in non-Aboriginal hunting or fishing, and can be assessed by economic measures that use the fact that a hunter could have chosen another location or pursuit. For First Nations, harvesting is also a trade-off decision that balances other activities including earning a wage that have real economic consequences whether they be commercial or for subsistence purposes.³⁶

³¹ Beverly and Qamanirjuaq Caribou Management Board, 2008: 7

³² Beverly and Qamanirjuaq Caribou Management Board, 2008: 18

³³ Whitefeather Forest Management Corporation, 2006: 24-27; Usher, 1976: 107; and Kritsch, Ingrid, and Karen Wright-Fraser, 2002. The Gwich'in Traditional Caribou Skin Clothing Project: Repatriating Traditional Knowledge and Skills. *Arctic*, 55(2)

³⁴ Whitefeather Forest Management Corporation, 2006: 24-27

³⁵ Beverly and Qamanirjuaq Caribou Management Board, 2008; and Ashley, Bruce, 2000. Economic Benefits of Outfitted Hunts for Barren-Ground Caribou in Northwest Territories. Wildlife and Fisheries Division/Department of Resources, Wildlife, and Economic Development, Government of Northwest Territories, Yellowknife, Northwest Territories: 44

³⁶ Adamowicz, Wiktor, Peter Boxall, Michel Haener, Yaoqi Zhang, Donna Dosman, and Juanita Marois, 2006. An Assessment of the Impacts of Forest Management on Aboriginal Hunters: Evidence from Stated and Revealed Preference Data. *Forest Science* 50(2): 150

This type of choice to determine a balance of activities can be modeled using a stated and revealed preference survey.³⁷ This type of assessment uses a survey to ask whether there are alternatives to the preferred hunting sites or habitats stated and then models these choices. The costs of the alternatives are determined based on factors such as: investment in equipment, and travel costs.

With travel costs the assumption is that the greater distance someone travels for an activity, the more costs that are absorbed, the greater value that location will have. However for First Nations, the ability to access the site is also based on location within traditional territory. Without proper access all the alternatives may be irrelevant or inappropriate if the same activities will not be possible.

3. Health and Wellness

“Many of the social problems facing First Nations communities, including alcoholism, physical abuse, suicide and general feeling of anomie can be linked to the social vacuum that was created when subsistence harvesting and the seasonal round ceased to be the orienting focus of life.”³⁸

In determining the economic value of caribou and their habitat, consideration must be given to the health and wellness of the community. A traditional diet based on country foods is more nutritious than store-bought alternatives, as seen in the rise of type II diabetes and other maladies. Health and wellness derived from caribou are thought to come from the nutritious food, satisfaction,³⁹ active lifestyle,⁴⁰ and the fulfillment of social and spiritual relationships.

By maintaining a harvesting lifestyle, First Nation people have been found to have a connection with their traditions and well-being, whereas those who did not were found to have less sense of purpose or direction that led to social malaise.⁴¹ In addition, subsistence harvesting is also a common experience that is a source of strength for kin relationships and the passing on of worldviews within these relationships.

The cost of poor health for individuals and for the community can be determined, but the extent to which loss of caribou and their habitats is a contributor to poor individual and community health is difficult to determine.⁴² To approach less-tangible or intangible values,

³⁷ For example with moose habitat, Adamowicz, 2006

³⁸ Hickey, Clifford, David C. Natcher, and Mark Nelson, 2005. Social and Economic Barriers to Subsistence Harvesting in Aboriginal Communities. *Anthropologica* 47(2): 289-301: 291

³⁹ Beverly and Qamanirjuaq Caribou Management Board, 2008: 26; and Whitefeather Forest Management Corporation, 2006

⁴⁰ Natcher, 2008: 4

⁴¹ Hickey et al. 2005: 291

⁴² Hickey et al. 2005

such as health and wellness and the values below, First Nation communities and researchers use more participatory⁴³ or holistic approaches.⁴⁴ These may include appreciative inquiry,⁴⁵ interviews, workshops, or a combination of these methods.⁴⁶ All of these methods have the advantage of allowing less hindered discussion about values that help build a case for the value of caribou above and beyond monetary figures.

To evaluate the health and wellness, as well as other intangible values, contingent ranking and preferences can be useful. The method asks community members to rank different scenarios or changes in daily life.⁴⁷ These ranks can then be summed across the community or region and offer a means of comparing management or development goals.

The cultural capital concept⁴⁸ looks at values that represent resources or capital: natural, human, social, institutional, and built capital that must all be present for a fully functioning healthy community.

Another method is the structured decision-making process that seeks to understand values and consequences as they relate to management options rather than using a monetary sum.⁴⁹ In all cases, community involvement⁵⁰ will be essential for determining values that still have meaning to the community they represent. Community members will also help with determining the values that are captured by economic tools and which need additional description.

⁴³ Verschuuren, Bas, 2006, Overview of Cultural and Spiritual values in ecosystem management. *Endogenous Development and Bio-cultural Diversity*: 322; and International Institute for Sustainable Development, 2001. *Integrating Aboriginal Values into Land-Use and Resource Management*. International Institute for Sustainable Development: 42

⁴⁴ Powell, Judith. 2000. Expanding boundaries: Environmental and Cultural Values within Natural Boundaries. *International Journal of Heritage Studies*, 6(1): 49

⁴⁵ International Institute for Sustainable Development, 2001

⁴⁶ Beverly and Qamanirjuaq Caribou Management Board, 2008: 26; Whitefeather Forest Management Corporation, 2006

⁴⁷ Commonwealth Department of the Environment, Sport and Territories, the Commonwealth Department of Finance, and the Resource Assessment Commission Australian Government Publishing Service, 1995. *Techniques to Value Environmental Resources: an Introductory Handbook*. Commonwealth Department of the Environment, Sport and Territories, the Commonwealth Department of Finance, and the Resource Assessment Commission Australian Government Publishing Service, Australia. Accessed November 1, 2010: <http://www.environment.gov.au/about/publications/economics/value/index.html>

⁴⁸ Rolfe, Rebecca E., 2006. *Social Cohesion and Community Resilience: A Multi-Disciplinary Review of Literature for Rural Health Research*. The Rural Centre, Halifax, Nova Scotia: 27

⁴⁹ Gregory, Robin and William Trousdale, 2008. Compensating aboriginal cultural losses: An alternative approach to assessing environmental damages. *Journal of Environmental Management* 90:2469-2479. doi:10.1016/j.jenvman.2008.12.019

⁵⁰ Powell, 2000: 59; and Gregory and Trousdale, 2008

4. Reciprocity

Through the practice of hunting, trapping and other activities in caribou habitat, relationships are built amongst community members.⁵¹ Time spent on the land, and the sharing of equipment, knowledge, and skills are critical to the maintenance of social cohesion within many northern communities.⁵² Sharing of food is another important collective benefit, wherein hunters recognize the harvest as a gift and share it with their families and other community members if enough is available.⁵³ In this way, the sharing of the harvest is an important source of nutrition and satisfaction for recipients, and a source of respect for generous harvesters.

The sharing of the harvest is also important for respecting and honouring Elders and ATK holders. In addition, reciprocity is an important base for spiritual and moral values. “While participating in the production and distribution of wildfoods establishes a sense of social relatedness within communities, equally important is the fact that the sharing of wildfoods instills a moral framework between people and the non-human world.”⁵⁴

Economic valuation of this sharing would almost certainly underestimate the true value and motivations for such social institutions.⁵⁵ Some of the same methods applied to less tangible values, such as health and wellness will be critical in the assessment of the value of reciprocity. Holistic models may also be used, that attempt to weave together all values and promote holistic valuation techniques.⁵⁶

5. Language

Harvesting of caribou is a venue for the development of language.⁵⁷ Many of the words and concepts in Aboriginal languages are important for the understanding of caribou and the spiritual relationship to the land. Without language, Aboriginal peoples lose connection with the land.⁵⁸ For the BQCMB, the practice of harvesting caribou is integral to preserving and revitalizing northern First Nation culture.⁵⁹

⁵¹ Kruse, Jack, 2006. Indicators of Social, Economic, and Cultural Cumulative Effects Resulting from Petroleum Development in Alaska: A Review. University of Alaska; and Rolfe, Rebecca E., 2006

⁵² Natcher, 2008: 4-5; Nelson et al. 2005: 291

⁵³ Hickey et al. 2005: 291

⁵⁴ Natcher, 2008: 5

⁵⁵ Natcher, 2008: 1

⁵⁶ Stephenson, 2008: 134

⁵⁷ Keeshig-Tobias, Lenore, 2003. Of Hating, Hurting, and Coming to Terms with the English Language. Canadian Journal of Native Education, 27 (1): 97; Beverly and Qamanirjuaq Caribou Management Board, 2008: 26; and Verschuuren, Bas, 2006, Overview of Cultural and Spiritual values in ecosystem management

⁵⁸ Keeshig-Tobias, 2003: 97

⁵⁹ Beverly and Qamanirjuaq Caribou Management Board, 2008: 26

The importance of caribou to language preservation and revitalization will vary widely from community to community, but the value of the language to a particular community will be difficult to calculate. One method to assess the economic value of language can be estimated by comparing the cost of establishing language programs in communities across the boreal forest. Any program cannot be a true replacement, since it will not be able to teach the specific local meanings and richness that would be learned during a hunt or in ceremonies associated with caribou and the land.

6. Self-determination

“The bush lifestyle does, of course, possess a symbolic value...constituted and maintained through the practice of subsistence harvesting.”⁶⁰

For First Nations, the use of the land is critical to their right to rely upon the land in the future.⁶¹ The caribou are valuable as they are part of their connection and rootedness to the land.⁶² The right and ability to rely upon the land in the future is also an important value.⁶³

Notably, valuation of caribou cannot account for the needs of future generations. The persistence of caribou populations is a critical component of First Nations’ self-determination; and we believe that joint-management opportunities must be negotiated to maintain the survival of the species.

7. Spirituality

Subsistence harvesting as a practice is not solely a process of obtaining meat for nutrition. With each hunt a deliberate set of relationships and protocols are awakened and reinforced. These include reciprocity, social cohesion, spirituality and passing on knowledge. Spirituality is an important value for many community members,⁶⁴ most notably, their spiritual relationship to the land. “By not hunting caribou, in effect, Pikangikum people are not acknowledging this particular gift from the Creator, they are no longer engaging in a relationship of reciprocity with the Creator (and the land) through the hunting of caribou.”⁶⁵ First Nation and Aboriginal people feel a connectedness with the land that is impossible to replace or put a measurable value upon.

⁶⁰ Hickey et al. 2005: 299

⁶¹ Hickey et al. 2005: 292

⁶² Natcher, 2008: 8-9; and Whitefeather Forest Management Corporation, 2006

⁶³ Hickey et al. 2005: 292

⁶⁴ Hickey et al. 2005: 291-299; and Whitefeather Forest Management Corporation, 2006

⁶⁵ Whitefeather Forest Management Corporation, 2006: 28

The Ecological Value of Boreal Woodland Caribou and Caribou Habitat

Background

Canada's boreal region is one of the largest remaining continuous natural areas in the world – stretching across the country covering over 58 per cent of the country (584 million hectares). Its large area supports numerous species including the Boreal Woodland Caribou. Because Boreal Woodland Caribou are a key indicator species for the boreal region, it is important to include the value of the benefits provided by boreal ecosystems when undertaking socio-economic assessments of the protection of caribou habitat.

Two studies have evaluated the value of natural capital in the boreal region. The first evaluation for the entire boreal region across Canada and the second study focused on the values within the Mackenzie Valley Region.⁶⁶ The boreal study assessed the non-market value for boreal ecosystem services based on the benefits of carbon storage by forests and peatlands, nature-related recreation, biodiversity, water supply, water regulation, pest control, non-timber forest products and Aboriginal subsistence values. This study provides examples of the types of values that can be included in socio-economic assessments. For example, the most valuable benefits estimated were carbon storage (\$582 billion), flood control and water filtration by wetlands (\$110.7 billion), pest control services by birds in boreal forests (\$5.4 billion), and nature-related recreation (\$4.5 billion).⁶⁷

In the boreal study, the values of ecosystem services and their benefits were reported by ecosystem/land cover type. These values include the benefits from wetlands storing carbon, regulating water flows or flood control, water filtration and the value of biodiversity.⁶⁸ The method and values determined in this study are reported below as an example for the type of approach that could be taken for socio-economic assessments for caribou habitat.

Carbon

The boreal study estimated the value for natural capital in the boreal region primarily based on the use benefits, including direct use values and ecological function values. In this case, the economic value for carbon, stored within the biomass and soils of forest ecosystems, can be calculated based on the avoided carbon emissions using the avoided cost of predicted damages due to climate change. In the year 2000, review papers suggested values ranging from US\$34 per tonne of carbon to US\$50 per tonne of carbon

⁶⁶ Anielski, M., and Wilson, S. 2009 (update). *Counting Canada's Natural Capital: Assessing the Real Value of Canada's Boreal Ecosystems*. Canadian Boreal Initiative. Ottawa, Canada. Anielski, M., and Wilson, S. 2010 (update). *The Real Wealth of the Mackenzie Region*. Canadian Boreal Initiative. Ottawa, Canada;

⁶⁷ Anielski, M., and Wilson, S. 2009 (update). *Counting Canada's Natural Capital: Assessing the Real Value of Canada's Boreal Ecosystems*. Canadian Boreal Initiative. Ottawa, Canada.

⁶⁸ Ibid.

(C\$41/tC to C\$60.22/tC).⁶⁹ These values reflect the avoided cost of carbon emissions (i.e. greenhouse gas emissions) to the atmosphere. The 2007 Intergovernmental Panel on Climate Change (IPCC) reported that the average cost of global damages due to the level of carbon dioxide in the atmosphere in 2005 was US\$43 per tonne of carbon (C\$52/tC).⁷⁰ This value can be used to value the carbon stored in Canada's boreal region. For example, the annual value of carbon stored by boreal forest ecosystems and peatlands can be estimated using this dollar value per tonne, annualized over 20 years. In the case of the larger boreal study, the value of carbon stored by peatlands in the boreal region was estimated at \$402 billion per year or \$4,830 per hectare annualized over 20 years.⁷¹

Clean Water

The value for clean water supply provided by forests and wetlands can be based on the annual municipal water use in communities across the boreal region. For example, a US Forest Service study estimated the value of clean water that is filtered by forest watersheds to be worth \$0.05 per cubic metre for municipal water use.⁷² Such values can be transferred to estimate the dollar value for flood control services and water filtration services provided by forests and wetlands. In the larger boreal study, the average wetland values for flood control services were estimated at \$46.5 million per year, and water-filtering services were an estimated \$28.9 million per year (2000\$).⁷³ This method of valuation may not be relevant for First Nation communities that do not have municipal water systems, in which case more locally relevant valuation techniques will need to be developed.

Biodiversity Values

The values of natural forest pest control can be attributed to ecological predation. In the larger boreal study, the replacement cost of natural pest control was based on the cost of using chemical pesticides or genetic engineering in place of the services provided by birds such as predation of spruce budworm.

Non-timber values can also be included in socio-economic studies. These values can include the value of the harvest of mushrooms, berries and wild rice.

⁶⁹ R. Clarkson. *Estimating the Social Cost of Carbon Emissions* (London: Department of the Environment, Transport and the Regions, 2000); R. Tol, S. Fankhauser, R. Richels, and J. Smith. "How Much damage Will Climate Change Do? Recent Estimates," *World Economics* 1 (2000): pp. 179–206. Secretariat of the Convention on Biological Diversity. *The Value of Forest Ecosystems* (Conversion rate for US dollars to Cdn dollars is median price = 1.20440 [bid/ask], Friday March 11, 2005. From FXConverter™: Classic 164 Currency Converter © 1997-2005 by OANDA.com, retrieved March 11, 2005 from OANDA.com website <http://www.oanda.com/convert/classic>)

⁷⁰ IPCC. 2007. Summary for Policymakers. In: *Climate Change 2007: Impacts, Adaptation and Vulnerability*. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds. Cambridge University Press, Cambridge, UK.

⁷¹ Anielski, M., and Wilson, S. 2009 (update). *Counting Canada's Natural Capital: Assessing the Real Value of Canada's Boreal Ecosystems*. Canadian Boreal Initiative. Ottawa, Canada.

⁷² Ibid.

⁷³ Ibid.

Passive Value for Biodiversity

Passive values can be used to assess the value of protected areas in terms of the less tangible values of biodiversity. Passive values are referred to as cultural values, which can include the value of knowing that a species is protected from extinction or that the aesthetic value of a landscape is conserved. For example, a Saskatchewan study surveyed households to assess their willingness to pay for caribou habitat conservation. This 1993 study found that Saskatchewanans were willing to pay between \$14.66 and \$97.99 (1993 dollars) per household per year for caribou conservation.⁷⁴ Another example is a study undertaken in Edmonton, which found that households were willing to pay between \$89 and \$122 (1998 dollars) for the protection of old growth forests.⁷⁵

The Strengths, Limitations and Challenges of Cultural and Ecological Valuation

There are a number of challenges when applying economic valuation for First Nation cultural values. Woodland caribou, similar to other culturally important species, present many intangible values including the opportunity for traditional learning, building relationships, recreation, and as a resource for future generations, which are difficult to define or ascribe economic value to.⁷⁶

Given that cultural values vary between communities and even among them, it will be daunting to get a comprehensive understanding from over 300 First Nation communities. Currently, only a small portion of the diverse concerns of First Nation people across Canada pertaining to woodland caribou are known.

In order to determine cultural values and their worth to each community, the people will first need to be consulted in order to establish the appropriate context, including important losses, selecting suitable methodologies and avoiding underestimates, in which valuation

⁷⁴ M. Tanguay, W. L. Adamowicz, P. Boxall, W. Phillips, and W. White. 1993. A Socio-economic Evaluation of Woodland Caribou in Northwestern Saskatchewan. Edmonton: University of Alberta, Department of Rural Economy. Project Rep. No. 93-04.

⁷⁵ M. K. Haener and W. L. Adamowicz. 2000. "Regional Forest Resource Accounting: A Northern Alberta Case Study," Canadian Journal of Forestry Research. 30:264-273.

⁷⁶ Usher, Peter J., 1976. Evaluating country food in the northern Native economy. *Arctic*, 29(2); Usher, Peter J., Gérard Duhaime and Edmund Searles, 2003. The Household as an Economic Unit in Arctic Aboriginal Communities, and its Measurement by Means of a Comprehensive Survey. *Social Indicators Research* 61; and; Beverly and Qamanirjuaq Caribou Management Board, 2008

will take place.⁷⁷ With inadequate participation from First Nation communities the relevance of economic measures will be limited.⁷⁸

Another challenge is in the adoption of market-based measures rather than First Nation value systems to do cultural value assessment, as this approach risks devaluing First Nation perspectives and even alienating community members from the process.⁷⁹ A conflict between natural and cultural values had resulted from “the dominance of ecological criteria in the assessment of environmental values, and the broadening of our historical perception of landscape from isolated sites to whole cultural patterns.”⁸⁰ Instead, ecological and cultural values should be considered together not only to create a more complete picture, but also to bring in the perspectives of First Nation people.

A further challenge is that as a result of a lack of census information or databases to draw upon, initial studies will have a large cost, in order to collect the needed information.⁸¹ To proceed without accurate data would mean most of the information would have to be estimated. Accurate estimations are challenging for a number of reasons: Under an imposed regulatory system, First Nations have developed distrust for questions concerning harvesting activities effectively reducing participation in the valuation process.⁸² Also, social inequity and poverty lowers the total valuation, since willingness-to-pay measures use values that are affordable by the target population.⁸³ Comparisons are also distorted by the effects of regulation and other programs, based on estimations.⁸⁴

There are several limitations to identifying, measuring and valuing the state and value of natural capital and the benefits society receives from ecosystem services. Firstly, the availability of physical and quantitative data is often limited, out of date, or not accessible in order to construct an inventory for the ecological make-up of a designated study area.

Secondly, there is very limited information on the state of ecosystems and therefore the level of ecosystem functioning is often unknown and as a result land cover for a certain

⁷⁷ Gregory and Trousdale, 2008, 2472; Verschuuren, Bas, 2007. Seeing is Believing, Integrating cultural and spiritual values in conservation management. Foundation for Sustainable Development. The Netherlands and IUCN, Gland Switzerland: 26; and Commonwealth Department of the Environment, Sport and Territories et al., 1995

⁷⁸ Gregory and Trousdale, 2008: 2471; Adamowicz, 2006: 142; Commonwealth Department of the Environment, Sport and Territories et al., 1995; Verschuuren, 2007: 27; and Powell, 2000: 59

⁷⁹ Gregory and Trousdale, 2008: 2472; Natcher, 2008: 2; Verschuuren, Bas. 2006. Sociocultural Importance of Wetlands in northern Australia; and Verschuuren, 2007: 27

⁸⁰ Powell, 2000:54

⁸¹ Gregory and Trousdale, 2008: 2471; Verschuuren, 2007: 27; and Powell, 2000

⁸² Weinstein, Martin S., 1998. Sharing Information or Captured Heritage: Access to Community Geographic Knowledge and the State's Responsibility to Protect Aboriginal Rights in British Columbia. M.S. Weinstein Consulting Services

⁸³ Commonwealth Department of the Environment, Sport and Territories et al., 1995

⁸⁴ Commonwealth Department of the Environment, Sport and Territories et al., 1995

ecosystem type is assigned a uniform value across the study area regardless of the quality and state of the ecosystem.

Thirdly, all estimates for ecological and cultural values are underestimated because of the two points above but also because it is not possible to account for and value all ecosystem services with our current level of knowledge. Non-market valuation, where there is no market price, is still a fairly new area of study and valuation techniques are being developed.

Lastly, it is difficult to transfer values from one study area to another because ecosystems vary, the state of ecosystems vary and the uses/benefits vary from place to place, making it a time-consuming and expensive task to undertake natural capital assessments. And of course, Earth and its ecosystems are ultimately irreplaceable because humans cannot replicate the Earth and its living systems through technology nor by moving to another planet; there is only one Earth.

Conclusion

This report provides a preliminary discussion of cultural and ecological values related to Canada's boreal woodland caribou.

The David Suzuki Foundation and the Assembly of First Nations call upon government decision-makers to broaden the approach to socio-economic valuation to ensure that assessments include both cultural and ecological values.

As this report demonstrates, both cultural and ecological values should also be taken into account during upcoming Action Planning for the boreal woodland caribou under Canada's Species At Risk Act.

It is clear that economic measurements should be applied with caution to the cultural practices and values of any people, especially Aboriginal peoples. However, by being inclusive and maintaining respectful dialogue, the process of valuation will build trust and set conservation goals that suit the communities and the lands relied upon. This type of inclusive approach will also provide the most credible estimates possible.

It is hoped that rigorous analysis of the true value of nature – including its ecological, economic and cultural benefits – will inform future land-use planning decisions in the boreal and ensure the survival of the communities and species that call the boreal home.



Credit: Gord McKenna via Flickr

This report provides a preliminary discussion of cultural and ecological values related to Canada's boreal woodland caribou and calls upon governments to broaden their approaches to socio-economic valuation to include these vital values.



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