ROOM FOR BOTH

REALIZING A FUTURE WITH SUSTAINABLE ECONOMIES AND HEALTHY CARIBOU POPULATIONS

DAVID SUZUKI FOUNDATION
One nature.

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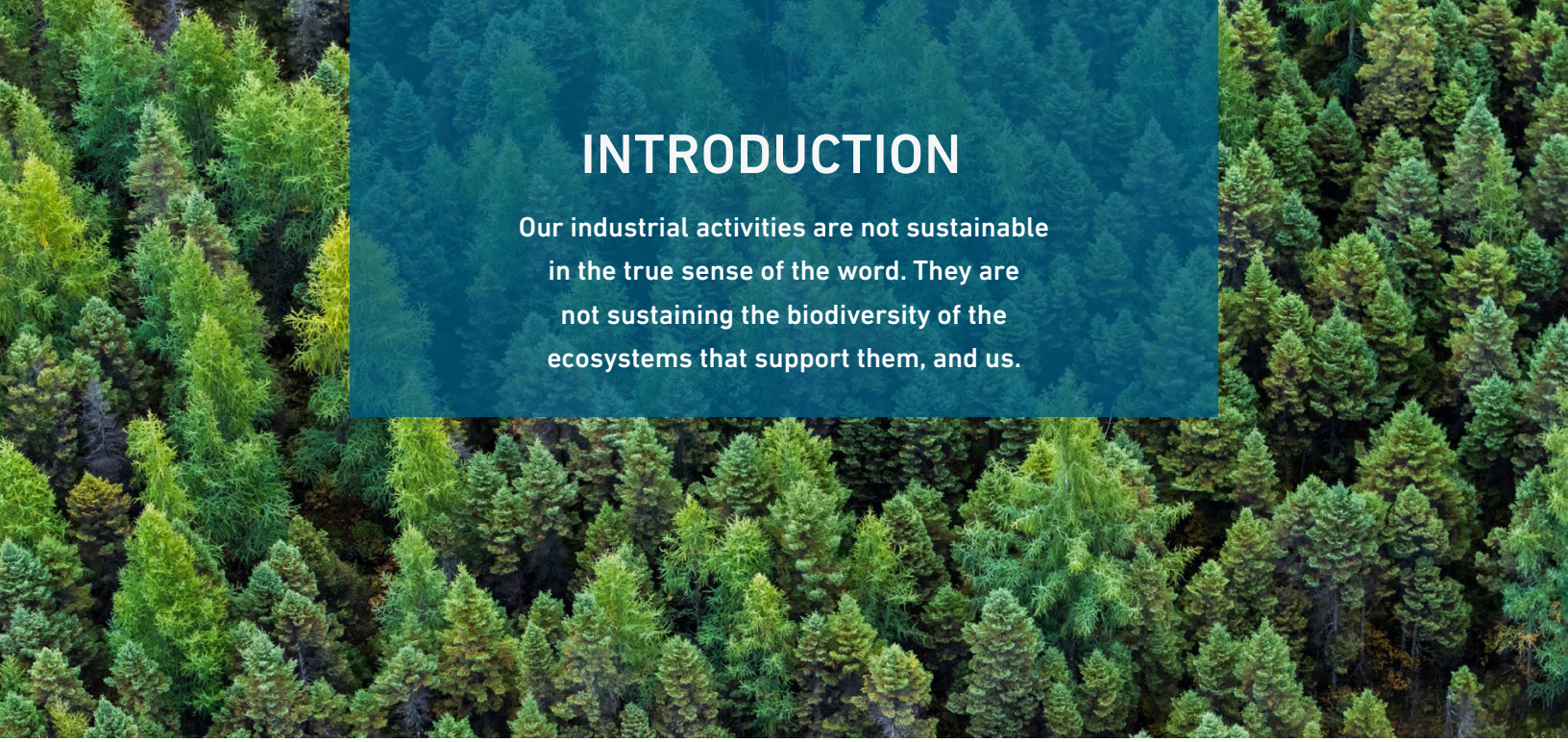

INTRODUCTION

Our industrial activities are not sustainable in the true sense of the word. They are not sustaining the biodiversity of the ecosystems that support them, and us.

ON JANUARY 24, 2019, the David Suzuki Foundation, Alberta Wilderness Association, Athabasca Chipewyan First Nation and Mikisew Cree First Nation, represented by EcoJustice, filed an application for a judicial review of the failure of the minister of the environment and climate change Canada to perform her statutory duty to recommend that cabinet issue a protection order for the critical habitat of five sub-populations of boreal woodland caribou in northeastern Alberta.

A protection order under the federal Species at Risk Act enables the federal government to prohibit activities that will result in the destruction of the critical habitat that boreal caribou need to survive. If the minister is ordered to make the recommendation, or does so of her own accord, the order then goes to cabinet, which ultimately will decide what happens on the ground.

What information will cabinet consider to make its decision? Unfortunately, to date, the framing of caribou conservation has been grossly distorted—transformed and amplified by misinformation, fear-based narratives and exaggerated impact claims that have successfully stalled (often indefinitely) or foreclosed implementation of caribou conservation measures.

In this report, the David Suzuki Foundation highlights opportunities for caribou conservation that have not been realized due to the political climate and the propagation of the much-exaggerated jobs-versus-environment framing. Drawing on research from three provinces—British Columbia, Alberta and Ontario—this report aims to illustrate examples of how and where caribou conservation and industry can co-exist and areas where caribou habitat restoration can contribute to a viable economy.

That said, the Foundation also recognizes that maintaining status quo business operations while advancing caribou recovery is not always possible, nor even desirable, as the majority of current provincial and territorial management regimes of industrial activity in the boreal forest do not maintain sufficient habitat for caribou populations to persist.

As a society, we must learn to set limits on industrial impacts if we are to share the land with wildlife. Throughout Canada, the lack of such limits has resulted in the threatened status of boreal caribou and numerous other wildlife species. It has meant that many of our industrial activities are not sustainable in the true sense of the word: they are not sustaining the biodiversity of the ecosystems that support them, and us. If caribou populations are to recover, industry, informed by science and Indigenous knowledge, will in some instances have to reduce its footprint to leave enough space for wildlife persistence.

This leaves decision-makers with some difficult choices. Short-term measures that entrench status quo operations, such as predator control (which is sometimes accompanied by killing other ungulates to reduce the prey base) and fences that semi-domesticate wildlife, are not the answer; they further disrupt ecosystems. We must seek solutions that optimize industrial and ecological values in instances where it is possible, and where it is not, decide about the kind of world we want to leave for future generations.

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BACKGROUND

WHEN THE SPECIES AT RISK ACT was brought into force in Canada in 2002, there was widespread belief that Canada was making a commitment to protect the habitat threatened and endangered species needed to survive and recover. This expectation was for both federal and provincial/territorial governments, as per commitments captured in the National Accord for the Protection of Species at Risk.[1]

However, habitat protection as a means of protecting and recovering species at risk in Canada has not played out according to expectations, as illustrated by the plight of boreal caribou, which are threatened with extinction from coast to coast to coast, and have continued to decline since the SARA was brought into force.

Habitat loss and destruction are the driver of most species declines, but in many instances, habitat protection has been hindered by a lack of knowledge regarding how much habitat a species needs to survive and recover. This was the case for boreal caribou until 2008,[2] when the federal government appointed 18 experts to conduct a meta-analysis of North American caribou studies. They discovered a clear relationship between total habitat disturbance (industrial and natural) in a caribou range and population condition (measured through calf survival). This gave provinces, territories and industries the information required to manage caribou by adopting a risk-based approach.

The 2012 federal boreal caribou recovery strategy directed provinces and territories to manage caribou range disturbance for a minimum 60 per cent probability of caribou persistence (by maintaining or restoring caribou ranges to a minimum of 65 per cent undisturbed habitat). Despite strong empirical evidence and the federal directive, provinces and territories in every instance have allowed further incursions into the intact habitat that caribou need to survive and recover. And the federal government has yet to use the Species at Risk Act as a safety net to protect caribou habitat where provinces/territories are failing to effectively do so.

As the 2017 federal progress report on the boreal caribou recovery strategy's implementation reveals, habitat condition in the majority of caribou ranges in Canada has worsened, and caribou throughout the country have continued to decline.[3] Further, in many jurisdictions, an inflated "jobs-versus-environment" dichotomy has polarized discourse, and many industrial associations and northern municipalities are strenuously fighting to halt or stall conservation efforts.

The David Suzuki Foundation believes that this can change — that, in many instances, there is room for both caribou conservation and healthy economies in Canada. This summary report draws on research from three case studies, conducted in British Columbia, Ontario and Alberta. Links to the background reports are provided in the appendix.

It argues for a transparent, science-based starting place for discourse by addressing misinformation. It models examples of caribou ranges where the federal directive for caribou management can likely be met and industry can continue to operate. And it illustrates how conservation can be good for our economy, via the burgeoning restoration economy, creation of certainty for industry, and the reallocation of subsidies that support industrial activities to ones that incentivize critical caribou habitat protection.

CREATING AN HONEST DISCOURSE

IN NORTH AMERICA, we have witnessed that, as the science pertaining to climate change has advanced, so too have efforts to deny it and manufacture uncertainty. A similar dynamic has played out for caribou conservation. In a paper titled *From Climate to Caribou: How Manufactured Uncertainty Is Affecting Wildlife Management,* published in the Wildlife Society Bulletin, Dr. Julee Boan et al write that "...as scientific understanding of [caribou] decline has become clearer, and agreement among scientists and governments about habitat management requirements has increased, campaigns of denial have intensified in the public sphere."[4] According to the paper, the strategy of exploiting scientific uncertainty in public discourse usually employs three primary tactics: 1) denying there is a problem, 2) denying the sources of the problem, and 3) claiming that the costs of addressing the problem are unacceptably high.

These tactics have been successfully employed throughout Canada with respect to the implementation of policies to recover caribou within managed forests. For example:

- In Alberta, a coalition of northern municipalities produced a report that estimated the impacts of caribou conservation *200* years into the future, at a price tag of $36 trillion.[5] As natural resource economist Thomas Michael Power noted for reference in a study titled *The Economic Impact of Restoring Woodland Caribou Habitat in the Bistcho and Yates Ranges in Northwestern Alberta* (hereafter referred to as the Power report. See appendix), the total value of output for the entire Canadian economy in 2017 was $1.7 trillion.[6]
- In Ontario, some in the forestry industry have denied that caribou are at risk.[7]
- Nationally, the Forest Products Association of Canada has called into question the drivers of caribou decline, suggesting that climate change isn't being adequately considered in the science and might be as or more consequential to caribou than habitat disturbance.[8] This motivated Canada's leading caribou scientists to respond, advancing, "There is little evidence to suggest that climate change brought caribou populations to their current threatened condition, nor does climate change explain the rapid rates of decline and range recession that are continuing today in many locations."[9]

Another tactic industry has used is to vilify those who call for increased caribou habitat protection, by, for example, labelling conservationists as "extremists" or "eco-terrorists" committed to destroying communities and the livelihoods of those within.[10]

This does not lay productive groundwork on which to develop progressive solutions. Environmentalists working to advance caribou conservation are not taking an extreme position but are championing what many, if not most, Canadians consider to be a common good: a future in which forest-dwelling wildlife persist. Caribou are an umbrella species, meaning protection and restoration of their habitat would benefit other species that also depend on unfragmented boreal ecosystems.[11] The David Suzuki Foundation is not opposed to industrial resource extraction activities; it seeks to ensure that they operate within limits needed by wildlife like caribou to survive.

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Communities that rely on resource extraction revenues are often subject to boom-and-bust cycles, which creates economic vulnerability. This in turn feeds a culture of instability, which provides fertile ground for classic climate-denial-tactic narratives to take root. In contrast, as the Ontario Nature report (see appendix) conveys, a more appropriate response to alleviating the insecurity of rural, resource extraction-dependent communities would be to create clear guidelines for sustainable development: "Sustainable resource development means providing security for forestry-dependent families, real government investment to reduce northern and rural economies' dependence on internationally traded commodities, and halting the decline of boreal caribou."

For progressive actions to recover caribou to occur, a level playing field of discourse must be established, wherein fear is not stoked to incite opposition to caribou conservation, and wherein leading science is used as a starting point from which management measures are planned.

Take-away messages:

- Fear-mongering and wilful misinformation have hindered potential opportunities to achieve caribou conservation.
- Sustainable development, which for caribou means the precautionary application of the risk-based disturbance threshold (with careful monitoring and adaptive management), can help to redress economic vulnerability.

MODELS OF CARIBOU RANGES WHERE THERE IS ROOM FOR BOTH

MODELS USED TO CALCULATE the impacts caribou habitat protection will potentially have on wood harvest levels are influenced by many assumptions. To date, there have been few examples where planning efforts have incorporated both economically viable harvest levels and effective caribou protection measures. As a result, industrial operations have proceeded to further degrade and fragment caribou habitat.[12]

There is an opportunity to build better models to support decision-making, and to minimize impacts on both caribou and industry. As the Power report notes, status quo operations could be changed if models input the twinned goals of caribou recovery and economic activity to optimize "least cost" solutions.

To date, there have been few examples where planning efforts have incorporated both desired harvest levels and effective caribou protection measures.

According to the Power study: "...optimization models are not new and have been used to optimize timber harvest programs for some time. What is new is placing value on the caribou habitat with a constraint that at least 65 percent caribou habitat be undisturbed."

Using such optimization models, Power concluded for Alberta's Bistcho and Yates caribou ranges, which were the subject of his analysis, that "caribou conservation and the continuation of existing Bistcho-Yates economic activities are possible."

Similarly, Ontario Nature noted that, "inappropriate model assumptions can lead to exaggerated projections of the socioeconomic impacts." Ontario Nature's research on harvest levels notes:

> *Of the 10 forest management units (FMUs) that have greater than 50 per cent overlap with boreal caribou range in Ontario, all are being cut below their allowable harvest area, most years. In fact, the most recent Annual Reports (2016/17 and 2017/18) show that of the 7.8 million cubic metres of conifer available in these forests, 4.7 million cubic metres was not harvested. At least part of this surplus could be used to protect critical caribou habitat.*

It concludes: "much of the planned wood supply in forest management units (FMUs) that significantly overlap boreal caribou ranges is not being logged, particularly over the past decade. This raises important questions as to why critical caribou habitat cannot be protected without causing economic hardship."

Take-away messages:

- In many ranges, there is likely room for both industrial activity and caribou conservation if planning is approached with the intent of finding solutions and properly acknowledging trade-offs.
- Unlogged forests within Forest Management Units could provide room for expanding caribou conservation initiatives.
- Optimization models should include the requirement to maintain or restore caribou habitat to a minimum of 65 per cent undisturbed condition, as per the directive from the federal Boreal Woodland Caribou Recovery Strategy. Subsequent monitoring must take place to ensure populations are stable, and adaptive management must be adopted to respond to population trends.

CONSERVATION AS GOOD FOR THE ECONOMY

Restoration

While habitat restoration is important, it is not a substitute for retaining current undisturbed habitat. Restoration of boreal caribou habitat has yet to be proven effective at range and population scales. (Most restoration efforts on land that has been impacted by industrial resource-extraction activities have been remedial, and even in that context, have been largely unsuccessful, given the older forest age and large scales needed by boreal caribou.)[13] Thus it makes no sense, when striving to recover threatened caribou populations, to remove or fragment currently viable undisturbed caribou habitat and count on potentially viable future habitat, as many provinces currently do in their forest management regimes.[14]

While habitat restoration is important, it is not a substitute for retaining current undisturbed habitat.

It is hard to plug restoration efforts into adaptive management programs, as evaluating the success of restoration initiatives to support caribou recovery takes upwards of 40 years. This serves to further complicate the caribou recovery landscape. As Dr. Justina Ray notes in her report commissioned by Environment Canada, *Defining Habitat Restoration for Boreal Caribou in the Context of National Recovery: A Discussion Paper*, many companies wish to seek credit for restoration initiatives to enable them to undertake new activities, often in undisturbed habitat. Yet it will be very difficult to imagine a precautionary method under which it is determined "that sufficient restoration has occurred to trigger permitting of disturbance elsewhere in a population range if it has not achieved self-sustaining status."[15]

Nonetheless, restoration is a critical component of caribou recovery: If caribou populations are to survive and recover in Alberta and northeastern British Columbia, aggressive range-scale restoration efforts, planned at both site and range scales, and

accompanied by adequate habitat protection measures, are required. If restoration is to be successful, ambitious restoration targets will need to be set in forest management policies. As a study by economist Mark Anielski titled *Research related to boreal caribou habitat restoration economics in British Columbia* (see appendix) highlights, current restoration requirements under regulations are often unambitious and poorly enforced. More progressive restoration directives that exceed the need to merely revegetate the land must be developed.

Anielski's analysis shows that restoration of disturbances such as seismic lines, if housed within a range-scale restoration framework, can be a viable economic prospect for northern British Columbia.

According to his report, restoration in fragmented boreal caribou habitat has the potential to create and replace jobs in northern rural municipalities and First Nations. This could pivot many forest-based livelihoods toward repairing overly fragmented caribou ranges. As identified in all three reports, a diversified economy is more stable than one that depends solely on one or two resource extraction activities; a restoration economy has the potential to diversify resource-extraction economies.

Further, ecological restoration also has the potential to advance reconciliation with Indigenous Peoples, by enhancing opportunities for them to practice their cultures and traditional livelihoods where these have been compromised or abrogated by ecological degradation and destruction.

As Anielski identifies in his report, many Indigenous communities believe that "traditional knowledge of boreal ecosystems will help to ensure restoration of industrial lands to a healthy and sustainable boreal forest ecosystem."

Anielski's report highlights flaws with the current economic models that oversee resource management decisions. As recent news about the billion-dollar price tag for orphaned well cleanup in the province reveals,[16] B.C. has failed to ensure that companies pay sufficiently up front for restoration costs incurred through their practices. If the costs for restoration obligations and offsetting funds to pay for restoration were required on both government and industry balance sheets, the current issue of who should pay for restoration would not be in play. In the absence of such a system, Anielski notes, costs for restoration are ultimately passed on to the public and future generations.

Ultimately, restoration initiatives will need to be funded by both industry and government, both of which have made billions of dollars from resource extraction activities in caribou habitat.

Anielski acknowledges that, for boreal caribou to survive in B.C., there will have to be deferrals on further incursions into their undisturbed habitat; management policies pertaining to boreal forest restoration will have to be accompanied by commitments to preclude future habitat disturbances unless sufficient levels of suitable habitat are maintained.

Anielski found that the existing industrial footprint in boreal caribou ranges in B.C. is sufficiently large to support ongoing industrial activities. He also calculated substantial employment benefits from large-scale restoration of seismic lines within caribou habitat:

> *There are potentially real and significant benefits from restoration of at least the seismic linear disturbance that compare even more favourably to the current forestry and logging employment in B.C. on a per hectare of land use basis.... [E]mployment benefit estimates of caribou habitat restoration, when compared to current forestry sector employment for BC, suggest that the potential benefits of restoration might outweigh the opportunity costs to these traditional resource industries over at least a 20-year restoration period.*

Anielski concludes, "Estimates of the potential scale and scope of a restoration economy, properly financed...will ultimately result in new employment, better economic opportunities for Indigenous Peoples, improved environmental conditions (i.e., reduced environmental liabilities) and overall improvement in economic resilience for both Indigenous and other communities in northeastern B.C."

This conclusion was also reached in the Powers report, which determines, "Managing lands for caribou recovery can grow the economy in the Bistcho-Yates caribou range lands of northwest Alberta."

Anielski's report also touches on the quality of restoration initiatives in the province. He notes that industrial-led reclamation efforts focus primarily on quantitative, not qualitative (i.e., ecosystem interdependence, connectivity, trophic cascading, etc.) indicators of success. In contrast, the report profiles Indigenous-led restoration initiatives that are adopting restoration of traditionally known plants that uphold regional patterns of biodiversity. Traditional ecological knowledge can also be used to identify priority areas for habitat restoration.[17]

Many Indigenous communities believe that "traditional knowledge of boreal ecosystems will help to ensure restoration of industrial lands to a healthy and sustainable boreal forest ecosystem."

Take-away messages

- As important as restoration is, it's vital to maintain current intact habitat in caribou ranges.
- Range-scale restoration of legacy industrial disturbance is critical.
- Funds should be posted by industry and government to cover their respective restoration obligations.
- Investments should be made in Indigenous-led restoration initiatives, as these have the potential to advance reconciliation.
- More progressive restoration directives that exceed the need to merely revegetate the land must be developed.

The green marketplace

Although the jobs-versus-environment narrative outlined in the first section has convinced some people that caribou conservation is bad for the economy, in reality there are marketplace rewards for sustainable industrial initiatives. Further, there are often negative financial repercussions, including legal challenges and boycotts, for industry and governments that refuse to adopt sustainable practices.

The Forest Stewardship Council certification system, which is comprised of four chambers in Canada—Indigenous, economic, social and environmental—recently incorporated an indicator pertaining to the maintenance of caribou habitat, to support implementation of the federal boreal caribou recovery strategy.[18] According to the Ontario Nature report, "Forest Stewardship Council (FSC) certification has had substantial uptake in Ontario, with about half of the managed forest currently certified under FSC's forest management standards."

Although the jobs-versus-environment narrative outlined in the first section has convinced some people that caribou conservation is bad for the economy, in reality there are marketplace rewards for sustainable industrial initiatives.

There are some risks as certification systems are voluntary and dependent on monitoring and evaluation. Further, certification systems that set high bars for sustainable practices run the risk of having certification systems with less stringent ecological and social criteria crowd the market, as once the market for certified products has been created, consumers are typically unable to distinguish between systems.[19]

As the Ontario Nature report outlines, "When using markets-based approaches, it is essential to determine whether or not they are accomplishing their intended purpose, in this case, supporting the protection of critical habitat and boreal caribou recovery. While the success of FSC certification in supporting boreal caribou recovery remains to be seen in implementation, the system represents a science-based and collaborative approach to support implementation of regulatory requirements for critical caribou habitat protection."

As indicated elsewhere in this summary report, clear management targets for caribou recovery would not only complement strong voluntary certification systems, but would also create certainty for industries and reduce risks of legal challenges, boycotts and loss of social licence.

Take-away messages:

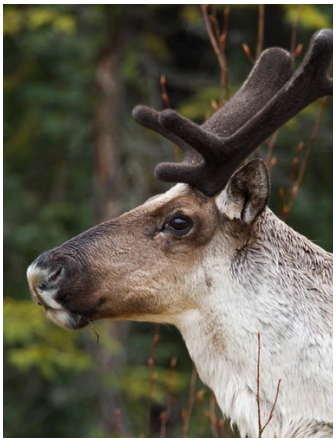
- Marketplace certainty can be advanced by developing and implementing clear regulatory targets for caribou recovery.
- Market-based solutions and incentives, such as FSC certification, can complement regulatory requirements.

Linking industrial subsidies to environmental performance

In Ontario, like most provinces in Canada, a range of subsidies, grants and loan programs is available to the forestry sector, some of which are detrimental to boreal caribou recovery.

The Ontario Nature report notes,

> *As most industrial logging occurs on public lands, the public expects that companies must provide a societal benefit in return for corporate profit. Put simply, this societal benefit is most often framed within the context of jobs in the sector and payment of taxes.*



However, some of the initiatives that are subsidized in Ontario, such as primary and secondary forestry road building, improve the bottom line for industry but can be detrimental to boreal caribou populations. Despite the fact that logging road expansion in Ontario has been shown to increase disturbance and negatively affect caribou populations, Ontarians currently contribute approximately $60 million a year to subsidize the road building and maintenance required by the forestry sector.

As the Ontario Nature report identifies, subsidies could be administered in a different manner. Incentives that promote unsustainable activities in boreal caribou habitat could, for example, be replaced by incentives that sustain critical habitat.

Indeed, there is precedence for linking environmental performance to grants and subsidy programs. Take the Federal Expanding Market Opportunity program, which, according to the report:

> *provides funding to forest product associations, provinces and wood-product research organizations to, in part, promote the use of Canadian wood, but also to promote the Canadian forest sector's environmental performance.*

As the report notes, "An indicator of performance based on the protection of critical caribou habitat could support expansion of markets based on environmental performance. Other programs, such as the Forest Industry Transformation program… could also be linked to such requirements."

Take-away messages:

- Taxpayer subsidies should be linked to environmental performance, such as achievement of disturbance levels consistent with requirements under the federal SARA. For example, shifting to a more "results-based" regulatory regime (i.e., maintaining disturbance below the maximum 35 per cent management threshold) rather than a "process-oriented" regulatory regime may achieve desired habitat outcomes more efficiently and at a lower cost.

CONCLUSION

ALTHOUGH CARIBOU RECOVERY is certainly challenging, the tools to achieve it are by now well-known (despite the fact that they have been often ignored by provinces, territories and industries).

First and foremost, range-scale, landscape-level planning to protect critical habitat and support recovery must take place, anchored spatially to caribou ranges. This must be accompanied by interdepartmental assessments of cumulative impacts in caribou ranges, to ensure that adequate caribou habitat is maintained/restored over time. As a first step, in caribou ranges where the disturbance threshold of a minimum of 65 per cent disturbance has already been breached, remaining areas of undisturbed habitat will need to be maintained until it is proven that restoration will work for caribou at range and population scales. Thresholds can be adjusted as populations are subsequently monitored.

Although caribou recovery is certainly challenging, the tools to achieve it are by now well-known.

Economic models must evolve to optimize both industrial and caribou-recovery values; incorporate full-cost accounting of industrial activities; recognize the need and value to fund restoration by drawing on government and industry revenues from activities that destroyed critical caribou habitat; and link taxpayer subsidies to sustainable environmental performance measures.

We need, collectively, to assert the value of a future with caribou in it, prioritize aggressive recovery initiatives and set limits to our activities so that species like caribou persist. Fear-mongering about caribou conservation should be replaced by solutions-finding. In instances where solutions that optimize sustainable development and caribou conservation are not possible, we must collectively make transparent decisions that are supported by science, not misinformation. We can co-exist with caribou. Let's find the ways to do so.

Appendix

Anielski, Mark, Research related to boreal caribou habitat restoration economics in British Columbia, May, 2019.

Ontario Nature, How can we Protect Critical Caribou Habitat and Support Forestry in Ontario, May, 2019.

Power, Thomas and Donovan Power, The Economic Impact of Restoring Woodland Caribou Habitat in the Bistcho and Yates Ranges in Northwestern Alberta. October 2018.

Notes

1 National Accord for Species at Risk, registrelep-sararegistry.gc.ca/6B319869-9388-44D1-A8A4-33A2F01CEF10/Accord-eng.pdf

2 Environment Canada, 2008. Scientific Review for the Identification of Critical Habitat for Woodland Caribou (Rangifer tarandus caribou), Boreal Population, in Canada. August 2008. Ottawa. Note that this science was upheld in 2011 updated scientific review: Environment Canada, 2011. Scientific Assessment to Inform the Identification of Critical Habitat for Woodland Caribou (Rangifer tarandus caribou), Boreal Population, in Canada: 2011 update. Ottawa, Ontario.

3 Environment and Climate Change Canada, 2017. Report on the Progress of Recovery Strategy Implementation for the Woodland Caribou (Rangifer tarandus caribou), Boreal population in Canada for the Period 2012-2017.

4 Boan, J.J., Malcolm, J.R., Vanier, M.D., Euler, D.L., & Moola, F.M., 2018. From climate to caribou: How manufactured uncertainty is affecting wildlife management. Wildlife Society Bulletin, 42(2), 366-381. wildlife.onlinelibrary.wiley.com/doi/pdf/10.1002/wsb.891

5 As cited in Thomas Power and Donovan Power, The Economic Impact of Restoring Woodland Caribou Habitat in the Bistcho and Yates Ranges in Northwestern Alberta, October 2018.

6 Ibid.

7 See, for example, Ontario Forest Industry Association, Counting Caribou: How did Canada's most populous ungulate end up on Ontario's endangered species list?

8 See, for example, quotes from FPAC in the *National Post*, "Protecting the caribou or saving jobs? Governments facing dilemmas and deadlines," August 3, 2017.

9 Response from scientists to claims made by the Forest Products Association of Canada regarding the scientific underpinnings of the federal Boreal Caribou Recovery Strategy, September 22, 2017, albertawilderness.ca/wp-content/uploads/2017/11/20170922_lt_scientists_to_ecccminister_car_strong_science.pdf.

10 See, for example: Is protecting northern Ontario's caribou habitat over forestry jobs 'eco-terrorism'? TVO, June 24, 2015.

11 Orphe Bichet et al., "Maintaining animal assemblages through single-species management: the case of threatened caribou in boreal forest." Ecological Implications, March 2016.

12 Environment and Climate Change Canada, 2017. Report on the Progress of Recovery Strategy Implementation for the Woodland Caribou (Rangifer tarandus caribou), Boreal population in Canada for the Period 2012-2017. Species at Risk Act Recovery Strategy Series. Environment and Climate Change Canada, Ottawa.

13 Ray, Justina C., 2014. Defining Habitat Restoration for Boreal Caribou in the Context of National Recovery: A Discussion Paper. Prepared for the Wildlife Conservation Society Canada.

14 This approach, for example, forms the basis of the Dynamic Caribou Habitat Schedule management regime in Ontario, which concentrates harvest areas to promote the regeneration of future conifer-dominated stands for caribou.

15 Ray, Justina C., 2014. Defining Habitat Restoration for Boreal Caribou in the Context of National Recovery: A Discussion Paper. Prepared for the Wildlife Conservation Society Canada.

16 See, for example, "BC taxpayers could get drilled for huge costs to clean up orphan wells," Vancouver Sun, March 14, 2019.

17 See, for example, Madziih (Caribo) Tsaa Che Ne Dane Traditional Knowledge Restoration Study, Doig River First Nation with the Firelight Group and the David Suzuki Foundation, December, 2016.

18 See https://ca.fsc.org/en-ca/standards/forest-management-standard-revision-01/species-at-risk-woodland-caribou.

19 See, for example, "Who's peddling pulp fiction in the SFI vs. FSC forestry wars?" Greenbiz, March, 2011.

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