

A close-up photograph of a wolverine's face, showing its dark fur, whiskers, and a focused expression. The background is a soft, out-of-focus green, suggesting a natural habitat.

Protecting Biodiversity in British Columbia

Recommendations for
an endangered species
law in B.C. by a species
at risk expert panel

October 30, 2018

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Garry oak, western Canada's only native oak species.
Photograph by: **Boris Mann**

Executive Summary

British Columbia has the greatest biological diversity of any province or territory in Canada. Yet more and more species in British Columbia are threatened with extinction and require active measures for protection and recovery. The current patchwork of provincial laws and regulations managing wildlife and their habitats has not effectively prevented species loss and decline. To address this shortcoming, the Government of British Columbia committed to enacting an endangered species law in the mandate of the Minister of Environment and Climate Change Strategy,ⁱ including consultation with stakeholders, experts, and Indigenous peoples.

We are scientific and legal experts on species at risk biology, policy, and recovery who have served on numerous related provincial, national, and international panels and working groups. We offer the government evidence-based recommendations for key features of legislation to identify and recover species at risk. In particular, listing must be timely, and recovery actions need to be prioritized by effectiveness, supported by best available evidence (including scientific and Indigenous knowledge), and subject to ongoing monitoring and reporting. Importantly, there must be legal accountability for lack of implementation. Because prevention is the best cure, British Columbia's new species at risk legislation should also support recovery actions that provide additional benefits by helping to keep non-listed species from declining and becoming at risk.

ⁱ Minister of Environment and Climate Change Strategy mandate letter: <https://www2.gov.bc.ca/assets/gov/government/ministries-organizations/premier-cabinet-mlas/minister-letter/heyman-mandate.pdf>

Our specific recommendations include:

1. Commit to principles of recovery, precaution, and feasibility

- 1.1 Integrate with provincial land-use planning framework
- 1.2 Ensure sustained funding
- 1.3 Commit to scientific integrity: rigour, transparency, independence, and open data

2. Take an evidence-based approach to recovery

- 2.1 Mandate an independent Oversight Committee to prioritize assessment, list species, guide prioritization of recovery actions, and evaluate effectiveness
- 2.2 Adopt automatic listing
- 2.3 Establish Recovery Teams for species or multi-species groups
- 2.4 Prioritize recovery actions quickly and transparently, while aiming to recover all species

3. Implement effective protections and stewardship, including

- 3.1 Implement automatic protections on Crown land and consult with landholders to apply additional protections
- 3.2 Use permits and exemptions sparingly and with justification
- 3.3 Support evidence-based stewardship

4. Ensure accountability to meeting Act objectives

- 4.1 Require government progress reports detailing the implementation of recovery



The stout western toad is a species of Special Concern
Photograph by: **Aerin Jacob**

Introduction

British Columbia (B.C.) has the greatest biodiversity of any Canadian province^{1,2} and also the most species at risk. The B.C. Conservation Data Centre (BCCDC) has identified 1,807 wildlife species (henceforth ‘species’) at risk, including those with declining populations, small populations, and restricted ranges.³ As part of national evaluations, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) has assessed 278 species at risk of extinction within B.C. (extirpated, endangered, threatened, or special concern); 214 of these are legally listed under the federal Species At Risk Act (SARA, 2002).⁴

In 1996, B.C. signed on to the National Accord for the Protection of Species at Risk, supporting the position that Canada’s biodiversity offers benefits to humans and should be protected. Although prevention is widely recognized as the best approach for conserving biodiversity,⁵ additional measures are needed to recover species at risk of extirpation or extinction. Unlike other provinces, B.C. has never had dedicated species at risk legislation and instead has been relying on an inadequate patchwork of legislation and resulting policy decisions to manage species at risk (e.g., the Wildlife Act (1996), the Forest & Range Practices Act (2002), and the Oil and Gas Activities Act (2008)). Critically, these legislative and policy frameworks were not intended to protect species at risk; the province has repeatedly been criticized for prioritizing resource development over the needs of species.⁵⁻⁷

In 2013, B.C.’s Auditor General found that the government was not doing enough to address biodiversity declines, particularly by not fully implementing or monitoring its own habitat-protection tools.⁸ Several bills have been tabled to protect B.C. species at risk,ⁱⁱ but none of these opposition-led bills passed first reading in the legislature.

B.C. needs strong and effective species at risk legislation. The national benchmark legislation, SARA, has been plagued with issues related to timeliness and effectiveness. For most listed species, the federal government has failed to meet legal timelines⁹ and has made little progress towards recovery goals (a pattern that holds for all monitored vertebrate taxa).^{10,11} Furthermore, there are taxonomic biases, with mosses and lichens more likely to have designated critical habitats than vertebrates.⁹ Similar problems in implementing species at risk legislation exist elsewhere: under Australia’s Environmental Protection and Biodiversity Conservation Act (1999), where key tools such as protecting critical habitat are discretionary, less than 1% of listed species had critical habitat designated and protected as of 2017.¹² In the United States, identifying and protecting critical habitat

ii) Including the Wildlife Protection Act, 2008 by Shane Simpson of the New Democratic Party (NDP); the Species at Risk Protection Act, 2010 & 2011 by Rob Fleming (NDP); the Endangered Species Act, 2017 by Andrew Weaver (Green Party), and the Species at Risk Protection Act, 2017 by George Heyman (NDP).

**British Columbia has the
greatest biodiversity of any
Canadian province and also
*the most species at risk.***

1807 species in decline

278 species at risk of extinction

214 listed under the federal Species At Risk Act

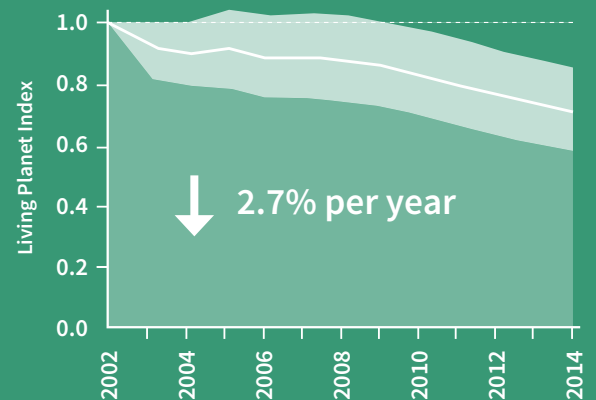
under the Endangered Species Act has lagged as agencies make ample use of legislative exemptions.¹³

In 2017, B.C.'s newly formed minority NDP government appointed George Heyman as Minister of Environment and Climate Change Strategy, with a mandate including the enactment of endangered species law. In 2018, the government of B.C. began to consult the public in advance of drafting legislation. The province stated a goal of “[managing] human-related activities so that: species are recovered and are no longer considered at risk; species at risk are safeguarded from further threats; and native species are not lost from B.C.,” while simultaneously supporting “sound decision-making, based on evidence, community knowledge, and Indigenous traditional knowledge.”⁵ We refer to this as-yet undrafted legislation as the British Columbia Species At Risk Protection and Recovery Act (hereafter BCSARPR or ‘the Act’).

Overall, we recommend that the legislation be written as a platform for a systematic, planned, and evidence-informed approach that protects and recovers species at risk across the entire province and that includes Indigenous peoples and other parties as partners in conservation. Our recommendations are grounded in our scientific training and expertise in species at risk policy and recovery. Our recommendations are limited to lands and waters under provincial jurisdiction (excluding marine habitats under solely federal jurisdiction). We recognize section 35 rights of Indigenous peoples under Canada’s Constitution, the commitment of the provincial and federal governments to the U.N. Declaration on the Rights of Indigenous Peoples (UNDRIP), and that Indigenous peoples have unique rights and interests in the use, management, and conservation of biodiversity. We recognize the possibility that endangered species legislation may conflict with the sovereign interests of Indigenous peoples, including their efforts to recover species at risk. We support the objective of reconciliation, and we urge the B.C. government to engage on a nation-to-nation basis when developing the BCSARPR and its associated policies.

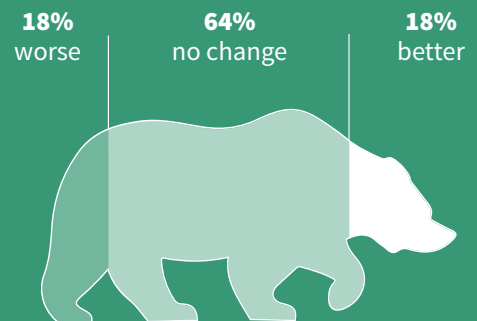
BIODIVERSITY CRISIS IN CANADA

Species at risk continue to decline under SARA



(WWF-Canada 2017)

Of the 455 species assessed more than once by COSEWIC, most have deteriorated in status or have failed to improve*¹⁰



*In most cases where species have improved in status, it is because more information has become available, not genuine recovery

Western painted turtles are the only native pond turtle left in B.C.
Photograph by: **John D. Reynolds**



Recommendations

Our recommendations for BCSARPPRA focus on committing to strong principles of precaution and scientific integrity, as well as enshrining a process intended to focus on implementing recovery action with independent oversight. We propose specific tools and approaches to avoid the delays in listing species, designating critical habitat, and implementing recovery actions that have plagued species at risk laws in other jurisdictions. **We make recommendations for legislation that emphasizes immediate and efficient recovery action within an evidence-based, transparent, inclusive, and adaptive management framework.** Our recommendations include:

1 Commit to principles of precaution, recovery, and feasibility

The purpose of the Act should be to prevent wildlife species (all taxa) from becoming extirpated or extinct in British Columbia, to provide for the recovery of wildlife species that are endangered or threatened, and to prevent healthy populations from becoming at risk. The Act should acknowledge that the Crown owns and holds wildlife species in trust for the present and future generations of British Columbians and that the Crown commits to exercise its authority over wildlife species in a manner that respects the intrinsic value of wildlife species (e.g., non-monetary or non-use values).ⁱⁱⁱ

The government's 2018 primer to support discussion on new species at risk legislation states the need for a law that “does not use a lack of scientific information as a reason to postpone protecting a species at risk if there are significant threats to that species.”^v We wholeheartedly support this approach. It aligns with decades of scientific literature,^{14,15} reflects best practice in the field of environmental management,¹⁶ is a core policy principle of SARA,¹⁷ and is consistent with international guidelines on species assessments (e.g., IUCN Red List). Furthermore, socioeconomic considerations should not trump ecological ones in cases of imminent imperilment, a principle supported by recent Canadian case law.^{iv}

Definitions of technical terms describing a species,^v survival, recovery, critical habitat,^{vi} and others should be consistent with definitions used at the federal level to minimize conflicts in objectives and

assessment. In particular, the current proposed SARA policy suite defines species “survival” as applying when a species surpasses a threshold for persistence, and species “recovery” as a higher threshold that also ensures that the range and genetic diversity of the species is represented.¹⁸ Specifying objective and practical targets for recovery can incentivize conservation actions to move species onto a “green list” of success”.¹⁹

iii) Since being articulated in the World Charter for Nature, World Conservation Strategy, Earth Charter, and the Convention on Biodiversity, a growing number of laws around the world acknowledge the intrinsic value of other species. These include laws in Costa Rica, Canada, Bangladesh, Israel, Japan, Tanzania, New Zealand, and the European Union. The Northwest Territories' Wildlife Act 2013, a law heavily influenced by Indigenous peoples, states “Wildlife is to be conserved for its intrinsic value and for the benefit of present and future generations.”

iv) For the Greater Sage Grouse in Alberta, the Canadian federal court concluded: “In deciding that no critical habitat would be identified in the Recovery Strategy, I find that the respondent reached that decision without regard to the material before it. It is not a decision that “falls within a range of possible, acceptable outcomes which are defensible in respect of the facts and law.”” *Alberta Wilderness Association v Canada (Environment)*, 2009.

v) SARA 2002: “a species, subspecies, variety, or geographically or genetically distinct population of animal, plant or other organism, other than a bacterium or virus, that is wild by nature and is either native to Canada or has extended its range into Canada without human intervention and has been present in Canada for at least 50 years.”

vi) SARA, 2002: “the habitat that is necessary for the survival or recovery of a listed wildlife species and that is identified as the species' critical habitat in the recovery strategy or in an action plan for the species.”

1.1 Integrate with the provincial land-use planning framework

Biodiversity management requires both “coarse-filter” (e.g., representative parks and protected areas, coordinated development at the landscape level) and “fine-filter” (e.g., species-specific) approaches. In this paper, we focus our comments on the fine-filter species-based legislation currently being considered by the B.C. government. Anthropogenic effects are taking a toll on wildlife²⁰ with many species potentially subject to thresholds below which they cannot recover.²¹ For most species, these critical thresholds are not yet known.²² For well-studied species where habitat disturbance thresholds have been identified (e.g., grizzly bears²³ and boreal caribou²⁴), these limits are often exceeded. Cumulative effects (e.g., the effects of multiple interacting stressors, such as climate change, habitat loss, and pollution) threaten biodiversity across large parts of B.C., particularly mammals with large distributions and ecosystems with high levels of conversion.²⁰

We recognize that laws managing the recovery of endangered species must link to other development and economic actions, both private and public. To halt ongoing declines and accomplish the goals of recovery, many species will require actions taken on a large spatial scale that involve many parties. To protect species, considering endangered species will need to be a formal part of every environmental impact assessment or cumulative effects assessment, including addressing data deficiencies. Other legislation (e.g., Forest & Range Practices Act, 2002 and Environmental Assessment Act, 2002) must be amended to allow for the implementation of required recovery actions as prescribed under BCSARPPRA.

1.2 Ensure sustained funding

No matter how well-crafted the text of a BCSARPPRA, the Act cannot accomplish its objectives unless it is sufficiently financed for people to carry out the programs and activities it describes.⁷ Such activities include the machinery of listing species and supporting Recovery Teams, private land stewardship, habitat restoration, removal of invasive species, species monitoring, and, if necessary, research for filling critical knowledge gaps. Government capacity will be needed to manage these processes and ensure they are achieved within mandated timelines. The government should implement financing options for the Act that are not subject to budgetary discretions that vary from year to year. This model would likely include tying income to support the Act’s programming with a specific revenue stream (e.g., fishing and hunting licenses, carbon price, or other means). We strongly caution against relying on funding from external bodies (e.g., B.C. Parks Foundation, Habitat Conservation Trust Foundation) in lieu of consistent provincial financial support.

1.3 Commit to scientific integrity: rigour, transparency, independence, and open data

As governments and society recognize the importance for science to be conducted and communicated transparently, commitments to scientific integrity (**Box 1**) are increasingly common in legislation and policy. For instance, a provision for government scientific integrity, honesty, objectivity, thoroughness, and accuracy has been proposed for Canada’s next federal impact assessment law.²⁵ All of Canada’s federal scientific departments have been mandated to implement scientific integrity policies by the end of 2018.²⁶ These policies are meant to allow federal scientists to conduct their work without political interference, communicate freely, and ensure that their scientific findings are available to the public. The Government of B.C. has also recognized the importance of professional independence and integrity to enhance public confidence in natural resource decision making.²⁷

Box 1: Components of Scientific Integrity

The BCSARPRA should explicitly support the following components of scientific integrity (adapted from Jacob et al. 2018 and Westwood et al. 2018):^{27,28} scientific rigour, transparent decision-making, independent advisors, and open information.

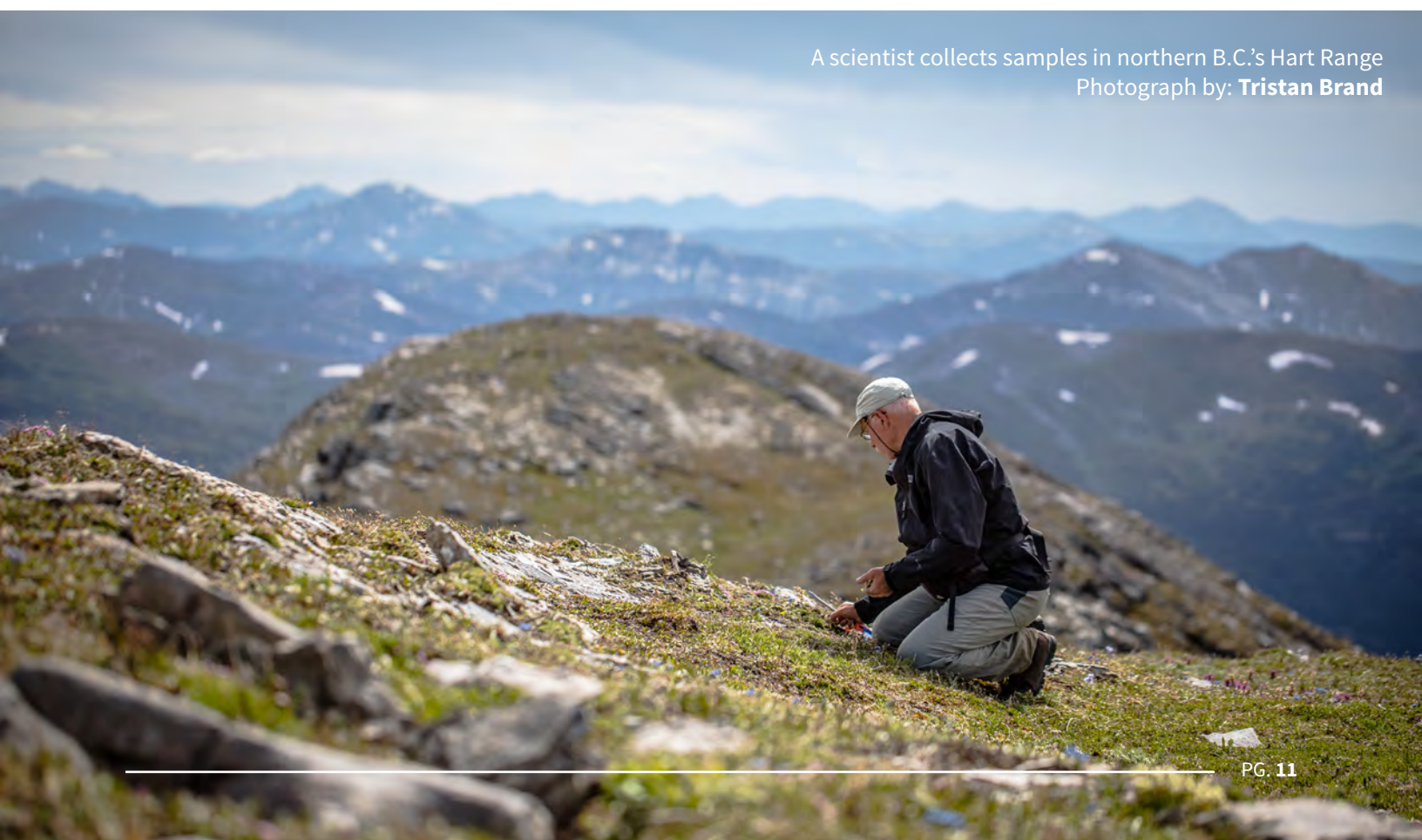
Scientific rigour

Although scientific evidence is commonly used in public policy, it is not always used effectively.³⁰ The best available methods should be used to collect and analyze data related to the Act. Data, metadata, associated results, and their interpretation, as well as their application in evidence-based decision making should adhere to evolving best scientific practices, including being subject to standards of peer review where applicable.^{31,32} Cumulative effects must be rigorously considered in species at risk assessment and recovery planning. Lacking full knowledge of threats or their interactions must not be used as a reason to delay recovery actions.

Transparency of decision-making

Although species assessment should be informed by evidence, including Indigenous knowledge, socioeconomic considerations will come into play when applying protections, assessing threats, and planning and implementing recovery actions. It is essential for the public to be informed about how and where different forms of evidence were considered, and on what basis decisions were made. In the past, decisions regarding wildlife management in B.C.⁷ and across Canada and the United States^{33,34} have been criticized for lacking transparency. Transparent decision-making for a proposed Act is supported by the government,⁵ and we encourage an explicit statement in BCSARPRA committing to this principle.

A scientist collects samples in northern B.C.'s Hart Range
Photograph by: **Tristan Brand**



Box 1: Components of Scientific Integrity (cont.)

Independence for advisors

Duties related to species at risk legislation, such as enforcing protections and implementing recovery actions, will belong to the government, but decisions and actions can be advised or undertaken by expert committees and scientists under contract. It is essential that in carrying out their duties under the Act, all parties, the information that they gather, and processes that they undertake are protected from interference. Although data collection and reporting has been strongly criticized for not meeting standards of independence for some environmental legislation in B.C. and nationally,³⁵⁻⁴¹ species assessment by COSEWIC as input to SARA has remained independent, providing a possible model. Measures should be included in the legislation to facilitate independence for parties collecting evidence, listing, and overseeing and planning recovery actions.

These would include declaration and prohibitions against perceived and real conflicts of interest, security of tenure for Oversight Committee and Recovery Team members, and sufficient funding and other administrative resources provided to assess, recover, and protect species under BCSARPR.



Photograph by: **Tristan Brand**

Open information, including a publicly available data platform

Standards of open data have increasingly been recognized as a best scientific practice⁴²⁻⁴⁴ by the Government of Canada,⁴⁵ Canada's three federal research granting agencies,⁴⁶ the European Commission,⁴⁷ top peer-reviewed scientific journals,⁴⁸⁻⁵¹ and major research funders.⁵²⁻⁵⁵ All information collected and produced in accordance with the Act should be explicitly required to be available to the public in full (with due consideration for sensitive data, geographic locations, and/or Indigenous or community-held knowledge), for free, without delay, in formats that are transferable, interoperable, and archived in perpetuity. Critically, data, reports, and decision-statements associated with all activities related to the Act by all stakeholders should be made available without undue delay, ideally via a web-based open-data platform. It may be advisable to include commitments to submitting data as part of related professional designations (such as Registered Professional Biologist in B.C.). A government-established integrated database was identified as one way to evaluate the impact of SARA.⁵⁶

The open-data platform would serve as the primary means of public engagement and clearly explain the BCSARPR and the roles of government and advisory bodies in enacting and monitoring the Act. All data and reports need to be complete, except for exemptions as above. It will be necessary to collaborate with the federal government, which hosts its own registry related to SARA,⁴ and the BCCDC, which already holds substantial data relevant to species conservation. Efforts should be made to align data warehousing methods between jurisdictions to more easily support independent analysis, data-sharing, and evaluation of cumulative effects (details about how this coordination might be done are described in Westwood et al. 2017⁵⁷). If well-executed, the open data platform will enable public participation, long-term monitoring and trend analysis, independent verification, effective coordination with other jurisdictions, and measurement of Act effectiveness.

2

Take an evidence-based approach to recovery

National and provincial species at risk legislation across Canada, including SARA and previous drafts of B.C. legislation, have typically addressed four components of species protection and recovery: (1) assessing risk status; (2) designating a legal status ('listing'); (3) applying immediate protections to individuals and habitats; and (4) planning and implementing further recovery actions. The manner in which these components are addressed varies across jurisdictions, particularly regarding the discretion exercised by government officials at each stage.

While our proposed process for managing and recovering species at risk includes these four components, we also add a fifth: (5) reporting on outcomes, with explicit criteria and indicators, to ensure government accountability towards achieving the purpose of the Act. Across all components, we recommend methods to promote expeditious, efficient, and effective implementation. This includes using an adaptive management framework in a truly rigorous way:⁵⁸ an iterative approach that examines which recovery activities are working and adjusting accordingly, with an emphasis on improving measurable outcomes.

2.1 Mandate an Oversight Committee to prioritize assessment, list species, guide prioritization of recovery actions, and evaluate effectiveness

In preliminary materials, the government has expressed interest in creating a committee to assess the status of species in the province.⁵ We suggest that this function and others be conducted by an independent Oversight Committee.

The Oversight Committee's responsibilities would include:

- Overseeing status assessment (section 2.2)
- Listing assessed species (section 2.2)
- Grouping species for recovery action planning, and defining and coordinating the planning process (section 2.3)
- Nominating members for recovery teams (section 2.3)
- Reporting on recovery actions and outcomes (section 4)

Creating an Oversight Committee has key benefits for effective and efficient assessment and recovery of listed species. It would: (1) increase integration among provincial, federal, and Indigenous governments, academic, industry, and non-governmental sectors for species conservation and

recovery; (2) ensure transparency and consistency in the assessment and recovery processes; (3) reduce costs through the coordination of multi-species recovery plans and actions; and (4) rapidly integrate advances in conservation science into implementation of the law.

Much like SARA sets out the responsibilities of COSEWIC,⁵⁹ BCSARPPRA must set out the functions and member qualifications of the Oversight Committee and ensure the provincial government provides the committee with the resources necessary to perform its functions. Members should include experts in ecological and conservation sciences, including Indigenous Knowledge, who are able to participate independently of their affiliations; clear conflict of interest guidelines need to be developed and followed to ensure independence. Member qualifications should be in the public record, and we strongly suggest that selection of members accounts for other aspects of diversity and representation of under-represented groups. Initial committee nominations will be made by the government, and once the committee is established, additional or replacement members shall be nominated by the committee itself. The relevant Minister must approve appointments, and rejected nominations must be explained by the Minister in a written decision.

2.2 Adopt automatic listing

Legal designation (listing) of a species as ‘at risk’ is a key step that triggers legal mechanisms for protection and recovery. Canadian jurisdictions vary in the extent to which the listing decision is discretionary (made by government) or automatic (made by an independent expert body). Under SARA, assessment is done by an independent committee (and is evidence-based, with peer-reviewed reports) while listing is at the discretion of the relevant Minister.⁵⁸ Alberta’s Wildlife Act, 2000 also uses discretionary listing. Because the application of protections may have economic or socio-cultural impacts, discretionary listing results in some imperiled species not being listed (particularly those with commercial value or for whom protections would impact resource industries).⁵⁹ Ontario’s Endangered Species Act, 2007 includes automatic listing, based exclusively on a scientific assessment.

We recommend that the Act adopt an automatic listing system^{vii}, involving two tracks as described in the next paragraph. An automatic listing process will increase the law’s (a) scientific integrity, because listing is based on best available evidence, (b) efficacy, because all at-risk species benefit from protection and monitoring, (c) transparency, allowing for a clear statement to the public about which species are imperiled and are being recovered, and (d) timeliness, by avoiding delays related to Ministerial decisions. We recommend that the government use post-listing mechanisms (section 2.4) to balance social and economic considerations versus actions for species recovery.

vii) The majority of coauthors supported the model advocated in this paper: automatic listing (section 2.2) with SARA-like protections on Crown land (section 3.1) with an opt-out clause at the recovery planning stage (section 4). We also considered alternative listing and protection models, including (1) automatic listing with no opt-out clause and SARA-like protections on Crown land, (2) discretionary listing with SARA-like protections on Crown land, (3) discretionary listing with enhanced protections on Crown land, and (4) discretionary listing with SARA-like protections and an opt-out clause.

The two tracks would be as follows:

- (1) automatically listing B.C. species that are listed federally under SARA, and
- (2) separately assessing and listing species whose status requires special consideration in the province, in coordination with COSEWIC and the BCCDC as appropriate.

Automatically adopting the SARA list avoids delays and costs of re-evaluation while encouraging synchronization of provincial and federal recovery efforts. Listed species would then be subject to some automatic protections (section 4.1) and would enter into the recovery action prioritization and tracking process.

Some species and populations will require B.C.-specific assessment, including designatable units or sub-populations in B.C. that are more at risk than their federal status indicates (e.g., red-listed species that are endangered in B.C. but only listed as special concern in Canada) and some nationally-imperiled species not listed under SARA (e.g., species identified as at risk by COSEWIC but not listed under SARA). One of the most successful components of SARA is the independent scientific assessment provided by COSEWIC.⁶² We recommend that the Oversight Committee be granted similar powers to propose species for assessment, based on requests received for additional listings or changes in status from interested parties, including members of the public and the government. The Minister would then add species to the list based on direction from the Oversight Committee. Technical and administrative support should be provided by the government. We recommend using COSEWIC’s criteria for assessing risk, scaled appropriately to the province, as the basis of listing decisions.

In addition, emergency listings will be needed in cases where provincial extirpation may be imminent without protection (tailoring the emergency listing procedures of SARA to B.C.). We also suggest provision be made for rapid assessment in cases where new information could affect listing. In all cases, species must be added to the regulated list within three months of listing by SARA or a recommendation to list by the Oversight Committee.

2.3 Establish Recovery Teams for species or multi-species groups

In line with the B.C. Species at Risk Task Force,⁷ we recommend that Recovery Teams be established to identify and prioritize recovery actions for multi-species groups, which can deliver cost efficiencies over single species action plans.⁶¹ Multi-species recovery approaches may be employed when species overlap substantially in a particular ecoregion (ecosystem-based) or when a subset of species face clearly definable common threats (e.g., pollutants, invasive species, or a disease). Several areas of B.C. have high numbers of species at risk (e.g., southern Vancouver Island Garry Oak ecosystems, South Okanagan ecosystems) that would be well-served by this approach. Multi-species coordination can address cases where recovery actions for one species may affect another (e.g., when both a predator and its prey species are at risk). There is precedent in B.C. for broadly constituted Recovery Teams, including the Garry Oak Ecosystem Recovery Team and the Vancouver Island Marmot Recovery Team. Listed species should be assigned to an existing or new Recovery Team on a set timeline (e.g., within three months of listing).

This approach is consistent with the multi-species approach that Environment and Climate Change Canada is increasingly using for SARA-listed species. That said, the central goal of B.C. legislation would remain improving the status of all individual species at risk, such that recovery actions are targeted appropriately and with species-specific measures for monitoring recovery.

The Oversight Committee would be responsible for:

- (1) creating general guidance for Recovery Teams to ensure that plans are based on the best available information on the conservation status of a species, including scientific, Indigenous, and local knowledge;
- (2) organizing their structure (delineating multi-species groupings while taking into account existing Recovery Teams, the efficacy of past Recovery Teams, and any recommendations made by the government);
- (3) reporting on progress towards species recovery (synthesizing information from the Recovery Teams); and
- (4) nominating team members. In cases where a federal Recovery Team exists, the Oversight Committee would determine whether an additional provincial team is needed.

Members of Recovery Teams would include experts with knowledge of the ecology, threats, socio-economics and recovery options for the species or species group and may be drawn from government (including Indigenous government) and non-government sectors of society. Their qualifications should be part of the public record. Government would be responsible for appointing members and adequately funding and supporting Recovery Teams. We recommend that rejection of Oversight Committee-nominated members be accompanied by a publicly-available written decision statement.

Scientist collecting insects in northern B.C.'s Hart Range
Photograph by: **Tristan Brand**

2.4 Prioritize recovery actions quickly and transparently, while aiming to recover all species

Under the SARA process, a Recovery Strategy is developed based on scientific and Indigenous knowledge, followed by an Action Plan, with the latter incorporating socioeconomic costs and benefits. This two-step planning stage has the advantage of clearly separating scientific recommendations from management actions, encouraging transparency of decision-making. However, in practice, the preparation of these two documents causes serious delays before actions are taken. As of 2017, the average time for Recovery Strategy completion exceeded six years,⁶⁴ double the legally-mandated time limit, and Action Plans are still missing for most listed species (beyond Plans within National Parks). Such delays have been found unlawful by the Federal Court of Canada⁶⁵ and can lead to increased costs, uncertainty for industry, and lost opportunities to recover species.^{12,66} Furthermore, Recovery Strategies and Action Plans often lack the content needed to determine which actions are essential for recovery (e.g., many early Recovery Strategies failed to specify critical habitat designation, despite the legal obligation to do so, as confirmed by court decisions^{64,67}). The lengthy and document-focused approach that has been used to implement SARA has not yet led to improved outcomes for species, and many species at risk continue to decline in status.^{11,68}

To speed up species recovery, we propose that the BCSARPPRA combine the two steps of Recovery Strategy and Action Plan into a single process, Recovery Action Prioritization (RAP). Overseen by the Recovery Team, the RAP will elicit expert opinion, evaluate risks, assess feasibility, and prioritize options for action. In doing so, it remains critical to apply the principles of scientific integrity, particularly transparency. This mandate means making it explicitly clear when management actions deviate from evidence-based recommendations for recovery and why such determinations were made. Sufficient funding and government capacity will be necessary to carry out prioritized actions (such as those described in section 3.3) and assess their effectiveness (section 4).

The RAP will be publicly available and considered a living document that allows for adaptive management. The Act should explicitly require that the first version of the RAP be drafted within one year of the species being assigned to the Recovery Team and updated on a mandatory timeline (length recommended by the Recovery Team) until all species under the purview of the Recovery Team are deemed recovered by the Oversight Committee (but see section 4). Upon implementing the law, there should be a two-year 'grace period' before mandatory reporting timelines come into effect, allowing for the Oversight Committee to be established and its guidance developed. The government may extend timelines with an explicit statement from the Minister, providing the rationale for the extension is published and the public are given adequate comment period.

Evidence-based assessment is central to determining the feasibility of recovery, the targets for and measures of recovery, and the mechanisms for achieving these targets. The choice of which actions and mechanisms to implement, in turn, requires input from socioeconomics,^{69,70} Indigenous peoples, and community concerns. The RAP stage is the appropriate place in the legislation for these considerations to be recognized through the prioritization of recovery actions. In other jurisdictions, the lack of a rigorous, transparent, and repeatable approach to prioritizing recovery action has led to delays in implementation of recovery plans and, in some cases, species extinction.^{66,71}

We propose that BCSARPPRA require Recovery Teams to evaluate and prioritize proposed recovery actions based on estimated effectiveness, benefits, and cost. Prioritization is a tool increasingly used in conservation and natural resource management to inform investment decisions by evaluating the costs of achieving the recovery of a species (e.g., financial cost of recovery, as well as lost sociocultural and/or ecological benefits associated with inaction) and the associated benefits (monetary and non-monetary) of recovery.⁷²⁻⁷⁴

The Recovery Team would be charged explicitly in the legislation with commissioning an evaluation, using modern scientific tools, of the potential actions that would allow for recovery and their predicted effectiveness. There are several participative processes available for such an evaluation.⁷⁵⁻⁷⁹

Minimum content for RAPs should be identified in the BCSARPPRA and include:

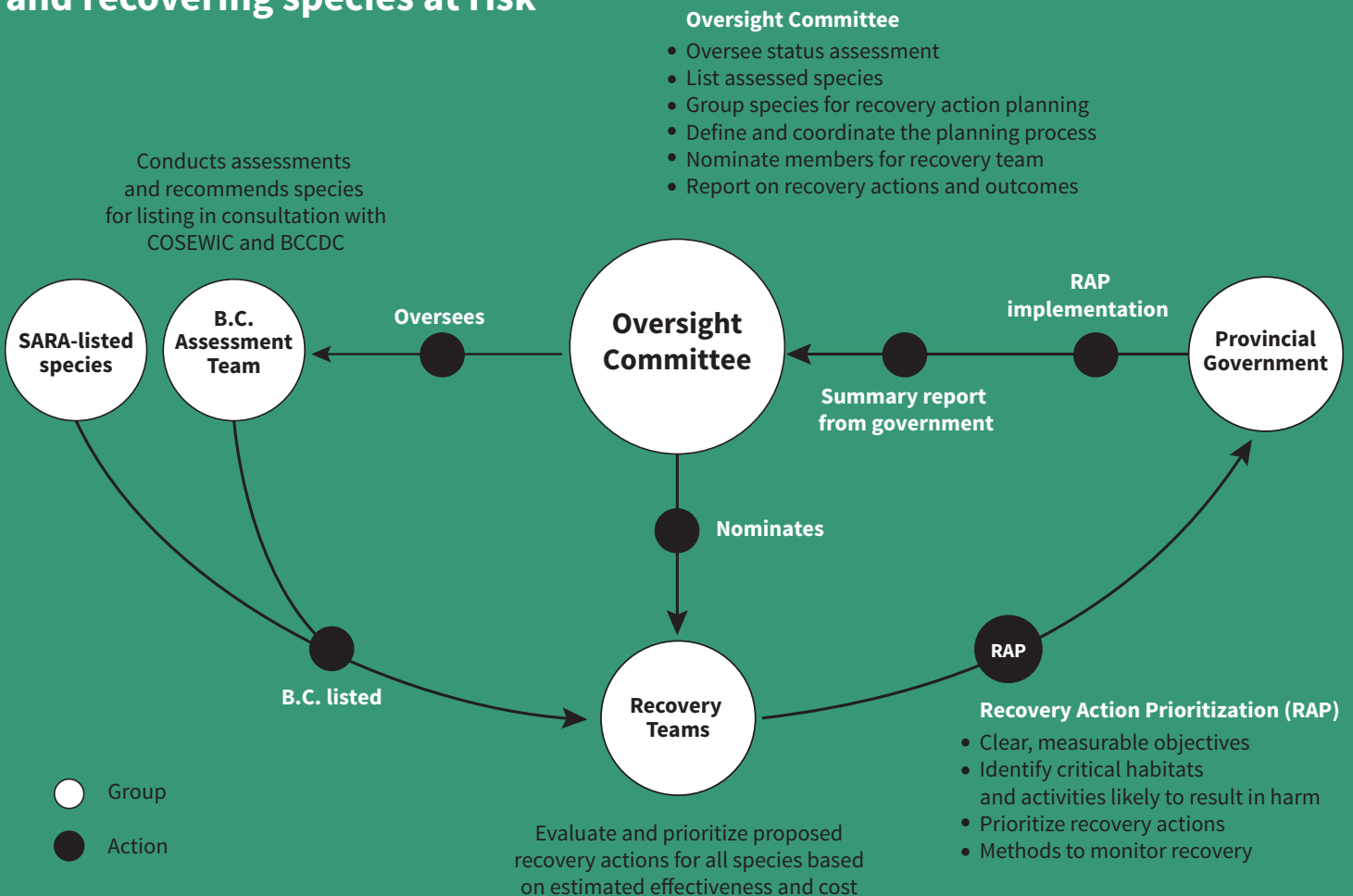
- (1) clear, measurable objectives and thresholds for individual species;
- (2) identifying critical habitat and analyzing cumulative effects,
- (3) describing activities likely to result in harm,
- (4) setting and prioritizing recovery actions by anticipated effectiveness, benefits, and costs
- (5) identifying methods used to monitor recovery.

As the RAP is intended to be a living document, in the absence of complete information (for example, if critical habitat has not yet been defined) the

RAP should be published with what information is available. In cases where additional research may affect the success of recovery actions, specific further study may be included in the prioritized list of actions.

The government should be explicitly required under the legislation to provide a summary report annually to the Recovery Team on recovery activities undertaken (or not taken) as listed on the RAP and on any assessed changes to the species at risk, following explicit criteria and indicators for measuring progress. We recognize that although some species may require less effort than others to recover, the purpose of the Act is to recover all listed species. Thus, although RAPs may be made and actions prioritized for groups of species, the conservation status of all listed species must be tracked individually (section 4).

Proposed model for listing and recovering species at risk



3 Implement effective prohibitions and stewardship

SARA has been hampered in its ability to recover listed terrestrial species due to the small proportion of federally-owned land in Canada, limiting where protections apply. With 94% of B.C. classified as Provincial Crown land⁸⁰ (although much of this may be subject, in part, to Indigenous peoples' land claims), a BCSARPRA has the advantage of being able to apply across much of the province's land base. Implementing protections will be more effective if the provincial government engages in joint recovery planning with Indigenous peoples (including through guardian programs) and private landowners to encourage shared stewardship.

Because of the insufficiency of any given policy measure and potential conflicts between policy measures, we strongly recommend adopting an approach that explicitly considers a policy mix for conservation. BCSARPRA will likely be most effective if designed with a mixture of prohibitions and incentives, as well as other structures for stewardship, explicitly considering how these policies interact. Measures that provide technical assistance and/or some regulatory relief for stakeholders undertaking stewardship actions (e.g., safe harbour habitat policies) can help to reduce resentment among stakeholders;⁸¹ meanwhile, introducing stewardship programs in informational sessions about compliance could potentially greatly broaden the stakeholders participating in stewardship.



Burrowing owls are considered Endangered nation-wide
Photograph by: **Michael Klotz**



The Purcell mountains are an important habitat for grizzly bear, mountain caribou, and wolverine
Photograph by: **Alex Popov**

3.1 Implement automatic protections on Crown land and consult with landholders to apply additional protections

Given that the purpose of species at risk legislation is to protect and recover species, we suggest that the Act immediately prohibit the killing, harming, taking, or harassment of individuals of endangered and threatened species (‘no take’) on Crown land, except where the RAP specifies conditions under which take is compatible with recovery. These protections should also extend to life-sustaining elements defined in the assessment, which may include ecological and/or habitat features (e.g., dens, nests, hibernacula, other sites regularly occupied by the species, essential geological features). Automatic protections should be consistent with S.32 and 33 of SARA, which will give users on the land base greater clarity about when and how activities can be carried out without concern about imminent orders from the federal government. Where such automatic protections infringe upon section 35 rights of the Constitution, we anticipate that the RAP will consider exceptions for Indigenous peoples, and we

urge the Province to engage with Indigenous groups to support conservation efforts by all parties and to identify means of compensating for any infringements.

However, ‘no take’ protections alone are insufficient to prevent further population declines, for two reasons. First, for most species indirect, cumulative, or ancillary harm from human activities are the major threats.^{82,83} Therefore, RAPs will specify additional protections or prohibitions essential to recovering species (including protecting critical habitat), which, if identified as a prioritized action deemed essential for recovery, must be legally required. Where such protections or prohibitions infringe upon section 35 rights, we anticipate that the RAP will consider exceptions for Indigenous peoples. We urge that incentives rather than penalties, along with active engagement and support of Indigenous-led conservation efforts, be used when constitutional rights

are affected. Recovery Teams will be tasked with evaluating stakeholder input and respecting the principles of UNDRIP when recommending priority actions. We note that, in some cases, carefully managed harvest is compatible with recovery of species at risk,⁸⁴ which can be reflected in the RAP.

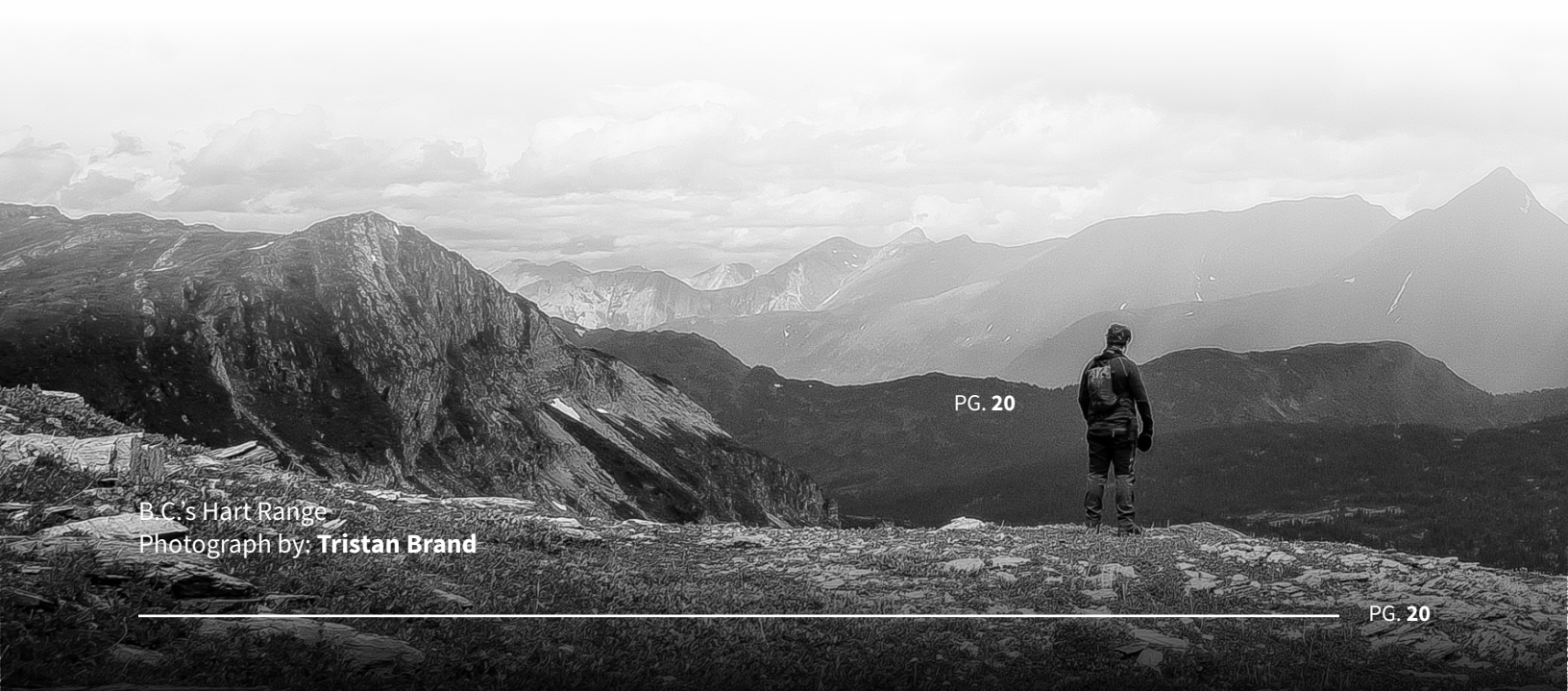
Second, a sole focus on prohibitions places a large burden of responsibility on those landholders who happen to find themselves saddled with species at risk on their lands. This focused burden is likely to trigger resentment, distributional justice issues, and perverse behaviours (e.g., “shoot, shovel, and shut up” to remove the species before it triggers regulatory restrictions). Accordingly, prohibitions should be used in direct conjunction with incentive and stewardship programs, so that landowners and tenure-holders do not perceive conservation as a bad-luck lottery.⁸⁵

We also note that protections will not achieve their intended aims of recovering species if they are not enforced and included within a broader framework of evaluating and reducing cumulative effects. We encourage the government to motivate compliance with adequate penalties, including penalties that scale appropriately with the offence (see section 105 of SARA) and to ensure adequate capacity is in place for monitoring and enforcement.

3.2 Use permits and exemptions sparingly and with justification

Permits and exemptions to powers under the Act are typical of species at risk legislation with automatic listing and are intended to dismiss or limit mandatory protections that according to government have unacceptable socioeconomic costs. Before permits or exemptions are authorized there should be a full exploration of alternatives to the proposed activity and measures to minimize the impacts of the proposed activity for the listed species (see SARA section 73(3)). Where permits or exemptions are issued, government must provide opportunities for public comment and publish the rationale for their decision.

In order to accomplish its stated purpose, the Act must, at minimum, legally require that no projects or activities be authorized that can jeopardize recovery of listed species or key features deemed essential for recovery (a ‘no jeopardy’ clause; see section 7 of the U.S. ESA). RAPs can set out what activities may be exempted from the no take and no jeopardy protections and restrict the granting of exemptions to what is allowed under the RAP. Permits may be given for activities for which exemption is granted, or where the activity in question is beneficial to the species, or otherwise consistent with the RAP.



3.3 Support evidence-based stewardship

It is important for the Act not to focus solely on prohibitions in meeting its objectives. Positive stewardship actions can be very important for protecting and recovering species, while generating goodwill among landowners and other parties,⁸⁶ particularly on private and Indigenous lands.⁸⁷ Ontario's Endangered Species Act Advisory Review Panel specifically suggested that conservation tools such as donations, easements, management plans, development credits, and 'safe harbour agreements' be recognized in the Ontario ESA, 2007.⁸⁸ Robust stewardship programs that include local communities could not only support recovery, but also prevent the decline of other non-listed species. Effective stewardship is particularly important in B.C., where the highest densities of species at risk occur in the south on lands that are largely privately owned.

As with prioritizing recovery actions, an effectiveness evaluation approach should be taken to stewardship that accounts for the effects of the action on stakeholder behaviour, such that the investments lead to added benefits. For example, stewardship programs should avoid 'industry capture', by which industry groups successfully lobby for subsidies for behaviours that should be undertaken regardless. Scientific evaluations and an evidence-based approach should also be taken for stewardship incentives.^{89,90}

It is crucial to design stewardship programs that yield long-term gains for biodiversity⁹¹ that do not inadvertently achieve perverse results or erode existing moral motivations for conservation.^{92,93} For example, some payment programs effectively give landowners or tenure-holders the right to degrade habitat unless paid otherwise.⁸⁴ Programs like conservation auctions and grants that adopt a cost-sharing (rather than profit-yielding) approach, and appeal to stakeholder expertise and creativity, are more likely to support existing motivations for conservation.⁹³⁻⁹⁵ To be successful, incentive programs should be supported by policies that facilitate collaboration among stakeholders.⁹⁶

Mountain goat is a species of Special Concern.
Photograph by: **Ross Donihue**



4

Ensure accountability to meeting Act objectives

The Government of B.C. must be accountable to British Columbians for achievements and failures under the BCSARPPRA to protect the province’s species at risk. Accountability can be achieved through transparent decision making, including decisions to apply the powers of the Act to particular species on timelines commensurate with the threats and rates of decline, as well as public engagement when assessing and recovering species at risk.

We recommend a formal means for evaluating the effectiveness of the Act. The Oversight Committee shall evaluate government progress reports using quantitative criteria and indicators, which may include but are not limited to: genuine changes in status of listed species; percentage of recommended recovery actions implemented (weighted by priority); and whether legislated timelines on assessment, listing, creation of Recovery Teams, and creation and updating of RAPs were met. Clearly, the central gauge of the law’s efficacy is improvement in status of listed species.⁷ The Oversight Committee should be explicitly required under the legislation to publish a summary report on the effectiveness of the Act every five years, to which the Minister would be required to respond within six months. These reports would emphasize demonstrable progress against a prioritized plan of action and quantitative and measurable targets for recovery.

In rare cases, it will not be feasible to recover some listed species, meaning the government can choose to cease supporting recovery actions specified by a RAP. Such an “opt-out clause” could only be invoked if the species is deemed irrecoverable (e.g., recovery actions have shown no positive effects on slowing or reversing population declines, and no further recovery actions are reasonably predicted to slow or reverse declines), or where the government deems there to be insurmountable challenges to recovering the species.

This clause can only be invoked after a written statement from the Minister detailing:

- (1) which recovery actions have been implemented to date and why they have failed,
- (2) summarizing either the scientific case for the irrecoverability of the species or the socioeconomic case for the challenges to recovery, providing clear and convincing evidence in light of the potential worth of the species to all future generations.

This statement must be available for public comment for a minimum of six months. Species for which the opt-out clause is invoked will still be included in monitoring and reporting of the Act.

The Act should formally recognize the public as a partner in the recovery and protection of species at risk in B.C. by providing legislated processes to enable public participation. These legislated processes should include mechanisms by which the public can request that a species be considered for assessment, the ability to comment on RAPs, the ability to comment on reporting on the Act by the Oversight committee, the ability to comment on all Ministerial statements, and the legal opportunity to seek judicial remedies for contraventions of the Act, including failure to adhere to legislated timelines.

Conclusions

Camassia

Photograph by: **Brian Starzomski**

British Columbia's varied topography and climate - from oceans to mountains to deserts - has nurtured the highest species richness in Canada. However, B.C. also includes the largest number of species under threat in Canada. An effective B.C. Species At Risk Recovery and Protection Act would protect and recover imperiled species at a time of unprecedented and ongoing environment-related challenges.

B.C. can learn from the successes, failures, and challenges of species at risk legislation in other jurisdictions to draft an Act that can better accomplish the purpose of recovering species at risk. We have made recommendations for an Act that are focused on prioritizing actions that will lead to recovery of species at risk. Critical to these efforts are the oversight of an independent committee, independent and specialized recovery teams who use a modern approach to prioritize recovery actions for species under their purview, and a strong program for monitoring and reporting of recovery for all listed species, with strict adherence to reasonable timelines. In addition, we identify effective funding, enforcement, and coordination with other laws as key components for success.

By focusing on principles of timeliness, accountability, scientific integrity, stakeholder inclusion, and a commitment to evidence-supported action for recovery, we seek an Act that will promote the recovery of species at risk and simultaneously help to safeguard all of B.C.'s biodiversity. We provide these recommendations to help the province draft effective legislation to protect B.C.'s wild species in perpetuity.

Elements of an effective act:

- Focus on and prioritize actions
- Mandatory reporting on actions taken
- Legislated timelines for listing, prioritization, and reporting
- Arms-length committees to oversee listing, actions, and progress on recovery



Literature cited

1. *Taking Nature's Pulse: The Status of Biodiversity in British Columbia*. (2008).
2. Cannings, S., Anions, M., Rainer, R. & Stein, B. *Our Home and Native Land: Canadian Species of Global Conservation Concern*. (NatureServe Canada, 2005).
3. B.C. Conservation Data Centre. Red or Blue-listed. *BC Species and Ecosystems Explorer* (2018). Available at <http://a100.gov.bc.ca/pub/eswp/> (Accessed: 21 October 2018)
4. 2018. Species at Risk Public Registry. Available at: <https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html>. (Accessed: 21th October 2018)
5. B.C. Ministry of Environment and Climate Change Strategy. *Protecting Species At Risk: A Primer To Support A Conversation With British Columbians*. (2018).
6. Sierra Legal & Environmental Law Centre. Joint submission to the Wildlife Act Review. 1–31 (2007).
7. British Columbia Task Force on Species At Risk. *Report of the British Columbia Task Force on Species at Risk*. (2011).
8. Office of the Auditor General of Canada. An Audit of Biodiversity in Bc: Assessing the Effectiveness of Key Tools. 1–30 (2013).
9. Bird, S. & Hodges, K. E. Critical habitat designation for Canadian listed species: Slow, biased, and incomplete. *Environ. Sci. Policy* 71, 1–8 (2017).
10. Environment and Climate Change Canada. Canadian Environmental Sustainability Indicators: Changes in the status of species at risk. (2018). Available at <https://www.canada.ca/en/environment-climate-change/services/environmental-indicators/changes-status-wildlife-species-risk.html> (Accessed: 21 October 2018)
11. WWF-Canada. *Living Planet Report: A National Look at Wildlife Loss*. (2017).
12. Martin, T., Camaclang, A., Possingham, H. P., Maguire, L. & Chadès, I. Timing of protection of critical habitat matters. *Conserv. Lett.* 10, 308–316 (2017).
13. Hagen, A. & Hodges, K. Resolving critical habitat designation failures: reconciling law, policy, and biology. *Conserv. Biol.* 29, 399–407 (2006).
14. Kriebel, D. et al. The precautionary principle in environmental science. *Environ. Health Perspect.* 109, 871–876 (2001).
15. Gregory, R. & Long, G. Using structured decision making to help implement a precautionary approach to endangered species management. *Risk Anal.* 29, 518–532 (2009).
16. Lauck, T., Clark, C. W., Mangel, M. & Munro, G. R. Implementing the precautionary principle in fisheries management through marine reserves. *Ecological Applications* (1998).
17. Government of Canada. *Species at Risk Policy Principles*. (2016).
18. Government of Canada. *Policy on survival and recovery* (proposed). (2016).
19. Akçakaya, H. R. et al. Quantifying species recovery and conservation success to develop an IUCN Green List of Species. *Conserv. Biol.* (2018). doi:10.1111/cobi.13112
20. Shackelford, N., Standish, R. J., Ripple, W. & Starzomski, B. M. Threats to biodiversity from cumulative human impacts in one of North America's last wildlife frontiers. *Conserv. Biol.* 32, 672–684 (2017).
21. Mcllellan, B. N., Serrouya, R., Wittmer, H. U. & Boutin, S. Predator-mediated Allee effects in multi-prey systems. *Ecology* 91, 286–292 (2010).
22. Hunter, M. L., Bean, M. J., Lindenmayer, D. B. & Wilcove, D. S. Thresholds and the mismatch between environmental laws and ecosystems. *Conserv. Biol.* (2009).
23. Proctor, M. et al. *Resource roads and grizzly bears in Alberta, Canada*. (2018).
24. Environment and Climate Change Canada. *Progress Report on Unprotected Critical Habitat for the Woodland Caribou (Rangifer tarandus caribou), Boreal Population, in Canada*. (2018).
25. House of Commons of Canada. *Bill C-69: An Act to enact the Impact Assessment Act and the Canadian Energy Regulator Act, to amend the Navigation Protection Act and to make consequential amendments to other Acts*. (2018).
26. Innovation Science and Economic Development Canada. Model policy on scientific integrity. (2018).
27. Haddock, M. *Professional reliance review: The final report of the review of professional reliance in natural resource decision-making*. (2018).
28. Westwood, A. R. et al. The role of science in contemporary Canadian environmental decision-making: The example of environmental assessment. *UBC Law Rev.* (2018).
29. Jacob, A. L. et al. Cross-sectoral input for the potential role of science in Canada's environmental assessment. *Facets* 3, 512–529 (2018).
30. Gosselin, P. et al. *The Royal Society of Canada Expert Panel: Environmental and Health Impacts of Canada's Oil Sands Industry. The Royal Society of Canada* (2010).
31. Science Integrity Project. Statement of Principles for Sound Decision Making in Canada. (2015). Available at: <http://scienceintegrity.ca/>.
32. Ryder, D. S., Tomlinson, M., Gawne, B. & Likens, G. E. Defining and using best available science: A policy conundrum for the management of aquatic ecosystems. *Mar. Freshw. Res.* 61, 821–828 (2010).
33. Artelle, K. A. et al. Hallmarks of science missing from North American wildlife management. *Sci. Adv.* 4, (2018).

34. Nichols, J. D., Johnson, F. A., Williams, B. K. & Boomer, G. S. Science alive and well in North American wildlife management. *Sci. Adv.* (2018).
35. Expert Panel on the Modernization of the National Energy Board. *Forward, Together: Enabling Canada's Clean, Safe, and Secure Energy Future - Volume I - Report of the Expert Panel on the Modernization of the National Energy Board.* (2017).
36. Smith, T., Gibbs, K., Westwood, A., Taylor, S. & Walsh, K. *Oversight At Risk: The State of the Government Science in British Columbia.* (2017).
37. Cleland, M. & Gattinger, M. *System Under Stress: Energy Decision-Making in Canada and the Need for Informed Reform.* (2017).
38. Haddock, M. *Professional reliance in British Columbia's environmental regulations.* (2014).
39. Beanlands, G. E. & Duinker, P. N. *An Ecological Framework for Environmental Impact Assessment in Canada.* (1983).
40. Casselman, A. Who is watching B.C.'s environmental watch dogs? *BC Business* (2015).
41. Darimont, C. T., Paquet, P. C., Treves, A., Artelle, K. A. & Chapron, G. Political populations of large carnivores. *Conserv. Biol.* 32, 747–749 (2018).
42. White, E. et al. Nine simple ways to make it easier to (re)use your data. *Ideas Ecol. Evol.* 6, 1–10 (2013).
43. Munafò, M. R. et al. A manifesto for reproducible science. *Nat. Hum. Behav.* 1, 1–9 (2017).
44. McNutt, M. Journals unite for reproducibility. *Science (80-.)*. 346, 679 (2014).
45. Gregr, E., Granados, M., Poisot, T. & Kerr, J. T. Open data: two little words with huge implications for Canada's environmental assessment process. *National Observer* (2017).
46. Government of Canada. Tri-Agency Open Access Policy on Publications. (2016). Available at: http://www.science.gc.ca/eic/site/063.nsf/eng/h_F6765465.html?OpenDocument.
47. European Commission. Commission recommendation on access to and preservation of scientific information. (2012).
48. Centre for Open Science. The Transparency and Openness Promotion Guidelines.
49. McNutt, M. Reproducibility. *Science (80-.)*. 346, 679 (2014).
50. Miguel, E. et al. Promoting transparency in social science research. *Science (80-.)*. 343, 30–31 (2014).
51. Nature. Availability of data, materials, code and protocols. (2018). Available at: <https://www.nature.com/authors/policies/availability.html>. (Accessed: 12th August 2018)
52. The Wellcome Trust. Open Research Fund. (2018). Available at: <https://wellcome.ac.uk/funding/open-research-fund>. (Accessed: 12th August 2018)
53. UCL. Child Health Open Research. Available at: <https://wellcome.ac.uk/funding/open-research-fund>. (Accessed: 12th August 2018)
54. Bill & Melinda Gates Foundation. Gates Open Research. Available at: <https://gatesopenresearch.org/>. (Accessed: 12th August 2018)
55. Montreal Initiative. MNI Open Research. Available at: <https://mniopenresearch.org/>. (Accessed: 12th August 2018)
56. Findlay, C. S., Elgie, S., Giles, B. & Burr, L. Species listing under Canada's species at risk act. *Conserv. Biol.* 23, 1609–1617 (2009).
57. Westwood, A. et al. Strong foundations: Recap and recommendations from scientists regarding the federal environmental and regulatory reviews. 24 (2017). Available at: <http://www.y2y.net/strongfoundations>.
58. Olszynski, M. Failed experiments: An empirical assessment of adaptive management in Alberta's energy resources sector. *UBC Law Rev.* 50, 697 (2017).
59. Government of Canada. *Species At Risk Act*. S.C. 2002, c.29. 1–96 (2002).
60. Government of Canada. *Timeline for amendments to Schedule 1 of the Species at Risk Act.* (2018).
61. Elgie, S. Statutory Structure and Species Survival: How Constraints on Cabinet Discretion Affect Endangered Species Listing Outcomes. *J. Environ. Law Pract.* 19, 1 (2008).
62. Waples, R. S., Nammack, M., Cochrane, J. F. & Hutchings, J. A. A Tale of Two Acts: Endangered Species Listing Practices in Canada and the United States. *Bioscience* 63, 723–734 (2013).
63. Martin, T. G. et al. Prioritizing recovery funding to maximize conservation of endangered species. *Conserv. Lett.* In Press, (2018).
64. Harrower, W. L. Meagre targets and modest progress for endangered species recovery in Canada. *Conserv. Biol.* In Review,
65. *Western Canada Wilderness Committee v Canada (Fisheries and Oceans)*. FC 148, (2014). 64. Favaro, B. et al. Trends in extinction risk for imperiled species in Canada. *PLoS One* 9, e113118 (2014).
66. Martin, T. G. et al. Acting fast helps avoid extinction. *Conserv. Lett.* 5, 274–280 (2012).
67. *Environmental Defence Canada v. Canada (Minister of Fisheries and Oceans)*,. FC 878, (2009).
68. Favaro, B. et al. Trends in extinction risk for imperiled species in Canada. *PLoS One* 9, e113118 (2014).
69. Greenwald, N., Ando, A. W., Butchart, S. H. M. & Tschirhart, J. Conservation: The Endangered Species Act at 40. *Nature* 504, 369–740 (2013).
70. Naidoo, R. et al. Integrating economic costs into conservation planning. *Trends Ecol. Evol.* 21, 681–687 (2006).
71. Evans, D. M. et al. Species Recovery in the United States : Increasing the Effectiveness of the Endangered Species Act. *Ecol. Soc. Am.* 28 (2015).
72. Levin, H. & McEwan, P. *Cost-effectiveness analysis: methods and applications.* (Sage Publications, 2001).

73. Joseph, L. N., Maloney, R. F. & Possingham, H. P. Optimal allocation of resources among threatened species: a project prioritization protocol. *Conserv. Biol.* 23, 328–338 (2009).
74. Pannell, D. J. et al. Integrated assessment of public investment in land-use change to protect environmental assets in Australia. *Land use policy* 29, 377–387 (2012).
75. Martin, T. et al. Prioritizing recovery funding to maximize conservation of endangered species. *Conserv. Lett.* In Press, e12604.
76. Carwardine, J. et al. Prioritizing threat management for biodiversity conservation. *Conserv. Lett.* 5, 196–204 (2012).
77. Firn, J. et al. Priority threat management of invasive animals to protect biodiversity under climate change. *Glob. Chang. Biol.* 21, 3917–3930 (2015).
78. Chadés, I. et al. Benefits of integrating complementarity into priority threat management. *Conserv. Biol.* 29, 525–536 (2015).
79. Weitzman, M. L. The Noah's Ark Problem. *Econometrica* (1998). doi:10.2307/2999617
80. Ministry of Forests, L. and N. R. O. *Crown Land: Indicators and Statistics Report.* (2011).
81. Wilcove, D. S. & Lee, J. Using economic and regulatory incentives to restore endangered species: Lessons learned from three new programs. *Conserv. Biol.* 18, 639–645 (2004).
82. Clarke Murray, C. et al. The insignificance of thresholds in environmental impact assessment: An illustrative case study in Canada. *Environ. Manage.* (2018). doi:10.1007/s00267-018-1025-6
83. McCune, J. L. et al. Threats to Canadian species at risk: An analysis of finalized recovery strategies. *Biol. Conserv.* 155, 254–265 (2013).
84. Polasky, S., Doremus, H. & Rettig, B. Endangered species conservation on private land. *Contemp. Econ. Policy* 15, 66–76 (1997).
85. Donlan, C. *Proactive Strategies for Protecting Species: Pre-Listing Conservation and the Endangered Species Act.* (2015).
86. Mir, D. F. & Dick, K. Conservation approaches to protecting critical habitats and species on private property. *Nat. Areas J.* 32, 190–198 (2012).
87. Kothari, A., Camill, P. & Brown, J. Conservation as if people also mattered: Policy and practice of community-based conservation. *Conserv. Soc.* 11, 1–15 (2013).
88. Endangered Species Act Review Advisory Panel. *Report of the Endangered Species Act Review Advisory Panel: Recommendations for Ontario's New Endangered Species Act.* (2006).
89. Schuster, R. et al. Tax Shifting and Incentives for Biodiversity Conservation on Private Lands. *Conserv. Lett.* 11, 1–7 (2018).
90. Robbins, J. Paying farmers to welcome birds. *The New York Times* (2014).
91. Chan, K., Balvanera, P. & Benessaiah, K. Why protect nature? Rethinking values and the environment. *PNAS* 113, 1462–1465 (2016).
92. Rode, J., Gómez-Baggethun, E. & Krause, T. Motivation crowding by economic incentives in conservation policy: A review of the empirical evidence. *Ecol. Econ.* 117, 270–282 (2015).
93. Chan, K. M. A., Anderson, E., Chapman, M., Jespersen, K. & Olmsted, P. Payments for ecosystem services: Rife with problems and potential—For transformation towards sustainability. *Ecological Economics* (2017).
94. Stoneham, G., Chaudhri, V., Ha, A. & Strappazzon, L. Auctions for conservation contracts: An empirical examination of Victoria's BushTender trial. *Aust. J. Agric. Resour. Econ.* 47, 477–500 (2003).
95. Ramsdell, C. P., Sorice, M. G. & Dwyer, A. M. Using financial incentives to motivate conservation of an at-risk species on private lands. *Environ. Conserv.* 43, 34–44 (2016).
96. Sorice, M. G., Haider, W., Conner, J. R. & Ditton, R. B. Incentive structure of and private landowner participation in an endangered species conservation program: Incentives to improve endangered species recovery. *Conserv. Biol.* 25, 587–596 (2011).

BC NEEDS TO GET ITS ENDANGERED SPECIES ACT TOGETHER

For the full report and list of
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British Columbia has the *most biodiversity* of any province or territory in Canada and also *the most species at risk of extinction*.

It is one of only a few provinces with *no endangered species legislation*

1807
Species in decline

278
Species at risk of extinction

Of 455 federally-listed species at risk evaluated more than once, most have *worsened in status or failed to improve*

18% worse **64%** no change **18%** better



WHAT SCIENTISTS PROPOSE

Our species at risk expert panel recommends an endangered species law that promotes the recovery of species at risk and simultaneously safeguards BC's biodiversity. This law should:



Commit to species recovery within a broad and integrated framework

- Integrate with the provincial land-use planning framework
- Ensure sustained funding
- Commit to scientific integrity: rigour, transparency, independence, and open data



Implement effective protections and stewardship

- Implement automatic protections on Crown land and work with landholders to apply additional protections
- Use permits and exemptions sparingly and with justification
- Support evidence-based stewardship



Take an evidence-based approach to recovery

- Mandate an independent Oversight Committee to prioritize assessment, list species, guide prioritization of recovery actions, and evaluate effectiveness
- Adopt automatic listing
- Establish Recovery Teams for species or multi-species groups
- Prioritize recovery actions quickly and transparently, while aiming to recover all species



Ensure accountability to meeting Act objectives

- Require government progress reports detailing recovery actions and outcomes