Fixing the Canadian *Species at Risk Act*: identifying major issues and recommendations for increasing accountability and efficiency

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Abstract

Since the implementation of the Canadian *Species at Risk Act* (SARA) in 2003, deficiencies in SARA and its application have become clear. Legislative and policy inconsistencies among responsible federal agencies and the use of a subjective approach for prioritizing species protection lead to taxonomic biases in protection. Variations in legislation among provinces/territories and the reluctance of the federal government to take actions make SARA's application often inefficient on nonfederally managed lands. Ambiguous key terms (e.g., critical habitat) and disregard for legislated deadlines in many steps impede the efficacy of SARA. Additionally, the failure to fully recognize Indigenous knowledge and to seek Indigenous cooperation in the species protection process leads to weaker government accountability, promotes inequity, and leads to missed opportunities for partnerships. New legislative amendments with well-defined and standardized steps, including an automatic listing process, a systematic prioritization program, and clearer demands (e.g., mandatory threshold to trigger safety net/emergency order) would improve the success of species at risk protection. Moreover, a more inclusive approach that brings Indigenous representatives and independent scientists together is necessary for improving SARA's effectiveness. These changes have the potential to transform SARA into a more powerful act towards protecting Canada's at-risk wildlife. (The graphical abstract follows.)

Species at Risk Act (SARA), 2002
"An Act respecting the protection of wildlife species at risk in Canada"

Statistics about SARA

588 species with COSEWIC status*

453 federally listed species*

345 recovery strategies**

83 action plans**

* including Extirpated, Endangered and Threatened status
** including multi-species recovery/action plans

Current numbers as of February 14, 2021

What are the main issues with SARA and the solutions that can be incorporated to increase accountability and efficiency?

1. Inconsistencies in SARA framework, biases in listing and political decisions outweighting scientific evidence

- Implement automatic listing
- Integrate a web-based open data platfom
- Create a SARA-specialized tribunal
- Create Multi-Species Committees with Indigenous and scientific representatives
- Merge recovery strategy with action plan

2. Federal government's reluctance to exercise its power to apply SARA on provincial/territorial lands

- Establish a mandatory threshold to trigger safety net order if species at risk are not protected on provincial/territorial lands
- Use provincial/territorial or private land initiatives of protection management

3. Lack of Indigenous self-determination, recognition, funding and guidelines in species protection management

- Use of conservation agreements
- Create an Indigenous Accord on Species at Risk to outline Indigenous involvement
- Implement regional offices for NACOSAR and COSEWIC ATK committees composed of Indigenous representatives
- Use of the "Two-Eyed Seeing" approach as a guideline framework for Multi-Species Committees

4. Critical habitat identification does not follow well defined procedures, leading to delays in protection actions

- Prioritize the use of high quality data (e.g., from habitat-fitness and habitat-population viability analysis) to identify critical habitat
- Critical habitat identification would not be mandatory to trigger protection actions
- Prioritize intensive, short-term research when critical habitat data is lacking

5. Data-deficient category does not trigger future research, data collection, nor reassessment

- Create a priority research list for data deficient species
- Prioritize machine-learning methods to predict threat level

6. Subjective prioritization approach based on value-driven criteria

- Create a prioritization guideline that gives higher priority to endemic and globally at-risk species by fast-tracking the implementation of their action plans
- Prioritize funding for endemic and globally at-risk species with conservation management initiatives

7. High level of discretionary language and blurred definitions in SARA

- Create amendments to remove discretionary language (e.g., "to the extent possible") to set enforceable standards and timelines
- Complete analysis of SARA to identify where all discretionary wording is used

These changes have the potential to transform SARA as a more powerful act towards protecting Canada's at-risk wildlife

Mountain woodland caribou (*Rangifer tarandus caribou*)

Key words: Canada, species at risk, automatic listing, discretionary language, science to policy, Indigenous partnerships

1. Introduction

In recognition of their responsibility to protect declining species, many governments have established species at risk legislation (e.g., the *Endangered Species Act* (1973) of the United States and the *Environment Protection and Conservation Act* (1999) of Australia). To fulfill Canada's obligation under the Convention on Biological Diversity (CBD 1992) to protect native biodiversity, the Canadian government began implementing the *Species at Risk Act* (SARA) in 2003. SARA is a promising piece of legislation; it allows for scientific and economic input, deadlines for scientific-based recovery plans, and automatic protections for listed species on federally managed lands. However, since SARA's enactment, there have been few successes in species protection and recovery. Indeed, populations of SARA-listed species continued to decline 28% on average the following decade even after their listing (WWF 2017). SARA has been criticized for biases in listing species and failure to implement recovery plan standards set in the law (Findlay et al. 2009; Nixon et al. 2012). Here, we summarize some of the main problems with SARA and its implementation and present solutions (including some already proposed in the literature as well as new ideas) that can improve SARA's implementation. These solutions, summarized in **Fig. 1**, include both policy and legislative changes that would make SARA's implementation more effective and efficient.

2. Problems with SARA and proposed solutions

2.1. Inconsistencies in SARA framework: from listing to management

2.1.1. Issues

At every stage from listing to management (**Fig. 2**), biases can influence decisions that could be based solely on evidence (Mooers et al. 2010). This not only slows listing and protection decisions, but it also enables political considerations to outweigh scientific ones (Dybas 2006). The problem begins with the listing process itself. Status recommendations are made to the Minister by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), which designates species at risk (SAR) as Special Concern, Threatened, Endangered, or Extirpated (SARA 2002, s. 25–27; Mooers et al. 2010). The Minister then passes these recommendations to the Governor in Council, which acts on the advice of the Cabinet and is responsible for making listing decisions (SARA 2002, s. 27). The current process for listing that allows for biases to creep in means that many species go unprotected. Creighton and Bennett (2019) found that 28.4% of COSEWIC-recommended species have not been listed for protection.

Moreover, once a species is listed, there is no guarantee that actions will be taken towards its conservation beyond the basic protection of individuals on federally owned lands under sections 32, 33, and 51 of SARA (i.e., no kill, harm, collection or destruction/damage to residences of listed species, and no destruction of designated critical habitat). Delays and inaction in species protection have been documented to result in the extinction of species at risk globally (e.g., the Christmas Island pipistrelle (*Pipistrellus murrayi*); Martin et al. 2012). In addition, while COSEWIC applies a consistent and arms' length framework for status assessment by independent experts, no counterpart exists at the recovery strategy or action planning stage. Therefore, whether the government's SAR recovery strategies and action plans are based on the best biological information available is unclear (Mooers et al. 2010). For example, in the cases of the Nooksack dace (*Rhinichthys cataractae*), greater sage-grouse (*Centrocercus urophasianus*), and resident killer whale (*Orcinus orca*), the courts became the arbiter following the intervention of nongovernmental organizations who flagged problems with recovery strategies that the courts decided contravened SARA's intended purpose (Taylor and Pinkus 2013).

SARA is implemented by three primary agencies: (*i*) Environment and Climate Change Canada (ECCC) is responsible for the general management of SAR and migratory birds according to the *Migratory Birds Convention Act* (1994), (*ii*) Fisheries and Oceans Canada (DFO) is responsible for
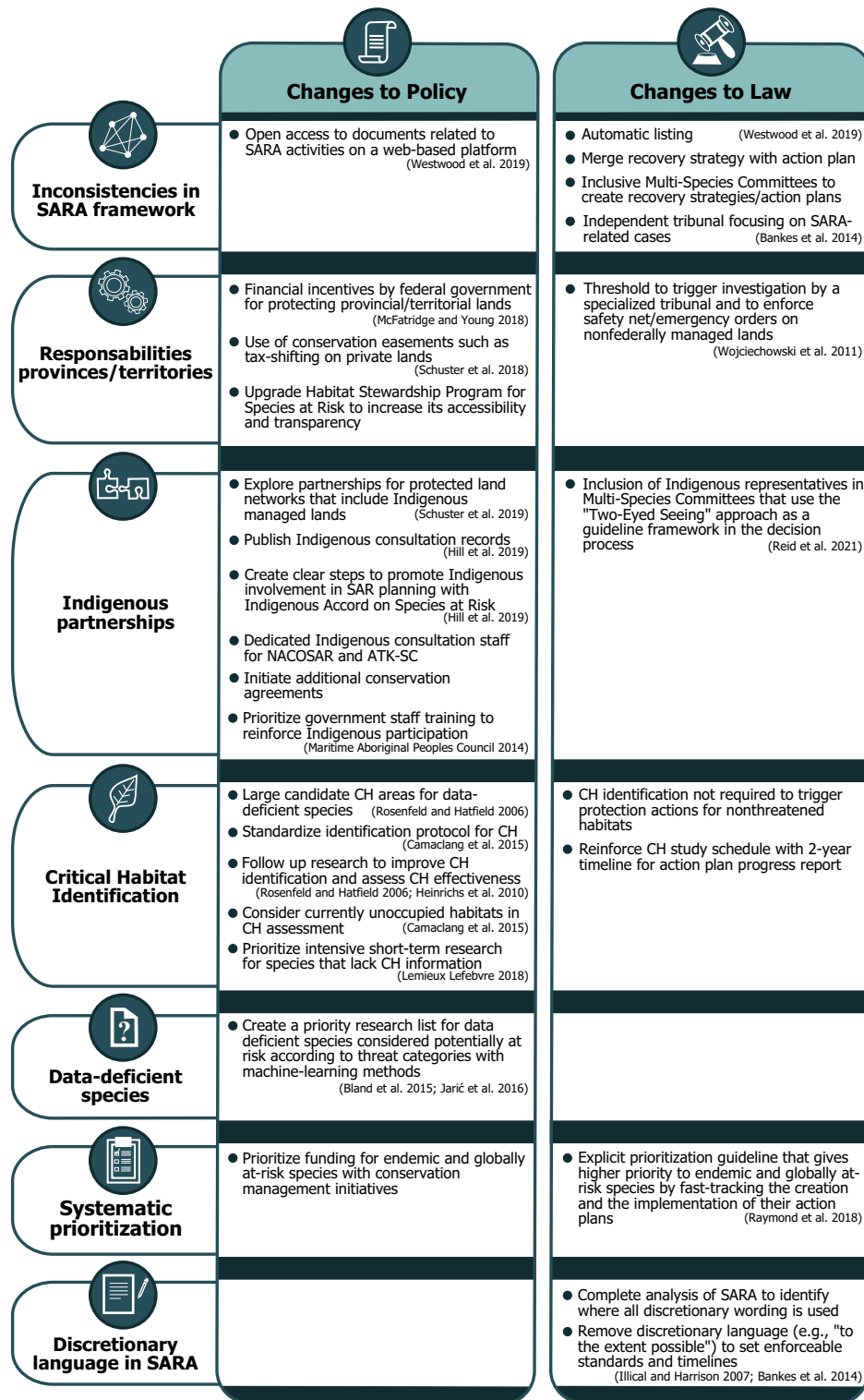
FACETS

	Changes to Policy	Changes to Law
Inconsistencies in SARA framework	• Open access to documents related to SARA activities on a web-based platform (Westwood et al. 2019)	• Automatic listing (Westwood et al. 2019) • Merge recovery strategy with action plan • Inclusive Multi-Species Committees to create recovery strategies/action plans • Independent tribunal focusing on SARA-related cases (Bankes et al. 2014)
Responsabilities provinces/territories	• Financial incentives by federal government for protecting provincial/territorial lands (McFatridge and Young 2018) • Use of conservation easements such as tax-shifting on private lands (Schuster et al. 2018) • Upgrade Habitat Stewardship Program for Species at Risk to increase its accessibility and transparency	• Threshold to trigger investigation by a specialized tribunal and to enforce safety net/emergency orders on nonfederally managed lands (Wojciechowski et al. 2011)
Indigenous partnerships	• Explore partnerships for protected land networks that include Indigenous managed lands (Schuster et al. 2019) • Publish Indigenous consultation records (Hill et al. 2019) • Create clear steps to promote Indigenous involvement in SAR planning with Indigenous Accord on Species at Risk (Hill et al. 2019) • Dedicated Indigenous consultation staff for NACOSAR and ATK-SC • Initiate additional conservation agreements • Prioritize government staff training to reinforce Indigenous participation (Maritime Aboriginal Peoples Council 2014)	• Inclusion of Indigenous representatives in Multi-Species Committees that use the "Two-Eyed Seeing" approach as a guideline framework in the decision process (Reid et al. 2021)
Critical Habitat Identification	• Large candidate CH areas for data-deficient species (Rosenfeld and Hatfield 2006) • Standardize identification protocol for CH (Camaclang et al. 2015) • Follow up research to improve CH identification and assess CH effectiveness (Rosenfeld and Hatfield 2006; Heinrichs et al. 2010) • Consider currently unoccupied habitats in CH assessment (Camaclang et al. 2015) • Prioritize intensive short-term research for species that lack CH information (Lemieux Lefebvre 2018)	• CH identification not required to trigger protection actions for nonthreatened habitats • Reinforce CH study schedule with 2-year timeline for action plan progress report
Data-deficient species	• Create a priority research list for data deficient species considered potentially at risk according to threat categories with machine-learning methods (Bland et al. 2015; Jarić et al. 2016)	
Systematic prioritization	• Prioritize funding for endemic and globally at-risk species with conservation management initiatives	• Explicit prioritization guideline that gives higher priority to endemic and globally at-risk species by fast-tracking the creation and the implementation of their action plans (Raymond et al. 2018)
Discretionary language in SARA		• Complete analysis of SARA to identify where all discretionary wording is used • Remove discretionary language (e.g., "to the extent possible") to set enforceable standards and timelines (Illical and Harrison 2007; Bankes et al. 2014)

Fig. 1. Proposed changes to policy and legislation to ensure better application of the *Species at Risk Act* (SARA) to allow listing and protecting species at risk (SAR) to be more efficient. Previously proposed solutions include relevant citations. NACOSAR, National Aboriginal Council on Species at Risk; ATK-SC, Aboriginal Traditional Knowledge – Subcommittee on Species at Risk of Committee on the Status of Endangered Wildlife in Canada; CH, critical habitat.
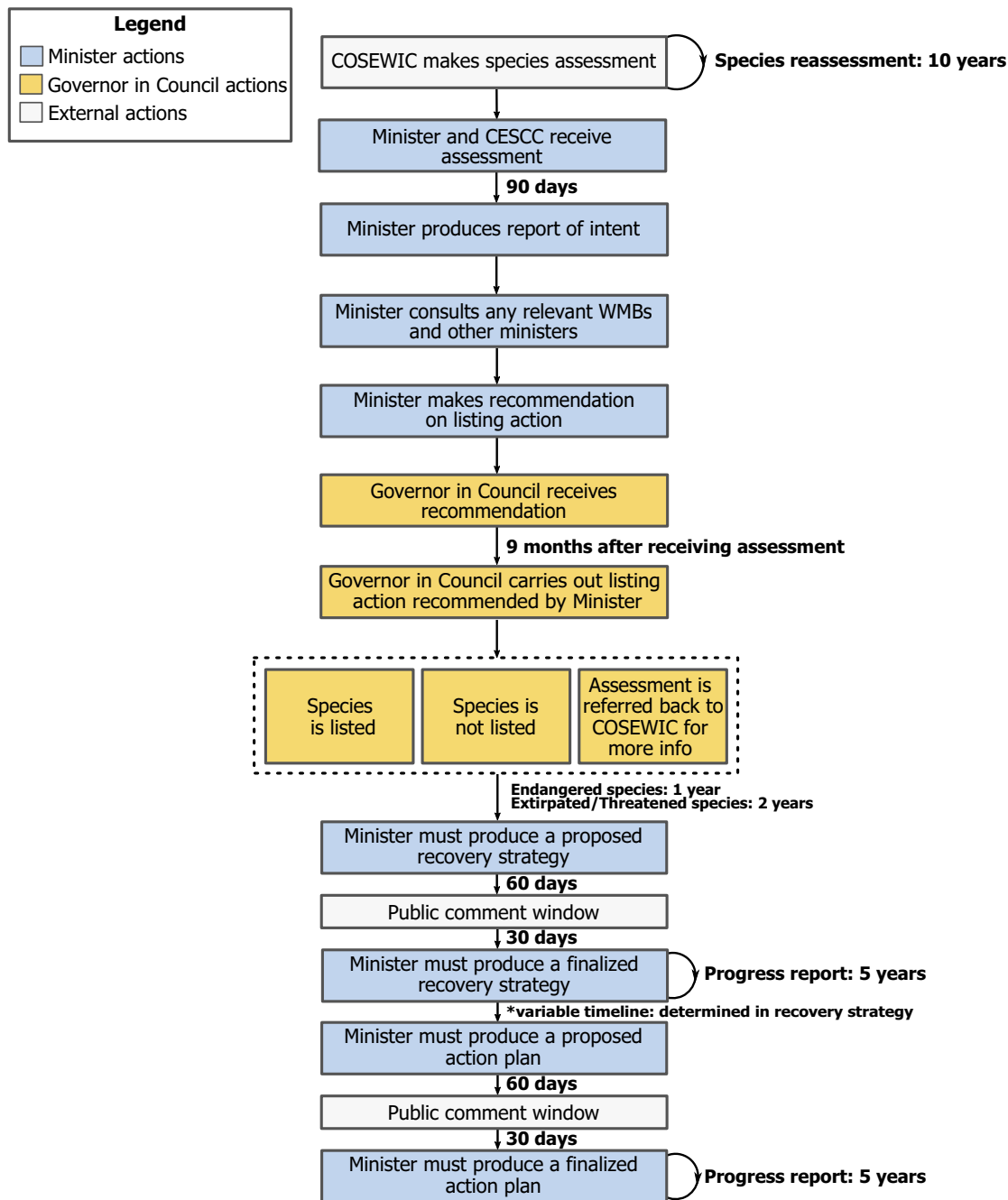
Fig. 2. Detailed flowchart of the current framework of the *Species at Risk Act*. Current structure with the representation of the Minister of Environment and Climate Change (in blue), the Governor in Council (in orange) and the external actors (COSEWIC and public; in light gray). In this framework, the final decisions are predominantly made by governmental parties, leading to a high level of governmental discretion. Indeed, COSEWIC produces a species assessment report, but it is the Governor in Council who acts on the advice of the Cabinet that make the final legal listing decision based on Minister recommendations. After the listing, a two-step recovery process is engaged by the creation of (1) a recovery strategy and (2) an action plan. The timeline for the creation of an action plan is specified in the associated recovery strategy (usually 5 years), which can allow delays in production. COSEWIC, Committee on the Status of Endangered Wildlife in Canada; CESCC, Canadian Endangered Species Conservation Council; WMB, Wildlife Management Board.

aquatic SAR, and (*iii*) Parks Canada is responsible for all SAR occurring in national parks and historic sites. Taxa are split among agencies, primarily ECCC and DFO, for the development of recovery strategies, with Parks Canada focusing on recovery action plans for listed species within areas under their jurisdiction. This separation leaves the protection and recovery of individual species vulnerable to disparate institutional cultures and policies (Taylor and Pinkus 2013). Indeed, previous studies have demonstrated that species under the jurisdiction of DFO are more often denied listing than those under ECCC or Parks Canada jurisdiction (Findlay et al. 2009; McDevitt-Irwin et al. 2015; Creighton and Bennett 2019). Findlay et al. (2009) highlighted that socio-economic impacts are often cited in decisions not to list marine species. They also mentioned that DFO conducts socio-economic analyses during the listing process, whereas ECCC does not (Findlay et al. 2009). ECCC officials have suggested that if these analyses are done, they should be done at a later stage (e.g., action plan development) (Findlay et al. 2009).

Further inconsistencies also arise because of large variation in the time taken to make listing decisions based on COSEWIC's assessments. These delays often occur because of the need for extended consultations given potential impacts of listing on commercial, recreational, and Indigenous activities (Findlay et al. 2009). The lack of specific guidance about the scope of and timelines for socio-economic analysis that should be conducted prior to listing decisions leads to inconsistency. While extended consultations are not inherently problematic, this process should be reserved for clearly justifiable cases, for example to complete meaningful Indigenous consultations.

2.1.2. Solutions

To address the biases, delays, and reluctance in listing certain species, we propose an automatic listing process (Fig. 3), similar to that which exists in Ontario (OESA 2007). Once COSEWIC produces or amends a species assessment, the list of protected species would be updated by the Governor in Council in accordance with the assessment (Elgie 2008). An automatic process based on biological evidence alone would protect the listing process from political interference and increase transparency in listing decisions (Westwood et al. 2019). Thus, every COSEWIC-listed species would receive at least a basic level of protection. This includes protection on federal lands and additional protection outlined in the recovery strategy/action plan that is enforced by safety net or emergency orders. It would also reduce the delays associated with waiting for ministerial listing recommendations and possible re-evaluation requests (see Fig. 2; Westwood et al. 2019).

We recognize that automatic listing of species without considering socio-economic impacts can be controversial. Indeed, several business groups have lobbied the Ontario government to remove automatic listing from the OESA (e.g., OFA 2019; OHBA 2019). Automatic listing is also an important consideration with respect to Indigenous Rights, though we are not aware of any Indigenous groups lobbying against automatic listing. Key to our recommendation is that the decision to protect is automatic and transparent, while the decision of how to protect can come afterwards and considers important cultural values and socio-economic impacts. A transparent and inclusive prioritization process that demonstrates such values can help to determine which actions may most benefit a species, while reducing impact on human livelihoods. As is already provided for under SARA (2002, s. 73), every alternative could be evaluated and agreements/permits could still be authorized by the competent federal Minister regarding activities that have high socio-economic benefits (Westwood et al. 2019). However, if automatic listing is too politically problematic, a potential alternative could be automatic prohibitions (e.g., no additional activities while a listing is pending) following a COSEWIC assessment, prior to final listing decisions. This could act as a disincentive on stakeholders for prolonging listing consultations and call more attention to the outcomes of assessments, preventing further losses while listing decisions are made.
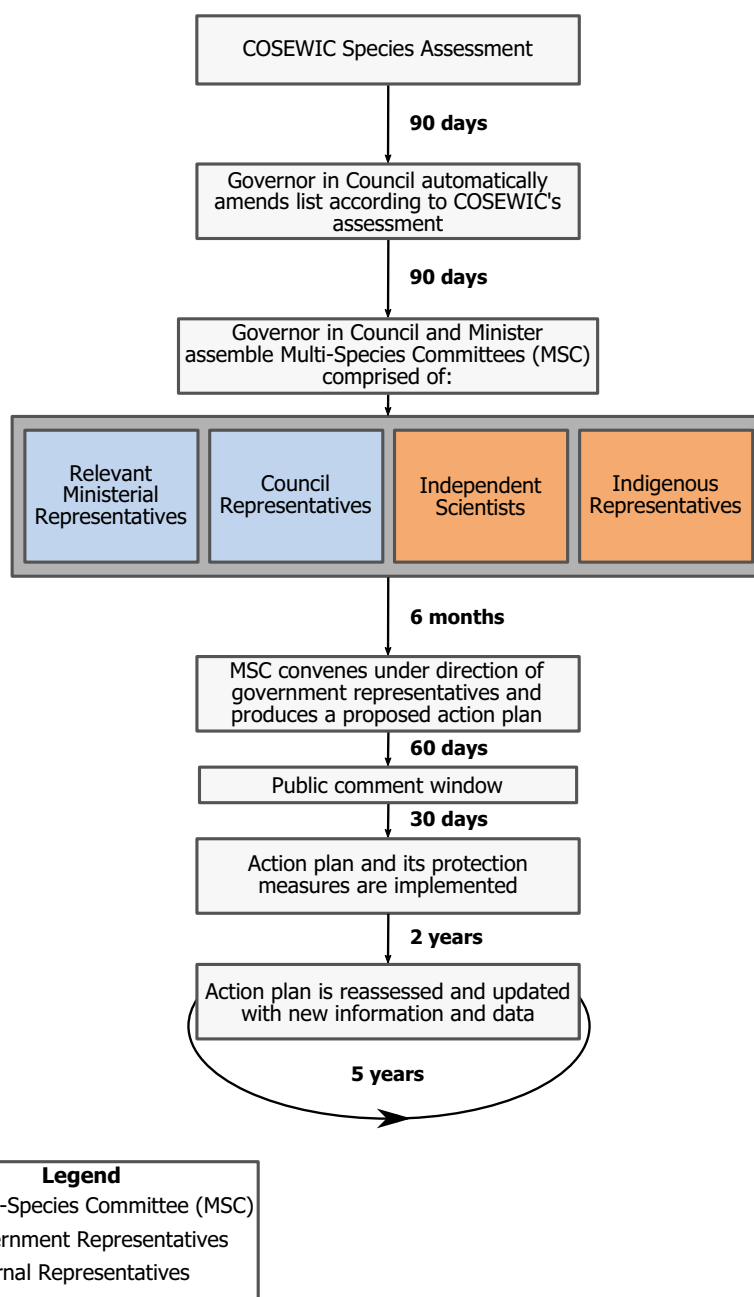
Fig. 3. Flowchart of our recommendations for a legislative restructuring of the *Species at Risk Act*. The main goal is to reduce the number of steps and provide a more linear and rigorous process. Adopting automatic listing, instituting Multi-Species Committees (MSC; in the gray box), composed of independent scientists and Indigenous representatives, and merging the recovery strategy with the action plan would help streamline the conservation process and allow better collaborations among various groups with diverse perspectives and values. COSEWIC, Committee on the Status of Endangered Wildlife in Canada.

We also recommend amendments to SARA to merge recovery strategies with action plans to stream-line the management process and reduce delays from listing to protection. We recommend that these be produced by Multi-Species Committees that would be created and managed by the Governor in Council and federal Minister, and include relevant independent scientists and Indigenous represent-atives for groups of species (or protected areas such as national parks) (Fig. 3). The goal of these com-mittees would be to create actions plans that include Indigenous and scientific knowledge alongside political and socio-economic considerations. These committees would allow better collaboration among various groups with diverse perspectives and values throughout the decision-making process. In addition, an annual report would be needed to follow the progress of each committee according to a specific list of predetermined criteria.

Additionally, to increase transparency and public participation, each step from assessment to listing to action plan reassessment should be available on a web-based open data platform (Westwood et al. 2019), along with clear mention of timelines for each step. This platform would facilitate independent analyses (Westwood et al. 2019). The public window already available under SARA to allow any per-son to file written comments on the proposed recovery strategy (SARA 2002, s. 43) or action plan (SARA 2002, s. 50) should be kept within the new framework.

We also recommend a specialized tribunal, as is already implemented in 44 countries (representing over 1200 environmental courts and tribunals; Pring and Pring 2016), focusing only on disputes that arise under SARA. This tribunal could allow any party (e.g., citizens, conservation agencies, Indigenous communities) with specific concerns regarding SARA application to voice their concerns. This would be a more efficient means of keeping the federal government accountable than the current judicial process, which is both costly and lengthy (Bankes et al. 2014; Pring and Pring 2016). A spe-cialized tribunal focusing only on SARA disputes would promote the development of more efficient decision-making processes and should allow for relatively quick decision timelines. In addition, this would enable problem-solving approaches such as conciliation, mediation, and arbitration to be applied, instead of the current win–lose approach (Pring and Pring 2016). The implementation of this specialized tribunal is crucial to consider given that all stages of SARA implementation have been under-resourced and are often delayed (Bankes et al. 2014; Pring and Pring 2016).

In many jurisdictions, specialized environmental tribunals are important for supporting legislation (Pring and Pring 2016). They allow specialized teams to examine decisions made by the government and return original decisions with directives for revision (Bankes et al. 2014). For example, in New Zealand, the environmental court, consisting of a group of legally trained environmental judges and commissioners specialized in diverse scientific fields, led to the resolution of the majority of the envi-ronmental cases without hearings or legal decisions (Pring and Pring 2016). Ontario has an Environmental Review tribunal that combines five environmental tribunals that have jurisdiction over 100 laws (however, the Ontario Endangered Species Act is currently not included; Pring and Pring 2016). For example, following the Ontario framework, a SARA tribunal could be established under the current Environmental Protection Tribunal of Canada. This tribunal should require a high level of accessibility with an open and freely available filing process. Results of initial screening and decisions of the tribunal should be available on a public registry to increase government accountabil-ity and enhance public confidence (Pring and Pring 2016). The tribunal could also evaluate requests and recommend the application of SARA's safety net/emergency order on nonfederally managed lands, if it is determined that a SAR species is not adequately protected by the laws of a province or territory. This new tribunal would also be part of the development of new legislative changes based on previous case decisions that would progressively help to optimize SARA application (Pring and Pring 2016).

Compliance with statutory timelines and rules in SARA is critical to avoid Canadian species extirpation or extinction, and this specialized tribunal, even considering the additional amendments to SARA that we propose, would be an important step to ensure that the government complies with the law (Bankes et al. 2014). However, a reduction of discretionary terms in SARA would also be needed to allow such a tribunal to work at its full potential (see section 2.7; Bankes et al. 2014).

2.2. Responsibilities of provinces and territories

2.2.1. Issues

The primary responsibility of protecting the majority of federally listed terrestrial species falls to the provinces and territories, as SARA primarily applies to federally managed lands, which currently constitute a small percentage of provinces and territories (i.e., ~4% of the land outside of the territories; Mooers et al. 2010; Wojciechowski et al. 2011). Despite this, the federal government is responsible for ensuring that all SAR in Canada have some basic level of protection: sections 34 and 35 of SARA state that if the Minister believes that a species is not adequately protected by the laws of a province or territory, then a federal "basic prohibition safety net" order can extend sections 32 and 33 prohibitions on harming species and their residences to provincial and territorial lands (SARA 2002; Wojciechowski et al. 2011). However, this has never been employed, despite many species being left unprotected on provincial Crown lands (Bolliger et al. 2020). "Critical habitat safety orders" are also available under section 61 of SARA, whereby the Minister may prohibit destruction of critical habitat on provincial or territorial lands where they believe that laws of the province or territory do not effectively protect critical habitats. Environmental groups have petitioned the Minister of ECCC to recommend section 61 critical habitat protection orders for caribou (*Rangifer tarandus caribou*) herds in Ontario and Alberta; however, the Minister has not fulfilled these requests (Ecojustice 2017, 2018). In addition, according to section 80 of SARA, an emergency order can be applied on any land (public or private) when the Minister feels that the species "faces imminent threats to its survival or recovery" and will provide protection for the species and its habitat on public and private provincial or territorial lands (SARA 2002). Emergency orders have only been applied to two species, the greater sage-grouse (*Centrocercus urophasianus*) and the western chorus frog (*Pseudacris triseriata*) (Government of Canada 2013, 2016).

2.2.2. Solutions

When a SARA-listed species is not effectively protected on nonfederally managed lands, a mandatory threshold would trigger the basic prohibition and critical habitat safety net on provincial/territorial lands. We propose that if a species is listed under SARA for two years, but it is not listed or legally protected (i.e., prohibitions on killing/harming species or destruction of residence and protection of critical habitat) on provincial/territorial lands, this would trigger an investigation by the specialized tribunal proposed in section 2.1.2 (Wojciechowski et al. 2011). If the tribunal determines that there are no justifiable reasons explaining why provincial/territorial jurisdictions have not listed or protected this species or its critical habitat, then a basic prohibition or critical habitat safety net order should normally be issued, unless there is a clear legal reason (e.g., impinging on Indigenous Treaty Rights, public safety, or conflict with additional legislation) that prevents this (Wojciechowski et al. 2011). An increase of safety net or emergency order applications should reduce burdensome litigation based on failed enforcement (Wojciechowski et al. 2011).

To reduce intergovernmental and stakeholder conflicts associated with providing effective protections on nonfederally managed lands, financial incentives could be provided. Currently, provinces and territories often either lack or do not prioritize sufficient resources for the effective protection of many SAR (Nixon et al. 2012). However, with financial aid from the federal government, they may be able

to increase protection efforts, and compensate for economic losses (McFatridge and Young 2018). While these incentives may not completely make up for all economic losses related to protecting SAR, they may be an important step in tipping the balance of decisions towards improving protection on nonfederally managed lands.

Another strategy for optimizing species protection is to increase incentives for private landowners' participation in land conservation (Kamal et al. 2015; Schuster et al. 2018). This would also help to address the inefficiency of the current reserve network to protect SAR, particularly in high biodiversity areas (Deguise and Kerr 2006; Kamal et al. 2015). Better use of conservation easements to reduce tax burdens, and payment for the services provided through habitat stewardship, could help increase private land protection (McFatridge and Young 2018). Tax shifting is another promising solution, as it allows the preservation of collective and individual interests (Kamal et al. 2015). This strategy consists of increasing the tax rate on nonpriority lands according to their biodiversity value and reducing the property tax on high-priority lands (Schuster et al. 2018). For example, a tax increase of 0.13% on the nonpriority parcels could compensate for tax relief on high-priority parcels in British Columbia, in exchange for the implementation of conservation activities and to reach the target of protecting 17% of the imperiled coastal Douglas fir ecosystem (Schuster et al. 2018). There is precedent for analogous programs to protect habitats in Canada (e.g., Ecological Gifts Program and Ontario Conservation Land Tax Incentive Program).

In addition, to reduce the costs of government programs, public participation can also be better integrated into SAR conservation. For example, in New South Wales, Australia, the government's Saving our Species program has a specific stream of species for which public participation in conservation is encouraged (State of New South Wales 2018). Recognizing the importance of some species' social value, this program develops community and stakeholder partnerships to create and implement conservation projects. An analogous system is currently available in Canada (i.e., the Habitat Stewardship Program for Species at Risk), but major improvements are needed to increase its accessibility to the public. These could include better promotion (e.g., creation of ambassador SAR) and a public-friendly website with access to progress reports on conservation projects financed by the program.

2.3. Recognizing Indigenous Peoples' authority: establishment of partnerships

2.3.1. Issues

Government-led protection initiatives throughout the world have often contributed to the loss of Indigenous self-determination by imposing prohibitions on traditional land uses (e.g., fishing and hunting), and by moving communities from their ancestral lands to create protected areas (West et al. 2006). This has profound consequences for the relationships between Indigenous Peoples and colonist governments (West et al. 2006).

In Canada, there has generally been an inadequate co-operation between federal agencies and Indigenous Peoples regarding SAR management (Hill et al. 2019). This is despite the fact that the preamble of SARA recognizes that "the roles of the Aboriginal peoples of Canada and of wildlife management boards established under land claims agreements in the conservation of wildlife in this country are essential" and directs that "the traditional knowledge of the Aboriginal peoples of Canada should be considered in the assessment of which species may be at risk and in developing and implementing recovery measures" (SARA 2002). SARA states that Aboriginal Traditional Knowledge (ATK) should be used in COSEWIC assessments through the ATK Subcommittee on Species at Risk of COSEWIC (ATK-SC) (SARA 2002, s. 18(1)).

SARA does not explicitly require that the Minister consult with Indigenous Peoples that will be directly affected by the legal protection of a species. However, it has been suggested by the Assembly of First Nations (2009) that the Minister is required to consult with Indigenous Peoples affected by the listing of a species during recovery strategy development, under the Constitution Act (1982, s. 35) and established environmental cases (Haida Nation v. British Columbia (Minister of Forests) 2004; Mikisew Cree First Nation v. Canada (Governor General in Council) 2018). Indeed, SARA sets out a qualified duty to consult with Indigenous Peoples in preparation of a SAR's recovery strategy: "to the extent possible, the recovery strategy must be prepared in co-operation with every Aboriginal organization that the competent Minister considers will be directly affected by the recovery strategy" (SARA 2002, s. 39(1d)). However, the use of the phrases "to the extent possible", and "considers will be directly affected" give the Minister discretion to minimize or potentially even avoid consultation with Indigenous Peoples who will be directly affected by the recovery strategy. Perhaps as a result of this qualification, fewer than half of recovery strategies show evidence of any involvement of Indigenous Peoples in their preparation, and involvement varies drastically among regions and federal agencies (Hill et al. 2019).

Although several Indigenous organizations already exist to help coordinate consultation, a shortage of funding in the National Aboriginal Council on Species at Risk (NACOSAR) as well as no clear guidelines on the engagement process have led to a deficiency in authentic participation and mutual respect (Maritime Aboriginal Peoples Council 2014; Olive 2014). The lack of clear guidelines for recording consultations with Indigenous Peoples on SAR management also leads to inconsistencies in documentation among planning documents (Hill et al. 2019).

2.3.2. Solutions

Partnerships that recognize Indigenous Peoples as owners of their lands could help governments, including Canada, to achieve area-based conservation targets, while providing tangible benefits to Indigenous stewards who voluntarily engage in partnerships (Schuster et al. 2019). Richness of native species is already high in many Indigenous-managed lands likely because Indigenous management practices are generally less destructive compared with non-Indigenous practices (Waller and Reo 2018; Schuster et al. 2019). Partnering with Indigenous owners to help establish networks that include Indigenous protected and managed lands could increase connectivity for SAR populations while creating new respectful relationships that recognize Indigenous self-determination rights (Indigenous Circle of Experts 2018; Schuster et al. 2019).

One way to increase partnerships is to initiate additional conservation agreements that are already supported under SARA. A conservation agreement can be established with "any government in Canada, organization or person" to benefit a species at risk or wildlife species that is not considered to be a species at risk (SARA 2002, s. 11 and 12). Funding agreements are available to cover the costs of programs and measures taken under conservation agreements (SARA 2002, s. 13(1)). Conservation agreements, which are underused (only nine were active at the time of writing), can recognize the authority of Indigenous Peoples over SAR, non-SAR species, and habitats throughout their territories and provide financial support and compensation for stewardship activities. For example, federal and British Columbia governments have been developing a conservation agreement under SARA (2002, s. 11) with West Moberly First Nations and Saulteau First Nations that focuses on three local population units in the central group of southern mountain caribou (*Rangifer tarandus caribou*) (Government of Canada 2020). This agreement proposes interim habitat protection, continued support for caribou recovery programs, and other recovery and habitat restoration actions (Government of Canada 2020).

In addition, to resolve the lack of clear guidelines on the Indigenous engagement process in SARA, an "Indigenous Accord on Species at Risk" that clearly outlines the steps for meaningful involvement of

Indigenous Peoples should be established (Maritime Aboriginal Peoples Council 2014; Hill et al. 2019). As recommended by Hill et al. (2019), a consultation record with Indigenous Peoples should be included in all recovery strategies/action plans. This would document interactions of government bodies with Indigenous Peoples during the preparation of recovery strategies/action plans, as well as evaluate the government bodies' participation success. The consultation record could include which Indigenous groups were contacted, how consultation was supported by the agency creating the recovery strategy/action plan, the nature of the information received, and how Indigenous input was used in the recovery strategies (while respecting privacy considerations). This record should be prepared by the relevant federal agency and provided to NACOSAR and other interested Indigenous organizations (Maritime Aboriginal Peoples Council 2014). Additionally, as suggested by the Maritime Aboriginal Peoples Council (2014), prioritizing government staff training to reinforce participation and clarifying that ATK collection is an insufficient means of Indigenous consultation is essential to meaningful collaboration with Indigenous Peoples (Hill et al. 2019). This would distinguish ATK collection as a collection activity only and not a fulfilment of the legal duty to consult Indigenous Peoples (Maritime Aboriginal Peoples Council 2014).

Moreover, Indigenous representatives should be members of the Multi-Species Committee as proposed in section 2.1.2 (also see Multi-Species Committee; Fig. 3). In addition, as suggested by Reid et al. (2021), Mi'kmaw Elder Dr. Albert Marshall's "Two-Eyed Seeing" approach combining Indigenous and western views should be used as a guiding framework in the decision process of Multi-Species Committees. This approach promotes equity among diverse perspectives and balance in the way to generate and harmonize different sources of knowledge (Reid et al. 2021). This would ensure that Indigenous knowledge, rights, and concerns are identified and consistently incorporated into decision-making during management of SAR, while acting as a sincere reconciliation effort between Indigenous Peoples and the federal government.

The implementation of regional offices and dedicated consultation support staff for NACOSAR and ATK-SC composed of Indigenous representatives could also help to resolve challenges caused by inaccessible federal committees and Indigenous experts who are already severely overcommitted. This would increase accessibility to smaller communities, help to break language barriers, enhance participation, as well as bring the consultation process to a common standard.

2.4. Clarifying critical habitat

2.4.1. Issues

SARA defines critical habitat (CH) as the habitat "necessary for survival or recovery" of a species (SARA 2002, s. 2(1)). CH identification and protection are considered as crucial steps in the recovery of listed species by supporting critical life stages that impact population persistence (Camaclang et al. 2015). Currently, SARA requires that a description of CH is included in recovery strategies and action plans (SARA 2002, s. 41(1c) and 49(1a)). Given that the designation of CH is tied to the application of prohibitions, identifying CH can cause controversy, opposition, and thus delays in planning and implementing actions (Martin et al. 2017). As a result, the identification of CH can represent a significant bottleneck in recovery planning. In addition, there is no clearly defined process for CH identification for most listed species (except aquatic species; DFO 2015), which leads to inconsistencies across taxa (Lemieux Lefebvre et al. 2018). With no clear guidelines, CH identification is less likely to capture the relationship between habitat and population viability, even when employing the best available data. While acknowledging that any approach to increase CH knowledge is a step in the right direction, Lemieux Lefebvre et al. (2018) observed that CH identification was made with data from a wide variety of methods, and that only 15% of the SARA recovery strategies that identified CH were based on high-quality data, such as data from habitat-fitness and habitat-population viability analysis.

Moreover, initial CH research is often not clearly documented and follow-up improvements to CH with new research are rarely made (Lemieux Lefebvre et al. 2018). Failure to identify CH based on data that show a direct link between habitat characteristics and population viability can lead to protecting poor habitats that cannot support populations in the long term (Heinrichs et al. 2010). Furthermore, when CH is delimited and based on a small number of previous species sightings, especially for cryptic and (or) rare species, the total area designated as CH is likely to fall below what is needed to support species recovery (Bendik et al. 2016). These issues are exacerbated if there is no follow-up aimed at improving CH identification and correcting initial inadequacies. Further, identified CH rarely includes currently unoccupied habitat (i.e., habitat from which the listed species has been extirpated), which could prove crucial in SAR survival or recovery by remaining available to future recolonization or restoration (Camaclang et al. 2015).

2.4.2. Solutions

A standardized CH identification protocol needs to be established (Camaclang et al. 2015). SARA requires that CH be identified using the best information available and we suggest that the use of these data should be regularly enforced by the standardized protocol proposed. In data-limited situations, uncertainty in CH designation should be buffered by identifying larger candidate CH areas, which can be reduced as more data are collected (Rosenfeld and Hatfield 2006). Follow-up research designed to improve CH identification should, when possible, prioritize acquiring high-quality data generated by habitat-population viability, population demographics and (or) habitat/individual fitness analysis (Rosenfeld and Hatfield 2006; Heinrichs et al. 2010; Lemieux Lefebvre et al. 2018). By recognizing that such data are not available for most species and that CH research is expensive and time consuming, intensive and short-term research focusing on CH identification should prioritize species that lack most information (Lemieux Lefebvre et al. 2018). As these higher-quality data become available, we can avoid accidentally protecting poor habitats and we can better identify the potential contribution of candidate CH areas to species persistence (Heinrichs et al. 2010). This knowledge would allow for credible prioritization of candidate CH areas for protection (Rosenfeld and Hatfield 2006). In addition, it should be mandatory to consider currently unoccupied CH (i.e., habitat from which the listed species was extirpated) given that these areas can be equally important for SAR persistence or recovery (Camaclang et al. 2015).

To reduce delays in the protection of SAR, we also suggest CH identification no longer be a required component for recovery strategies or action plans for species whose habitats are nonthreatened (Government of Canada 2019). However, in cases where there is significant doubt regarding whether habitat loss or degradation are (or could become) important threats, critical habitat should be identified (Government of Canada 2019). In addition, the study schedule that is already included in the recovery strategy when CH is not currently well defined (SARA s. 41 (1) c. 1) should be re-enforced by the 2-year timeline for the preparation of the first progress report in our proposed SARA framework (**Fig. 3**). Ideally, long-term monitoring projects would be initiated to proactively collect high-quality CH data that can help catch species declines early on (Lemieux Lefebvre et al. 2018). Follow-up research assessing CH effectiveness should also be mandatory to allow the evaluation, readjustment, and ultimately improvement of species CH identification (Heinrichs et al. 2010).

2.5. Assessing data-deficient species

2.5.1. Issues

One in six species assessed by the IUCN is classified as data deficient, with this number projected to increase because species with the best available information are more likely to have already been assessed (Bland et al. 2017). In Canada, there are similar challenges. To date, 62 species have been assessed as data deficient by COSEWIC, just over half of which are marine and freshwater fishes.

The data-deficient category reflects a lack of sufficient information to assess extinction risk (IUCN 2019). Under SARA, an assessment of data deficient does not trigger mandatory research, data collection, or reassessment (Mooers et al. 2010). For example, the Bering wolffish (*Anarhichas orientalis*) was initially listed on Schedule 3 as Special Concern but then designated as data deficient in November 2002 by COSEWIC, leading to its withdrawal from the Schedule 3 (COSEWIC 2002). Even with the identification of the possible threats and suggestions about the direction for future research, it was stated in the government response in 2004 that "the Minister will undertake no further action at this time but encourages jurisdictions to seek and provide any information respecting this wildlife species" (Government of Canada 2004). Since this statement, to our knowledge, no action was taken to increase the available information necessary to specify this species status.

2.5.2. Solutions

Given that data-deficient species are likely to be at risk (Bland et al. 2015), there is a need to prioritize research for these species based on their potential threat level. An approach that could be taken is to place potentially at-risk data-deficient species in a priority research list (Jarić et al. 2016). Data-deficient species would be considered potentially at risk if, based on available information, they would likely be placed in one of the threat categories but lack the data necessary for SARA listing (Jarić et al. 2016). Machine-learning methods can be used to predict the likely threat level with the information on the species that are already classified (Bland et al. 2015). In fact, several studies have shown that these algorithms are highly successful in predicting extinction risk in data-deficient species (Howard and Bickford 2014; Quintero et al. 2014). Assigning species to a priority research list would help identify data-deficient species that face high extinction risk (Jarić et al. 2016).

2.6. Implementing systematic prioritization

2.6.1. Issues

Resources available for conservation are limited, making it essential to systematically prioritize actions for at-risk species. In Canada, SARA contains a limited mechanism for prioritization based on threat level (SARA 2002, s. 15(1b); De Grammont and Cuarón 2006). Protections differ for listed species, with species classified as Endangered, Threatened, or Extirpated receiving protection on federally managed lands, while those classified as Special Concern do not. In addition, the time allowed for posting a recovery strategy is shorter for Endangered species compared with Threatened and Extirpated species (see **Fig. 2**). However, more detailed guidelines on prioritization are lacking in SARA and, generally, prioritization decisions made by the federal government have been shown to be value-driven and subjective (Findlay et al. 2009; McCune et al. 2013; Creighton and Bennett 2019). For example, there are longer delays in creating recovery strategies for species threatened by agriculture or residential/commercial development (McCune et al. 2013). Additionally, Raymond et al. (2018) observed that in many cases, endemic and globally threatened species in Canada do not receive higher priority than either subspecies or peripheral populations of globally secure species. Endemic species are particularly vulnerable to extinction, as they often have restricted geographic ranges and small population sizes (Cahill et al. 2013). In Canada, 308 species and subspecies have been identified as endemic, and most are of conservation concern (Enns et al. 2020). Prioritization of endemic and globally at-risk species is essential, given that their viability is often contingent on effective management (Bennett et al. 2014; Raymond et al. 2018).

2.6.2. Solutions

Establishing a more explicit priority guideline for recovery and action planning in SARA and a process for monitoring whether priorities are being met would lead to a less subjective approach to prioritization (Arponen 2012; Game et al. 2013). Criteria for priority setting must be clearly defined, which includes stating precise objectives and outlining a set of actions to be prioritized (Game et al. 2013).

As suggested by Raymond et al. (2018), it is crucial to implement more explicit processes for prioritization directly in SARA that give more importance to endemic and globally at-risk species by fast-tracking the implementation of their action plans and, thus, their recovery. A straightforward approach would be to adopt a process similar to that used by COSEWIC for prioritizing species for assessment by calculating a ranking score for each SAR that would consider the species threat level, its endemic status, as well as its global risk threat status (COSEWIC 2019). This ranking could also be used to determine which species need to be prioritized by provincial/territorial or private land initiatives for protection (see section 2.2.2).

2.7. Discretionary language in SARA: the basis of several issues

2.7.1. Issues

Discretionary language is partly responsible for the ineffective implementation of SARA (Bankes et al. 2014). The effectiveness of law application is dependent on the terms used in it, and the Canadian legislation process has led to the frequent use of discretionary terms (e.g., "to the extent possible", "is of the opinion" and "may"; Illical and Harrison 2007). In addition, many key terms used in SARA are loosely defined (e.g., recovery and survival) providing considerable space for cabinet discretion (Illical and Harrison 2007). This discretion also makes it difficult to hold federal agencies accountable to courts (Illical and Harrison 2007; Bankes et al. 2014). Additionally, SARA contains loopholes such as the ambiguity about when the Governor in Council receives COSEWIC assessments, and the possibility that the Governor in Council has to refer the assessment of a species back to COSEWIC for more information, leading to an extension of the 9-month listing deadline (**Fig. 2**; Mooers 2004).

2.7.2. Solutions

A complete analysis of the language used in SARA should be conducted to identify all the places where discretionary wording is used and clarify the intent of that language. Creating amendments to remove discretionary language would reduce inconsistencies and delays in SARA's application (Illical and Harrison 2007; Bankes et al. 2014). For example, the wording "*to the extent possible*, an action plan must be prepared in co-operation with every Aboriginal organization that the competent minister considers will be directly affected by the action plan" (SARA 2002, s. 48(1d)) should be changed to ensure that meaningful consultation becomes a requirement, unless there are no Indigenous agencies or groups who are able or willing to provide input (Hill et al. 2019). Reinforcing the language used throughout SARA could reduce ambiguity and delays, set enforceable standards for action in every step of the process and, thus, increase the likelihood of good outcomes (e.g., downlisting, increasing population trends) for SAR. However, this complete analysis and clarification of the language in SARA must also be accompanied by a willingness to abide by the language and by the more explicit deadlines we recommend.

3. Conclusions

In this paper, we have identified what we feel are the most important high-level issues with SARA and its implementation. We have highlighted solutions already proposed since SARA implementation and suggested new ideas that, we think, could greatly improve SARA's effectiveness, if they are correctly applied. Some solutions could be easily implemented in the short term by changes to policy or the creation of new ones, while others need amendments to the law. We recognize that our proposals will not entirely remove conflicts (e.g., government discretion vs. scientific and Indigenous knowledge) and important trade-offs (e.g., species protection vs. economic activities) around SARA. Many of our recommendations are centred on creating transparency and openness through better documentation and accountability. The idea of openness and accountability in environmental decisions has been heralded

by the federal government (Trudeau 2015). Moreover, we have identified that key language used in SARA is hindering the proper implementation and that can be improved by amendments with clearer terms. Automatic listing, the merging of the recovery strategy with the action plan, the creation of Multi-Species Committees composed of independent scientists and Indigenous representatives, an explicit prioritization program, and a close look at discretionary language in SARA would hopefully allow more efficient protection of SAR in Canada, and ultimately may prevent their extinctions.

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Author contributions

JRB conceived and designed the study. AT, NK, SF, CAP, SMG, MD, JS, JW, SJC, and JRB drafted or revised the manuscript.

Competing interests

The authors have declared that no competing interests exist.

Data availability statement

All relevant data are within the paper.

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