CPAWS
CANADIAN PARKS AND WILDERNESS SOCIETY

Recommendation for a Nature-Based Climate Solutions Fund - August 2019

Canada's vast forests, grasslands, oceans and wetlands are all part of the climate solution. Canada's ecosystems, however, are consistently degraded by various industrial activities. These activities generate GHG emissions[i], harm biodiversity, and degrade ecosystem services that would otherwise provide resilience to climate change[ii].

Canadian Parks and Wilderness Society (CPAWS) recommends that Environment and Climate Change Canada develop and manage a four-year, $1 billion nature-based climate solutions fund. Nature-based climate solutions are measures that have benefits for climate change mitigation or adaptation *and* biodiversity.[iii]

Fund Objectives and Parameters:

- $500 million for piloting approaches to reduce GHG emissions from land-use change and degradation – approaches that would facilitate putting a carbon price on large GHG emitters in 2022;
- $500 million dedicated to projects aiming to protect, restore, or use natural infrastructure to increase resilience to climate change; and
- For both pools of funding, the biodiversity benefits of the projects must be demonstrated.

The fund should increase emissions reductions from land use, land use change and forestry (LULUCF) beyond the current predictions of 24 Mt by 2030[iv]. Initial back of the envelop estimates show that an additional 20 Mt could be reduced by that time (see table below). The fund should demonstrate that nature-based solutions can perform the services needed to address climate change and biodiversity loss impacts, help build confidence in the value of nature-based solutions compared to other GHG mitigation or adaptation options, and support the tools needed to help these activities become more mainstream.[v]

Complementing other Funding Sources: With dual climate and biodiversity criteria, the fund will have limited overlap with other existing federal funding. The Nature Fund[vi] is biodiversity-focused and the Green Infrastructure or Disaster Mitigation funds[vii] are emissions-reduction and adaptation focused, and though natural infrastructure solutions are eligible for both, the funds are not set up to advance these types of projects. The closer overlap would be with emission reduction projects being generated through a federal offset program being developed as part of the Output-Based Pricing System. However, offset projects face limitations that a project developed through a fund need not face, which would allow a fund manager to support more innovative or complex projects than would likely be generated through a federal offset program.[viii]

Fund Use: The fund should support any actors (Indigenous Peoples, communities, NGOs, industry, governments) seeking to pilot approaches that could achieve the above objectives and inform the development of policy. Example projects might include methods to reduce the GHG emissions and biodiversity impacts from road development in wetlands or peatlands, adapting agricultural activities or food management practices to reduce the expansion of agriculture into existing grasslands and forests, or supporting municipalities working across a watershed to protect and restore wetlands and flood plains, which are vital natural infrastructure. To be effective and to provide meaningful results, these solutions should be implementable at a landscape scale and on a long-term basis.[ix] Funding should also be available for scientific or policy research to provide information vital for supporting the development of more innovative projects, for example a review of existing tax incentives that may encourage land use change[x]. Consideration should also be given to projects seeking to simultaneously reduce land use change pressures and address the demand for food, fuels, and other goods that impact land-use change. Research has shown these strategies are vital to reduce GHG emissions to the extent needed to meet climate goals.[xi]

Project Costs: The costs of these projects will vary significantly depending on the drivers of deforestation being addressed, the scale of restoration needed, the scope of the project, and how costs and benefits are defined. As such, there should not be a minimum funding threshold, and there should potentially be different application and management procedures depending on the amount of funding requested. See Table 1 for some of the literature on costs for types of projects that could be applicable.

Other Considerations:

The national inventory only quantifies very specific activities that impact wetlands, peatlands, salt marshes, etc. Only harvesting and flooding of wetlands are captured. This means that nature-based solutions related to reducing other activities in wetlands, would need to be quantified for the NDC outside of the national inventory process. This could be done using something like the WRI policy and action accounting standard: https://www.wri.org/publication/policy-and-action-standard. It is worth considering this type of approach however, at least for some type of activities. For example, in relation to loss of coastal salt marshes and disturbances of peatlands, which generate large emissions per hectare.

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Table 1

Strategy	Costs and Benefits provided
Reducing harvesting levels (national assessment)[xii]	Annual average strategy cost for **harvesting less** (national, but focused in those areas selected by CFS): **$253 million** Average mitigation cost per tonne ($t CO_2e^{-1}): **$43** (from $4 to $884 depending on the location) Average annual mitigation Mt CO_2e : 7.3 Average annual domestic mitigation Mt CO_2e: 6.7
Reducing harvest levels or restricting harvest to maintain old growth forests in BC[xiii]	**Harvest less**: Average annual domestic mitigation cost **($33M/year**) Average domestic mitigation cost per tonne **$21/t$CO_2$e** **Restricted harvest**: Average annual domestic mitigation cost (**$81M/year**) Average domestic mitigation cost per tonne: **$36/t$CO_2$e**
Afforestation on private land in the Canadian province of Ontario[xiv]	**Different estimates were presented** At **$37/ton carbon**: from less than 10 thousand ha to 1.91 million ha of land in Eastern Canada would potentially be made available for afforestation from **hybrid poplar.** At **$92/ton** carbon land availability would range from 20 thousand ha to 8.34 million ha. **$37/ton carbon**: 2.218 million ha would be potentially attractive for afforestation using hybrid poplar, 5 thousand ha would be attractive for hardwood plantations, and 1.930 million ha would be attractive for softwood (conifer) plantations. Or **$37/ton** would lead to afforestation of 81 thousand ha in Ontario over a period of 100 years – only 69 thousand ha of which are additional.
Targeted subsidies ($9 per acre) to protect pasture acreage from conversion[xv]	For high risk (of conversion) areas – 10,011 hectares for $95,678,521 (CAN 2006) – average cost **$1547/ha**. For high risk high conservation quality areas about 9256 ha for $50,095,585 or **$865.6/ ha average**. For medium/low risk – high quality areas about 9507 ha for $43,351,973 or about $**730/ ha**.
Conservation of habitat in Alberta[xvi]	To estimate economic consequences conservation scenarios in Alberta, the simulated rates of natural resource production were translated into gross domestic product (GDP) using

	conversion factors of \$64.76/m3 of timber, \$310.12/ha of farmland, \$0.1335/m3 of gas, \$179.29/m3 of conventional oil, and \$163.86/m3 of bitumen. The protection scenario resulted in **18,454 km2 less anthropogenic footprint after 50 years** as compared to the moderate development scenario with business as usual practices. Across watersheds, the economic cost of avoided habitat loss through protection ranged from **\$1.2 million to \$959.3 million (for areas with minable bitumen) of foregone GDP per km2 (or 100 ha) of avoided anthropogenic disturbance.**
Protecting existing aquifer and surroundings	The town of Gibsons, BC assessed the value of its naturally occurring aquifer to provide water storage services and its ponds to provide stormwater management services. Gibsons found that at a cost of **\$30,000 per year** for maintenance and monitoring, the aquifer provided water for approximately 70% of the town's projected population. The assessment of its naturally occurring ponds in the town's White Tower Park found that providing the same stormwater management services through engineered assets **would have cost about \$3.5 million to \$4 million.** These assessments led Gibsons to protect its aquifer and White Tower Park ponds from proposed new housing developments.
Building water retention wetland system[xvii]	Pelly's Lake is a 121-hectare wetland area, frequently flooded under natural conditions. The Pelly's Lake water retention wetland system, near Holland, Man., is located in a heavily drained agricultural area upstream of a high-flood-risk area of the Boyne River system. A cost estimation of The Pelly's Lake, Man., Water Retention Wetland System, Cost and Benefits (in 2017 dollars). **Cost: \$1,142,183**, for land: \$467,182*, Civil works: \$550,000, Operations and Maintenance and Harvest: \$125,000. **Benefits: \$449,540** for flood attenuation, biomass production, emission reductions (3,100 t), phosphorus and nitrogen. *The land acquisition cost is based on fair market value for high-value agricultural land in Manitoba, not the actual value of the land that Pelly's Lake occupies (low value, frequently flooded
Reducing wetland clearing and restoration[xviii xix]	A cost estimation provided by DUCs that considered a 3,657-hectare wetland projects in the Black-River sub watershed in southern Ontario (100 km north of Toronto) found that the total per-hectare **cost of restoring the wetland was \$27,664** per hectare. Including the opportunity cost of foregone land-use however, was estimated at \$4,335,459 for 3,647 ha or an additional **\$1188 per hectare**.[xx] Alberta estimate: General estimates are that the full cost for **restoration of natural wetlands in the White Zone is as low as \$10,000/ha, increasing to between \$19,000 and \$23,284/ha** in areas closest to Calgary.[xxi] Based upon mitigation guidelines and compensation rates, DUC (2012) estimates the per hectare cost of wetland restoration to be **approximately \$10,000 in the prairie parkland;** this includes land securement, physical restoration and future management costs.[xxii] Restoration costs are considered an up-front expenditure of **CAD\$13,585 per hectare restored** (unofficial estimate from Ducks Unlimited Canada), and opportunity costs are based on the rental rates are obtained from the Saskatchewan Ministry of Agriculture, and determined to be CAD \$88.01 per hectare of agricultural land (Government of Saskatchewan, 2012). [xxiii]

[i] See for example Part 1 of the 2019 Canadian National Inventory Report information on forest conversion here: https://unfccc.int/documents/194925 on page 188. In 2017, Forest Land converted to Cropland, Wetlands and Settlements amounted to total immediate and residual emissions of 11 Mt. This number underestimates the GHG emissions occurring from land use change but provides a starting point for discussions.

[ii] For examples, see https://www.horizonadvisors.org/natural-infrastructure-benefits

[iii] Nature-based climate solutions, as defined by IUCN, help to address climate change while providing benefits for biodiversity conservation[iii]. https://portals.iucn.org/library/sites/library/files/documents/2016-062.pdf

[iv] https://www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-gas-emissions/projections-2018.html

[v] See for example, https://www.iisd.org/library/advancing-natural-infrastructure-canada-forum-report, http://act-adapt.org/still-creek-a-case-study-of-transboundary-municipal-ecosystem-governance/ for some of the concerns and considerations regarding assessment criteria and challenges to implementing natural infrastructure solutions.

[vi] While climate values were mentioned, these projects were not required to explicitly demonstrate their emissions reduction or adaptation potential.

[vii] While both theoretically supportive of natural infrastructure solutions, challenges include funding thresholds in the DAMF and the definition of assets in both funds.

[viii] The federal offset program is still in design mode, but that will likely face certain limitations such as the price that such offsets will be able to garner per ton, what sources and sinks will be recognized, among other considerations.

[ix] https://portals.iucn.org/library/sites/library/files/documents/2016-062.pdf

[x] Schuster R, EA Law, AD Rodewald, TG Martin, KA Wilson, M Watts, HP Possingham, P Arcese (2018). Tax-shifting and incentives for biodiversity conservation on private lands. Conservation Letters 11:e12377

[xi] See Williams, David R., Ben Phalan, Claire Feniuk, Rhys E. Green, and Andrew Balmford. 2018. "Carbon Storage and Land-Use Strategies in Agricultural Landscapes across Three Continents." *Current Biology* 28 (15): 2500-2505.e4. https://doi.org/10.1016/j.cub.2018.05.087 or Searchinger, Timothy D. (2018). Assessing the efficiency of changes in land use for mitigating climate change. *Nature (London).* (564)7735. p.249

[xii] Cost of climate change mitigation in Canada's forest sector by Tony C. Lemprière et al. Table 5, page 610

[xiii] Climate change mitigation strategies in the forest sector: biophysical impacts and economic implications in British Columbia, Canada Zhen Xu & Carolyn E. Smyth & Tony C. Lemprière & Greg J. Rampley &Werner A. Kurz. Table 11.

[xiv] Use of revealed preference data to estimate the costs of forest carbon sequestration in Canada. Rose Murphy[a] Dominique M. Gross[b] Mark Jaccard[a]

[xv] Agricultural Land-Use Change in Prairie Canada : Implications for Wetland and Waterfowl Habitat Conservation. By Benjamin Rashford, Christopher Bastian, and J. Cole. Table 8, page 201

[xvi] Application of land-use simulation to protected area selection for efficient avoidance of biodiversity loss in Canada's western boreal region . Matt Carlson,, David Browne , Carolyn Callaghan

[xvii] IBC Wetlands Report 2018; https://www.intactcentreclimateadaptation.ca/wp-content/uploads/2018/09/IBC_Wetlands-Report-2018_FINAL.pdf

[xviii] IBC Wetlands Report 2018, Table 7, page 35

[xix] Benefits of Adopting Natural Infrastructure at https://www.horizonadvisors.org/natural-infrastructure-benefits

[xx] IBC Wetlands Report 2018; Table 3; pg 20

[xxi] Benefits of Adopting Natural Infrastructure, page 11

[xxii] Benefits of Adopting Natural Infrastructure

[xxiii] Benefits of Adopting Natural Infrastructure, page 43 Wetlands, Flood Control and Ecosystem Services in the Smith Creek Drainage Basin: A Case Study in Saskatchewan, Canada