

Assessment Priority: Healthy environment relationships

- Water and river systems, incl. flows: Groundwater effects; Water usage (processing); Changes to flow (dams)
- Wildlife and habitat, incl. SAR, birds, fish: Effects on harvest species; Impacts on ecological corridors; Effects to spiritual beings; New species making use of road corridors; Higher risk of roadkills; Impacts to
- Peatlands and other unique environments: Effects of disrupting peatlands; Permafrost;
- Forest ecosystems, incl. plants: ITK, 2- eyed seeing in Forest Management Plans; Impacts due to clear cutting
- Climate change adaptation: Use of fossil fuels for electricity; Change in species
- Biodiversity: Change in biodiversity

Description	Holder and Availability	Format	Limitations or Restrictions
Provide a general description of this information (title, topic, timeframe, geographic extent, purpose, etc.)	Who is/are the author(s) or owner(s)? To whom/ how is the information available?	E.g., databases, reports, shapefiles, oral communications, print (i.e. not digitized), etc.	Is the information or data already public? Are there access or costs restrictions? Is it confidential? Is it Indigenous Knowledge?
Bowman, J.E., J.C. Ray, A.J. Magoun, D.S. Johnson, and F.N. Dawson. 2010. Roads, logging, and the large mammal community of an eastern Canadian boreal forest. <i>Canadian Journal of Zoology</i> 88:454-467.	Paywalled, available through subscription/purchase, or on request from authors	Peer-reviewed publication	No restrictions
Browne, D.R. (2007). Freshwater fish in Ontario's boreal: Status, conservation, and potential impacts of development. <i>WCS Canada Conservation Report 2</i> .	Publicly available	Report	No restrictions
Burton, C. A. & Chetkiewicz, C.B. (2021). Monitoring that matters: Towards effective ecological monitoring to address cumulative impacts on biodiversity. In (Eds.), <i>Handbook of Cumulative Impact Assessment</i> .	Paywalled, available through subscription/purchase, or on request from authors	Book chapter	No restrictions
Carroll, C. & J.C. Ray. 2021. Maximizing the effectiveness of national commitments to protected area expansion for conserving biodiversity and ecosystem carbon under climate change. <i>Global Change Biology</i> DOI: 10.1111/gcb.15645.	Publicly available	Peer-reviewed publication	No restrictions

Chetkiewicz, C., Hornseth, M., Rempel, F., O'Connor, C., Scrafford, M., Southee, M., Ray, J., Carlson, M. & Farrell, C.E. (In progress). Assessment of the potential cumulative impacts of climate change and development on wolverine in northern Ontario.	Available on request from authors	Report in progress including cumulative effects scenarios for the Ring of Fire area	Restricted access
Chetkiewicz, C., Carlson, M., O'Connor, C., Edwards, B., Southee, M., & Sullivan, M. (2017). Assessing the Potential Cumulative Impacts of Land Use and Climate Change on Freshwater Fish in Northern Ontario. WCS Canada Conservation Report 11.	Publicly available	Report	No restrictions
Chetkiewicz, C. & Lintner, A. (2014). Getting it Right in Ontario's Far North: The Need for a Regional Strategic Environmental Assessment in the Ring of Fire [Wawangajing]. WCS Canada, Ecojustice.	Publicly available	Report	No restrictions
Chetkiewicz, C. and Carlson, M. (2013). A Fork in the Road: Future Development in Ontario's Far North. Wildlife Conservation Society Canada Collaborative Report.	Publicly available	Report	No restrictions
Dawson, F.N., Magoun, A.J., Bowman, & Ray, J.C. (2010). Wolverine, <i>Gulo gulo</i> , home range and denning habitat in lowland boreal forest in Ontario, Canada. Canadian Field-Naturalist.	Paywalled, available through subscription/purchase, or on request from authors	Peer-reviewed publication	No restrictions
Dzus, E., Ray, J.C., Thompson, I., & Wedeles, C. (2010). Caribou and the National Boreal Standard - Report of the FSC Canada Science Panel. Wildlife Conservation Society Canada [WCS Canada].	Available on request from authors	Report	No restrictions
Edwards, B.A., Southee, F. M., & McDermid, J.L. (2016). Using climate and a minimum set of local characteristics to predict the future distributions of freshwater fish in Ontario, Canada, at the lake-scale. Global Ecology and Conservation.	Publicly available	Peer-reviewed publication	No restrictions
Elsen, P. R., Oakes, L. E., Cross, M. S., DeGemmis, A., Watson, J. E., Cooke, H. A., ... & Grantham, H. S. (2023). Priorities for embedding ecological integrity in climate adaptation policy and practice. One Earth.	Publicly available	Peer-reviewed publication	No restrictions

Farrell, C., Simard, J., Loutit, S., Southee, M., Cruz-Font, L., Struthers, D., Seguin, J. & O'Connor, C. (2024). Occupancy, movement, and behaviour of namew (lake sturgeon, <i>Acipenser fulvescens</i>) in an intact river in Canada. Endangered Species Research.	Publicly available	Peer-reviewed publication	No restrictions
Far North Science Advisory Panel. 2010. Science for a changing Far North. The Report of the Far North Science Advisory Panel. Ontario Ministry of Natural Resources, Toronto, Ontario. 141 pp.	Publicly available	Report	No restrictions
Festa-Bianchet, M., J C. Ray, S. Boutin, S.D. Côté and A. Gunn. 2011. Caribou conservation in Canada: an uncertain future. Canadian J. of Zoology 89:419-434.	Publicly available	Peer-reviewed publication	No restrictions
Goodday, V., Harris, L., & Tanguay, L. (2024) Assessing Peatland Lawand Policy Across Canada: Is Canada Fulfilling Its Critical Stewardship Role? The National Peatland Policy Project, WCS Canada.	Available on request from authors	Report in progress	Restricted access
Grantham, H. S., et al. (2020). Anthropogenic modification of forests means only 40% of remaining forests have high ecosystem integrity. Nature Communications.	Publicly available	Peer-reviewed publication including useful dataset	No restrictions
Harris, L.I., Olefeldt, D., Pelletier, N., Blodau, C., Knorr, K.H., Talbot, J., Heffernan, L. & Turetsky, M. (2023). Permafrost thaw causes large carbon loss in boreal peatlands while changes to peat quality are limited. Global Change Biology.	Publicly available	Peer-reviewed publication	No restrictions
Harris, L.I., Richardson, K., Bona, K.A., Davidson, S., Finkelstein, S., Garneau, M., McLaughlin, J., Nwaishi, F., Olefeldt, D., Packalen, M., Roulet, N., Southee, F.M., Strack, M., Webster, K.L., Wilkinson, S.L. & Ray, J.C. (2021). The essential carbon service provided by northern peatlands. Frontiers in Ecology and the Environment.	Publicly available	Peer-reviewed publication including useful dataset	No restrictions
Johnston, A. & Ray, J. C. 2023. Assessing Biodiversity under the Impact Assessment Act: Principles and Guidance for Safeguarding Biodiversity Through Project Assessment. Report prepared for the Impact Assessment Agency of Canada.	Publicly available	Report	No restrictions

Johnson, C. J., & Ray, J. C. (2021). The challenge and opportunity of applying ecological thresholds to environmental assessment decision making. In (Eds.), Handbook of Cumulative Impact Assessment. Wildlife Conservation Society Canada [WCS Canada].	Paywalled, available through subscription/purchase, or on request from authors	Book chapter	No restrictions
Johnson, C.J.J., O. Venter, J.C. Ray & J.E.W. Watson. 2019. Growth-inducing infrastructure represents transformative yet ignored keystone environmental decisions. Conservation Letters. 2019:e12696.	Publicly available	Peer-reviewed publication	No restrictions
Keatts, L.O., + 16 co-authors (including J.C. Ray). 2021. Implications of zoonoses from hunting and use of wildlife in North American arctic and boreal biomes: pandemic potential, monitoring, and mitigation. Front. Public Health 9:627654. doi: 10.3389/fpubh.2021.627654.	Paywalled, available through subscription/purchase, or on request from authors	Peer-reviewed publication	No restrictions
Kirkwood, A., Finkelstein, S., Davies, M., Fenton, N., Sanderson, N., Dieleman, C., Packalen, M., McLaughlin, J., Barreto, C., Moore, T., Balliston, N., Roulet, N., Humphreys, E., Southee, M., Webster, K., Harris, L. (In progress). Synthesizing 70 years of peatland knowledge for the world's second largest peatland – the Hudson Bay Lowland.	Available on request from authors	Peer-reviewed publication in progress	Restricted access
Kirkwood, J. A. H., Roy-Léveillé, P., Mykytczuk, N., Packalen, M., McLaughlin, J., Laframboise, A., & Basiliko, N. (2021). Soil microbial community response to permafrost degradation in palsa fields of the Hudson Bay Lowlands: Implications for greenhouse gas production in a warming climate. Global Biogeochemical Cycles, 35(6), e2021GB006954.	Publicly available	Peer-reviewed publication	No restrictions
Kirkwood, A., Roy-Léveillé, P., Branfireun, B., Basiliko, N. (2020). Mercury, methylmercury, and microbial communities in a degrading palsa of the Hudson Bay Lowlands, Far North Ontario. Cold Regions Engineering 2020. 12pp.	Paywalled, available through subscription/purchase, or on request from authors	Book chapter	No restrictions

<p>Koen, E.L., J.C. Ray, J. Bowman, F.N. Dawson, and A.J. Magoun. 2008. Surveying and monitoring wolverines in Ontario and other lowland, boreal forest habitats: Recommendations and protocols. Ont. Min. Natur. Resour., Northwest Sci. and Info. Thunder Bay, Ont. NWSI Field Guide FG-06 94 pp. + append.</p>	<p>Publicly available</p>	<p>Report</p>	<p>No restrictions</p>
<p>Lescord, G., Simard, J., Johnston, T., Seguin, J., Farrell, C., O'Driscoll, N. & O'Connor, C. (2024). The long-term effects of water resource development on blood mercury levels and the trophic ecology of Namew (lake sturgeon, <i>Acipenser fulvescens</i>). Facets.</p>	<p>Publicly available</p>	<p>Peer-reviewed publication</p>	<p>No restrictions</p>
<p>Lescord, G.L., Johnston, T. A., Heerschap, M.J., Keller, W., Southee, F.M, O'Connor, C., et al. (2020). Arsenic, chromium, and other elements of concern in fish from remote boreal lakes and rivers: Drivers of variation and implications for subsistence consumption. Environmental Pollution.</p>	<p>Paywalled, available through subscription/purchase, or on request from authors</p>	<p>Peer-reviewed publication</p>	<p>No restrictions</p>
<p>Lonsdale, W.R., Kretser, H.E., Chetkiewicz, C.B., & Cross, M.S. (2017). Similarities and differences in barriers and opportunities affecting climate change adaptation action in four North American landscapes. Environmental Management (2017) 60:1076–1089.</p>	<p>Paywalled, available through subscription/purchase, or on request from authors</p>	<p>Peer-reviewed publication</p>	<p>No restrictions</p>
<p>Magoun, A.J., J.C. Ray, D.S. Johnson, P. Valkenburg, F. N. Dawson, & J. Bowman. 2007. Modeling wolverine occurrence using aerial surveys of tracks in snow. Journal of Wildlife Management 71:2221-2229.</p>	<p>Paywalled, available through subscription/purchase, or on request from authors</p>	<p>Peer-reviewed publication</p>	<p>No restrictions</p>
<p>McDermid, J.L., Browne, D.R., Chetkiewicz, C-L., B. & Chu, C. 2015. (2015). Identifying a suite of surrogate freshwaterscape fish species - a case study of conservation prioritization in Ontario's Far North. Aquatic Conservation: Marine and Freshwater Ecosystems 25(6): 855-873.</p>	<p>Paywalled, available through subscription/purchase, or on request from authors</p>	<p>Peer-reviewed publication</p>	<p>No restrictions</p>

Murdoch, A., Yip, D. A., Cooke, S.J., & Mantyka-Pringle, C. (2022). Evidence for the combined impacts of climate and landscape change on freshwater biodiversity in real-world environments: State of knowledge, research gaps and field study design recommendations. <i>Current Landscape Ecology Reports</i> .	Paywalled, available through subscription/purchase, or on request from authors	Peer-reviewed publication	No restrictions
Olszynski, M. & J. Ray. 2021. Science and Indigenous knowledge as the evidentiary basis for impact assessment. In: <i>In: The Next Generation of Impact Assessment</i> (M. Doelle & A. J. Sinclair, eds.). Irwin Law Inc., Toronto. (M. Doelle & A. J. Sinclair, eds.). Irwin Law Inc., Toronto.	Publicly available	Book chapter	No restrictions
Palmer, L., Harris, L., Cooke, H., Poley, L., & Ray, J. (2024). WCS Canada Comments - Forest Degradation (followup 4). <i>Wildlife Conservation Society Canada [WCS Canada]</i> .	Publicly available	Public comments	No restrictions
Plumptre, A.J., Baisero, D., Wlodzimierz, J, Kühl, H., Maisels, F., Ray, J., Sanderson, E., Strindberg, S., Voigt, M., & Wich, S. (2019). Are we capturing faunal intactness? A comparison of intact forest landscapes and a first scoping of Key Biodiversity Areas of Ecological Integrity. <i>Frontiers in Forests and Global Change</i> .	Publicly available	Peer-reviewed publication	No restrictions
Poley, L. G., Schuster, R., Smith, W., & Ray, J. C. 2022. Identifying differences in roadless areas in Canada based on global, national, and regional road datasets. <i>Conservation Science and Practice</i> . E12656.	Publicly available	Peer-reviewed publication	No restrictions
Poley, L. G., B.A. Pond, J.A. Schaefer, G.S. Brown, J.C. Ray, and D.S. Johnson. 2014. Occupancy patterns of large mammals in the Far North of Ontario under imperfect detection and spatial autocorrelation. <i>Journal of Biogeography</i> . 41:122-132.	Paywalled, available through subscription/purchase, or on request from authors	Peer-reviewed publication	No restrictions
Poulton, D.W. & Ray, J.C. 2003. Knowledge, perception and application of the mitigation hierarchy among officials in Canadian Federal Regulatory and Resource Management Agencies. Report prepared for the Impact Assessment Agency of Canada.	Publicly available	Report	No restrictions

Ray, J.C. 2023. The imperative for transformative change to address biodiversity loss in Canada. In: Transformative Politics of the Wild (A. Olive & K. Beazley, eds.), University of Toronto Press, Toronto	Publicly available	Book chapter	No restrictions
Ray, J.C. 2014. Defining habitat restoration for boreal caribou in the context of national recovery: a discussion paper. Commissioned by Environment Canada, Ottawa, Canada.	Publicly available	Discussion paper	No restrictions
Ray, J.C., J. Grimm & A. Olive. 2021. The biodiversity crisis in Canada: failures and challenges of federal and sub-national strategic and legal frameworks. FACETS 6: 1–25.	Publicly available	Peer-reviewed publication	No restrictions
Ray, R., C. Poley, L., Magoun, G., Audrey J., Chetkiewicz, C., Southee, F.M., Dawson, N.F., & Chenier, C. (2018). Modelling broad-scale wolverine occupancy in a remote boreal region using multi-year aerial survey data. <i>Journal of Biogeography</i> .	Paywalled, available through subscription/purchase, or on request from authors	Peer-reviewed publication	No restrictions
Raygorodetsky, G. & Chetkiewicz, C. (2017). Watching, Listening, and Learning to Understand Change - Developing a Community-Based Monitoring (CBM) Initiative in Ontario's Far North. WCS Canada.	Publicly available	Report	No restrictions
Rempel, R.S, Carlson M, Rodgers, A.R, Shuter, J.L, Farrell, C.E, Cairns, D, Stelfox, B, Hunt, L.M, Mackereth, R.W, & Jackson JM. (2021) Modeling cumulative effects of climate and development on moose, wolf, and caribou populations. <i>The Journal of Wildlife Management</i> 85(7), 1355-1376.	Publicly available	Peer-reviewed publication	No restrictions
Scrafford, M., Seguin, J., McCaw, L., Boyce, M. & Ray, J. (2024). Wolverine density, survival, and population trends in the Canadian boreal forest. <i>Journal of Wildlife Management</i> .	Publicly available	Peer-reviewed publication	No restrictions
Southee, F.M., Edwards, B.A., Chetkiewicz, C. & O'Connor, C. (2021). Freshwater conservation planning in the far north of Ontario, Canada: Identifying priority watersheds for the conservation of fish biodiversity in an intact boreal landscape. <i>FACETS</i> . 6: 90-117.	Publicly available	Peer-reviewed publication	No restrictions
Watson, J.E.M. + 15 authors (including J.C. Ray). 2018. The exceptional value of intact forest ecosystems. <i>Nature Ecology and Evolution</i> .	Paywalled, available through subscription/purchase, or on request from authors	Peer-reviewed publication including useful dataset	No restrictions

Webster, K. L., M. Strack, N. Balliston, ..., L. Harris, ..., A. Kirkwood et al. (2025). Data and knowledge needs for improving science and policy for peatlands in Canada in a changing world: Insights from Global Peatlands Initiative Workshop, June 2023. FACETS, 10, 1-19.	Publicly available	Peer-reviewed publication	No restrictions
WCS Canada & Smart Prosperity Institute (2021). Policy brief - Protecting northern peatlands. Wildlife Conservation Society Canada [WCS Canada].	Publicly available	Policy brief	No restrictions

Contact Information Form

Name of individual(s) or organization	Wildlife Conservation Society Canada
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Alternate contact	Brianna Kim (bkim@wcs.org) or Justina Ray (jray@wcs.org)
Please provide a brief overview of your organization and its activities and interests relevant to the Regional Assessment	
<p>WCS Canada is a national civil society organization focused on generating science and working with partners to conserve large intact ecosystems and the species that rely on them. We have been leading scientific research programs, working with First Nations partners, and engaged in policy in northern Ontario for over two decades, and have collective scientific expertise related to species, ecosystems, and cumulative effects that we can offer related to the Regional Assessment process. This expertise draws from both our field research and policy analysis in the region, and related expertise of WCS colleagues in Canada and other countries. The overarching aim of our work is maintenance of biodiversity and high-integrity ecosystems, through minimizing cumulative impacts from human and non-human sources, including climate change. Our expertise is in the areas of impact assessment, cumulative effects, land use planning, aquatic and terrestrial biodiversity (including species at risk), ecosystem science and carbon cycling, and climate change. We have undertaken a range of research and policy work in (and beyond) the region on forests, peatlands, and species at risk, including boreal caribou, wolverine, and lake sturgeon. We prioritize community-based research, including co-creating a now decade-long research and youth program focused on river and lake sturgeon ecology in partnership with Moose Cree First Nation. We are also engaged in supporting a more community-based peatland monitoring project in partnership with Weenusk First Nation, where data collection could contribute to the regional assessment. We have undertaken modelling and assessments of cumulative impacts that focus on freshwater fish and mammals in and near the area of the regional assessment. Collectively, we have knowledge of the area from field-based research in the area for over two decades, including aerial surveys across the entire far north. We have served as members of the Committee on the Status of Endangered Wildlife in Canada (Mammals and Freshwater Fish). One of us was a member of the Far North Science Advisory Panel. In addition to the reports and peer-reviewed publications listed above, we have also collected various datasets over the past two decades in northern Ontario that have been submitted to the Ontario Natural Heritage Information System and are available publicly through that system.</p>	