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2 **Quebec's legislative framework for the protection of wildlife species at risk: critical**
3 **assessment and recommendations for a major overhaul**

4

5 Translated from: **Cadre législatif québécois pour la protection des espèces sauvages**
6 **en situation précaire : évaluation critique et recommandations pour une révision**
7 **majeure**

8

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25

26 **Abstract**

27

28 In Quebec, the Act respecting threatened or vulnerable species (ARTV), adopted in 1989,
29 aims to safeguard Quebec's wild genetic diversity by protecting species at risk. However,
30 since its implementation approximately 30 years ago, it has been repeatedly pointed out
31 that the application of Quebec's legislative framework for the protection of wildlife
32 species at risk was often slow and inadequate. The aim of this article is to make a series
33 of observations on the limits of current legislation and propose nine urgent
34 recommendations to improve the effectiveness of conservation efforts for species at risk
35 in Quebec. Our recommendations aim to increase the efficiency and transparency of the
36 designation process, reconsider compensation mechanisms for the loss of critical habitat,
37 and standardize species status between the federal and provincial levels. We hope that our
38 article will pave the way for a constructive discussion leading to an improved protection
39 of wildlife species in precarious situations and their persistence for future generations.

40

41

42 **Introduction**

43

44 On a global scale, wild populations are facing increasing environmental changes mainly
45 of anthropogenic origin (Bowler et al. 2020) including habitat loss and degradation due to
46 agriculture, urban development, forestry, as well as energy and mining development. The
47 spread of diseases and exotic invasive species, pollution, and climate change are also
48 anthropogenic environmental stressors that have a significant impact on global
49 biodiversity (WWF 2018, Maxwell et al. 2019). Several studies show that these changes
50 can affect the ecology, evolution, and viability of wild populations (Baillie et al. 2004,
51 Montoya and Raffaelli 2010, Gomes et al. 2021). Indeed, some authors have estimated
52 that species loss is currently approximately 10,000 times greater than before the arrival of
53 humans on Earth (De Vos et al. 2015, Ceballos et al. 2017), compromising important
54 ecosystem services (Montoya and Raffaelli 2010, Gomes et al. 2021). Faced with this
55 biodiversity crisis, it is vital to have an effective legal framework to protect species in
56 precarious situations and their habitats to limit current and future declines.

57

58

59 With a surface area of around 1.7 million km², Quebec's immense territory encompasses
60 a wide diversity of terrestrial and aquatic ecosystems, including the St. Lawrence River,
61 its estuary and Gulf, hundreds of thousands of lakes, over 3,000 rivers, numerous peat
62 bogs, many types of forest, and arctic tundra. Most of these ecosystems (72%) lie north of
63 the 49th parallel (Tardif et al. 2005, Auzel et al. 2021). These ecosystems are home to a
64 rich biodiversity, with over 30,000 wild species listed (Government of Quebec 1992).

65 However, the actual number could be much higher, considering that a large portion of the
66 province is hard to access and survey and that there is a lack of scientific data for several
67 taxonomic groups (e.g., invertebrates, algae, fungi) (Langor 2019, Bazzicalupo et al.
68 2022).

69

70

71 Quebec's biodiversity is not immune to the impacts of human activity. Since European
72 colonization in the 17th century, Quebec's landscape has undergone major environmental
73 modifications (Jones 1942, Danneyrolles et al. 2016), which have intensified since the
74 1960s (Jobin and Brodeur 2023). For example, southern Quebec, which was once
75 covered by mature forests, is now dominated by agroforestry landscapes and vast urban
76 areas (Bélanger and Grenier 2002, Jobin et al. 2003, Jobin and Brodeur 2023). In the past,
77 over-exploitation has already led to the disappearance of certain species, such as the
78 passenger pigeon (*Ectopistes migratorius*, Bucher 1992) or the great auk (*Pinguinus*
79 *impennis*, Thomas et al. 2019), which are already extinct. Nowadays, habitat loss is
80 leading to significant declines [e.g., short-eared owl, *Asio flammeus*, COSEWIC 2021;
81 western chorus frog, *Pseudacris triseriata*, COSEWIC 2008] or increased extinction risk.
82 This is the case of the woodland caribou, *Rangifer tarandus*, of the Gaspésie-Atlantique
83 population (COSEWIC 2014a), the copper redhorse, *Moxostoma hubbsi* (COSEWIC
84 2014b) and the American ginseng, *Panax quinquefolius* (COSEWIC 2000). Quebec must
85 therefore adopt effective conservation tools to protect species in precarious situations,
86 both locally and nationally, to avoid their disappearance in the short to medium term.

87

88 In Quebec, the protection of endangered wildlife species is a shared responsibility
89 between the federal and provincial governments (Olive 2014, Smallwood 2003). Some
90 species are primarily the responsibility of the federal government (e.g., marine fish,
91 marine mammals, migratory birds), while others fall under provincial jurisdiction (e.g.,
92 freshwater and diadromous fish, terrestrial species on non-federal lands). However,
93 although there are management agreements linked to the responsibilities and jurisdictions
94 of each level of government, all Canadian wild flora and fauna species may be covered
95 by a piece of federal legislation, the Species at Risk Act (SARA, 2002), including those
96 found in Quebec.

97

98

99 As independent expert members of Quebec's Advisory Committee for threatened or
100 vulnerable wildlife species (hereinafter referred to as the "Advisory Committee"), we
101 have made several observations concerning the ineffectiveness of provincial legislation in
102 designating and protecting species at risk in Quebec. In this article, we propose a series of
103 modifications to the current legislation and its implementation to more effectively
104 conserve species at risk in Quebec. To justify these recommendations, we first introduce
105 the federal and the Quebec legislative frameworks. Although very different, both
106 frameworks apply in Quebec. A review of the federal framework enables us to assess the
107 areas of disagreement between the two levels and to identify possible improvements. We
108 then present a summary of the various stages in the process of designating threatened or

109 vulnerable species currently in place in Quebec. Although information on this process is
110 available, it is complex, and several sources must be consulted to understand its
111 application. Finally, we identify the limitations of current legislation and propose a set of
112 recommendations for improving the protection of species at risk in Quebec. The federal
113 designation process also has limitations and several articles have been written on the
114 subject (Findlay et al. 2009, Hutchings and Festa-Bianchet 2009, Mooers et al. 2010,
115 Turcotte et al. 2021). In this article, we focus on Quebec where such a critical analysis
116 has yet to be carried out. The context for making such recommendations seems favorable,
117 since the Quebec government publicly committed itself to improving biodiversity
118 protection during the 15th Conference of the Parties (COP15), which was held in
119 Montreal (Radio-Canada 2022). In addition, the Ministère de l'Environnement, de la
120 Lutte contre les changements climatiques, de la Faune et des Parcs (hereinafter
121 MELCCFP) recently mandated his parliamentary assistant to conduct consultations with
122 civil society organizations to identify what improvements could be made to the protection
123 regime for threatened or vulnerable plant and wildlife species in Quebec (Cision Canada
124 2023a).

125

126 *Canadian legislation*

127

128 At the federal level, the Committee on the Status of Endangered Wildlife in Canada
129 (COSEWIC), first established in 1977, assesses the status of wildlife species. It is an
130 independent advisory committee made up of scientific experts from several of the

131 country's provinces and territories and from various backgrounds (academic, Indigenous,
132 governmental and non-governmental organizations, and the private sector). Following the
133 1992 Earth Summit in Rio de Janeiro, Brazil, the Canadian government adopted the
134 Species at Risk Act (SARA) in 2002 to protect endemic biodiversity. The purpose of the
135 Act is to protect endangered wildlife species and their habitats across Canada (SARA
136 2002). Under the framework of the National Accord for the Protection of Species at Risk
137 (OAG 2023), signed in 1996 by federal, provincial, and territorial ministers responsible
138 for wildlife, SARA is applied across Canada. Among other things, it allows measures to
139 be taken in the absence of effective provincial and territorial legislation to protect species
140 at risk and their habitats. It should be noted that, although Quebec supports the objectives
141 of the Accord, the province has not officially signed it.

142

143

144 SARA identifies COSEWIC as the independent advisory committee responsible for
145 providing expert scientific recommendations that will be used by the Governor in Council
146 to establish the official list of species to be protected. It is important to note that an
147 assessment of a species "at risk" by COSEWIC is not automatically followed by the
148 addition of that species to Schedule 1 of SARA. Schedule 1 is the official list of wildlife
149 species at risk in Canada. On this list, species are classified as extirpated, endangered,
150 threatened, or of special concern (Box 1). Once an endemic species (a geographically or
151 genetically distinct species, subspecies, variety or population of animals, plants or other
152 organisms of wild origin, except bacteria or viruses) is listed, protection and recovery
153 measures are implemented. When SARA was adopted in 2002, the 233 species that had

154 previously been deemed endangered by COSEWIC between 1978 and 2001 were
155 reassessed. The reassessment was based on quantitative criteria slightly modified from
156 those developed by the International Union for Conservation of Nature (IUCN) and all
157 these species were included in Schedule 1 (SARA 2002, art. 42, Waples et al. 2023).
158 COSEWIC currently meets twice a year to assess the status of wildlife species at risk. Its
159 recommendations are then communicated to the responsible minister, who must forward
160 them to the Governor in Council. There is no deadline for this ministerial action.
161 Thereafter, the Governor in Council acts on the advice of Cabinet and is responsible for
162 deciding whether or not to list species at risk (SARA 2002, art. 27). COSEWIC's status
163 reports and recommendations are made public in French and English within a few weeks
164 or months after these meetings. It is important to note that the scientific assessments
165 produced by COSEWIC carry no legal weight. The Canadian government can follow
166 COSEWIC's recommendation and list a species on Schedule 1, decline the
167 recommendation, or require further clarification on specific issues to make a more
168 informed decision (SARA 2002, s. 24-31, Mooers et al. 2010). In cases where a
169 recommendation is not followed, the government must explain the reason to the public
170 (SARA 2002, s. 24-31, Olive 2014).

171

172 When a species is listed on Schedule 1, the responsibility for implementing SARA is
173 shared between different ministers. Fisheries and Oceans Canada (DFO) is responsible
174 for the protection of aquatic species, and Environment and Climate Change Canada
175 (ECCC), also responsible for Parks Canada (PC), oversees the protection of terrestrial
176 species (SARA 2002, ss. 32-36, Smallwood 2003). Under SARA, it is prohibited *to kill*,

177 *harm, harass, capture or take an individual of a wildlife species that is listed as an*
178 *extirpated species, an endangered species or a threatened species (SARA, s. 32 (1)).*
179 *Additionally, SARA states that no person shall possess, collect, buy, sell or trade an*
180 *individual of a wildlife species that is listed as an extirpated species, an endangered*
181 *species or a threatened species, or any part or derivative of such an individual. (SARA,*
182 *s. 32 (2)). It also prohibits damaging or destroying its residence (e.g., a den or nest)*
183 *(SARA, art. 33). These bans apply to all federal lands within a province or territory under*
184 *the authority of the minister responsible for the ECCC or PC. They also extend to all bird*
185 *species protected under the Migratory Birds Convention Act and to all aquatic species on*
186 *private, provincial, and territorial lands. SARA also introduces the notion of critical*
187 *habitat (SARA, s. 58), i.e., the habitat necessary for the survival or recovery of an*
188 *extirpated, endangered, or threatened species listed on Schedule 1. This critical habitat is*
189 *defined in the species' recovery strategy or action plan. It is protected by voluntary and*
190 *stewardship measures. If such measures are insufficient, prohibitions against the*
191 *destruction of critical habitat may be applied. Outside federal lands, SARA prohibitions*
192 *may be extended, by Order-in-Council or otherwise, to private, provincial, or territorial*
193 *lands where the laws in force in those jurisdictions do not effectively protect the species*
194 *in question or its habitat.*

195

196

197 ***Quebec legislation***

198 Quebec is one of seven provinces and territories to have adopted legislation to ensure the
199 conservation of species at risk (Olive 2014, ECCC 2019, ECELAW 2022) and is the
200 second province, after Ontario, to have adopted provincial legislation for the protection of
201 species at risk. During the 1988 Quebec Wildlife Summit, 23 organizations representing
202 all stakeholders in wildlife species and their habitats decided that Quebec should adopt
203 provincial legislation for the protection of species at risk (Government of Quebec 1992).
204 In 1989, the Quebec National Assembly adopted the Act Respecting Threatened or
205 Vulnerable species (ARTVS 1989). Then, the Quebec Policy for threatened or vulnerable
206 species (hereinafter referred to as the "Policy") was adopted in 1992 (Government of
207 Quebec 1992). The Policy defines the application of the ARTVS, including
208 administrative aspects and the species designation process, as well as the role and
209 composition of the two Advisory Committees, which assess the status of plant and animal
210 species likely to be designated.

211

212

213 The general aim of the ARTVS (see Box 2) and its Policy is to safeguard Quebec's
214 overall natural genetic diversity by protecting species at risk. On the recommendation of
215 the responsible minister and after consultation with other government ministers, this law
216 allows any species deserving such status to be designated as threatened or vulnerable. It
217 also allows for the habitat characterization of designated species, according to their
218 biological characteristics. Finally, it enables the implementation of programs to promote
219 the viability of these species. At the provincial level, species at risk are divided into two
220 main categories: threatened and vulnerable. The definitions of each of these categories

221 are not equivalent to those used at the federal level (Box 1, Government of Quebec
222 1992). The Quebec government also maintains a list of species likely to be designated as
223 threatened or vulnerable. Although the ARTVS does not provide specific legal protection
224 for the species listed, these species and their habitats are considered in the general
225 authorization procedure for development projects under sections 22 and 31 of the
226 Environment Quality Act (EQA). To date, 96 plant and animal species have been
227 designated as threatened and 55 as vulnerable in Quebec (Table 1). In addition, 537
228 species are on the List of plant and wildlife species which are likely to be designated as
229 threatened or vulnerable (Government of Quebec, 2023a).

230

231

232 The ARTVS allows for the designation of both plant and animal species. It can be applied
233 to all non-domestic species that spend a significant part of their life cycle in Quebec
234 (Government of Quebec 1992). Currently, the MELCCFP is responsible for the application
235 of Quebec's legislation on the protection of species at risk. However, flora and fauna
236 species have historically been managed by two different ministries, which explains why
237 the legal framework for the two major taxonomic groups differs.

238

239 For plant species, the ARTVS applies directly. The law states that *no person may have any*
240 *specimen of a threatened or vulnerable plant species or any of its parts, including its*
241 *progeny, in his possession outside its natural environment, or harvest, exploit, mutilate,*
242 *destroy, acquire, transfer, offer to transfer or genetically manipulate it (art.16 and 17).*

243 However, it is the Regulation respecting threatened or vulnerable plant species and their
244 habitats (RRTVPSH), which derives from the ARTVS, that identifies designated plant
245 species and plant habitats. The ARTVS defines the level of protection for these habitats,
246 specifying that (art. 17) *no person may, in the habitat of a threatened or vulnerable plant*
247 *species, carry on an activity that may alter the existing ecosystem, the present biological*
248 *diversity or the physical or chemical components peculiar to that habitat.* Certain
249 exceptions may apply and the ARTVS provides exemptions from the application of the
250 prohibitions set out in articles 16 and 17, such as in the case of interventions related to
251 public safety or to activities excluded or governed by the RRTVPSH, or by virtue of a
252 discretionary power granted to the Minister (ARTVS, art.16-19).

253

254 For wildlife species, the Regulation respecting threatened or vulnerable wildlife species
255 and their habitats (RRTVWSH), which also derives from the ARTVS, lists designated
256 species and characterizes their habitats. The ARTVS (art. 5) refers to the Act Respecting
257 the Conservation and Development of Wildlife (ARCDW) for habitat protection. Section
258 128.6 of the ARCDW states that it is forbidden to, *in a wildlife habitat, carry on an activity*
259 *that may alter any biological, physical or chemical component peculiar to the habitat of*
260 *the animal or fish concerned.* Sections 128.2 to 128.5 of the ARCDW allow this habitat to
261 be delimited by a mapped plan. The habitat of threatened or vulnerable species is included
262 in the list of habitats that may be protected under the ARCDW. This protection is governed
263 by the Regulation respecting wildlife habitats (RRWH), which derives from the ARCDW
264 and describes the activities for which the protection does not apply, as well as the
265 conditions under which interventions in the habitat of a designated species would be

266 allowed. Whether or not the habitat is mapped, this protection is limited by several
267 exceptions. It does not apply to activities excluded by regulation or carried out in
268 accordance with standards or conditions of intervention determined by regulation, as well
269 as to certain special cases, for example, *an activity necessary to avoid, limit or repair*
270 *damage caused by a disaster.*

271

272 The ARTVS applies to plant and animal species on both private and public lands.
273 However, for wildlife, although the description of the habitats of designated species in
274 the RRTVWSH could enable them to be protected on private lands, section 1 of the
275 RRWH limits the application of these measures to public lands. An amendment to this
276 regulation would make it possible to address this protection issue for wildlife species in
277 precarious situations on private lands.

278

279 **Process for designating threatened or vulnerable species in Quebec**

280

281 The official designation of species as threatened or vulnerable involves several stages
282 (Figure 1). The list of flora and fauna species likely to be designated as threatened or
283 vulnerable is developed by MELCCFP staff and updated periodically, depending on the
284 availability of status reports. The list is also based on the precariousness ranks, called
285 status rank or S ranks, of species assessed according to the standardized methodology
286 used by NatureServe (Faber-Langendoen et al. 2012). This rank is established by
287 consulting available scientific data, studies published in specialised journals, and peer-
288 reviewed government reports (e.g. inventory and monitoring results). It is defined

289 according to a five-point classification ranging from "critically endangered" (1) to
290 "secure" (5) and according to a geographical scale: global (G), national (N) and
291 subnational (S) (Faber-Langendoen et al. 2012). In Quebec, the Centre de données sur le
292 patrimoine naturel du Québec (CDPNQ) is responsible for assigning precariousness ranks
293 (Government of Quebec 2023c, chapter E-12.01, a. 10). The CDPNQ is also responsible
294 for gathering and analyzing data on wildlife and plant species at risk from various
295 sources, disseminating the information, and providing scientific expertise (Cision Canada
296 2023b).

297

298 Two independent advisory committees assess the situation of species at risk, one for
299 fauna and the other for flora. According to the Policy (Government of Quebec 1992),
300 each of these committees is made up of seven members appointed by the Minister: three
301 members from the scientific community, three members from non-governmental
302 organizations or institutions (e.g., conservation organizations), and one person
303 representing the Ministry, who coordinates the committee. The committee's assessments
304 are based on various sources of information, including but not limited to status reports,
305 inventory and monitoring databases, published scientific articles, expert opinions, and
306 status ranks. Status reports come from various expert groups and include provincial and
307 federal government reports and COSEWIC status reports when available. Scientific data
308 are presented on species biology, population size, and trends in Quebec, and the
309 availability and quality of habitats used. The factors limiting the recovery of species
310 identified as being at risk are also described. However, unlike the federal process, there
311 are no precise quantitative criteria for assessing whether the situation of the species under

312 consideration corresponds to the definitions of statuses set out in the Quebec policy (Box
313 2). The members of the Advisory Committee must therefore rely on their own expertise,
314 consult experts on certain species, and refer to the criteria adopted by COSEWIC and to
315 the S Ranks to support their discussions. At these meetings, the Advisory Committee
316 issues a recommendation based on the opinions of the members for each of the species
317 evaluated and specifies the reasons justifying this recommendation. The recommended
318 statuses and their justifications are then forwarded to the deputy minister responsible,
319 who will decide whether or not to accept the committee's recommendations.

320

321 If the recommendation is not accepted, the process stops without any further formal or
322 public communication of the reasons for rejection. If a recommendation is accepted,
323 consultations with Indigenous and interdepartmental communities must be organized to
324 identify the potential concerns, including socio-economic issues, related to the potential
325 designation of the species. Next, a draft amendment to the RRTVPSH or RRTVWSH is
326 drawn up and published in the Gazette officielle du Québec for a 45-day public
327 consultation period. This is the only step in the entire process that is subject to a deadline
328 and public disclosure. After this stage, the regulatory amendment must be approved by
329 the Members of Cabinet, and a version must be pre-published in the Gazette officielle du
330 Québec, to take effect on the fifteenth day following publication (Government of Quebec
331 2023b, art.5).

332

333 When a species becomes officially designated, the department responsible may set up a
334 recovery team (Figure 2) but is under no obligation to do so. The team's mandate is to
335 produce and implement a recovery plan which lists the objectives, measures, and actions
336 to be taken to promote the recovery of a species designated as threatened or vulnerable.
337 This team is made up of members from a variety of backgrounds, including industry in
338 some cases. These members, chosen for their expertise and interests, participate actively
339 in the development and implementation of the plan. The recovery plan lasts 10 years. A
340 mid-term review may be prepared in some cases. Detailed information on the various
341 stages of the process is available in the 2015 Recovery Team Framework (Gauthier
342 2015).

343

344

345 **Recommendations for removing obstacles to species designation and law**
346 **enforcement**

347

348 Since its inception, the ARTVS and the application of its Policy have been severely
349 criticized on numerous occasions by scientists and conservation organizations for their
350 ineffectiveness in protecting and restoring species at risk and their habitats (Radio-
351 Canada 2016, Le Devoir 2022, Radio-Canada, 2022, St-Laurent et al. 2022). Several of
352 the respondents consulted during the drafting of the White Paper for the Protection of
353 Biodiversity South of the 49th Parallel mentioned that federal legislation on species at
354 risk is more comprehensive than Quebec's (Auzel et al. 2021). Even the Auditor General
355 of Quebec pointed out in 2016 that Quebec was slow to meet its own commitments
356 regarding biodiversity protection (Commissioner of the Environment and Sustainable

357 Development 2016). At the COP15 of the United Nations Convention on Biological
358 Diversity, held in Montreal in December 2022, the functioning of the designation
359 process, including the fact that there has been no meeting of the animal Advisory
360 Committee since January 2017, was also strongly criticized (La Presse 2022). In addition,
361 between 2009 and 2023, the provincial government had made no amendments to the
362 regulation to designate new wildlife species. It was only in June 2023 that an updated
363 version of the RRTVWSH was finally published (Government of Quebec 2023b). A total
364 of 27 species were then added to the list of designated species, including 16 species
365 designated as threatened and 11 designated as vulnerable (Table 1).

366

367 Three of the main obstacles to the protection of endangered wildlife species in Quebec
368 are the lack of transparency, the slowness of the designation process, and the lack of
369 accountability of the minister responsible for decisions made under this process. In fact, it
370 has been shown that there are long delays between the time a species' situation is assessed
371 and the time a legal status is adopted in the regulations. Quebec legislation does not
372 specify a timeframe for any of the various steps in the designation process, except for the
373 posting of the draft by-law (stage 10, Figure 1), and imposes no obligation to explain and
374 make public the reasons for rejecting a recommendation by the Advisory Committees. In
375 addition, since the government is not legally bound by any pre-determined deadlines,
376 each stage of the designation process (Figure 1) can be delayed for economic, social, or
377 political reasons without justification. For example, between 2013 and 2023, the activities
378 of the Quebec Advisory Committee for threatened or vulnerable wildlife species were
379 suspended, except for two meetings in 2016 and 2017, and the government cited

380 budgetary reasons to justify the interruption. It should be noted that members sitting on
381 advisory committees perform their duties entirely on a voluntary basis or are released by
382 their home institutions to serve on the committee. These meetings generate very few costs
383 when held virtually. This interruption represents a delay of almost a decade in the
384 assessment of species status, which is only the first step in the designation process. This
385 delay can therefore cause a major slowdown before reaching the ultimate step of
386 implementing the protection measures best suited to the needs of species identified as
387 being in a precarious situation. However, in some urgent cases, due to the slow speed of
388 the process, teams have even been set up before the designation is in place.

389

390

391 Our first recommendation is therefore to introduce a legal obligation to make all stages in
392 the identification and designation of threatened or vulnerable species public and
393 transparent (recommendation #1, Box 3). In theory, more explicit consideration of the
394 competing priorities of public authorities is essential to ensure the accountability of those
395 involved (Carroll et al. 1996). Indeed, the government may decide, for political, social, or
396 economic reasons, not to follow the recommendations of its experts. Since these
397 recommendations are confidential and there is no legal requirement for decision-makers
398 to disclose information, everything happens behind the scenes and the public is not aware
399 of it. This lack of transparency is also detrimental to the functioning of the Advisory
400 Committees, since experts, seeing that their scientific recommendations have been
401 ignored for decades, question the usefulness of their voluntary participation in the
402 process. They also find themselves stuck in the incoherent situation of having to sit on a

403 government committee that does not comply with the transparency requirements for the
404 dissemination of their research and data by that same government (FRQ 2022). Quebec
405 lags behind other provinces and territories, as well as the federal government, when it
406 comes to transparency in decision-making on environmental issues. It is well known that
407 the principles of open science are crucial to promoting our society's values of equity and
408 inclusion (Office of Canada's Chief Science Advisor 2020). In spite of this, it is not
409 currently possible for the scientists, Indigenous communities, conservation organizations,
410 or citizens to know the list of species that have been assessed, to be aware of the
411 recommendations made by these committees, or to know and pass judgment on the
412 elements on which these recommendations and decisions are based. This highlights the
413 importance of our first recommendation (Box 3).

414

415 Our second recommendation is to thoroughly review the Act Respecting Threatened or
416 Vulnerable species, the Act respecting the conservation and development of wildlife and
417 the regulations deriving from them, to ensure that the minister responsible not only has
418 the power to apply them, but also the obligation to exercise the responsibilities for
419 protecting species at risk (Box 3). For example, in the federal designation process, after
420 communication with the Governor in Council, the Minister has only nine months to make
421 a decision. If there is no final decision at the end of this period, the species is
422 immediately listed under SARA with the status recommended by COSEWIC (SARA
423 2002, Olive 2014, Turcotte et al. 2021). However, time limits are sometimes extended,
424 for example, when the species concerned have a high socio-economic value (Hutchings
425 and Festa-Bianchet 2009). Conversely, there are no predetermined deadlines for defining

426 the critical habitat of a threatened or vulnerable species. The latter has been recently
427 criticized in an audit by Canada's Commissioner of the Environment and Sustainable
428 Development who concluded that the federal government was not acting proactively to
429 provide Canada's Minister of the Environment and Climate Change with timely advice on
430 the use of the emergency discretionary powers at his disposal to protect wildlife species
431 at risk and their habitat (OAG 2023). On the other hand, the federal government has 180
432 days to publish a Ministerial Order in the Canada Gazette once the critical habitat of an
433 officially designated species has been defined, and in some cases mapped, as part of the
434 Federal Recovery Program. Failing this, a declaration must be filed stating how the
435 critical habitat, or part of it, is legally protected in the Species at Risk Public Registry.
436 These limitations do not solely pertain to the federal process (Findlay et al. 2009,
437 Hutchings and Festa-Bianchet 2009, Mooers et al. 2010, Turcotte et al. 2021) and should
438 also be considered in a revision of Quebec legislation.

439

440 Several studies have already pointed out that a slow designation process can reduce the
441 likelihood of success of conservation efforts (Kraus et al. 2021, Turcotte et al. 2021). It is
442 therefore essential that Quebec legislation be amended to include stricter legal deadlines
443 for the designation process (recommendation #3, Box 3). The case of the Gaspésie-
444 Atlantique population of woodland caribou (*Rangifer tarandus caribou*) provides a good
445 illustration of the issues associated with the slowness of the process. Although this
446 population was initially designated at the federal level in the 1980s, it took the Quebec
447 government over 20 years to grant it a protection status. During this time, population size
448 steadily declined, to the point where the viability of this population is largely

449 compromised (Frenette et al. 2020). The population's decline continues despite its
450 designation as a vulnerable species in 2001 and as a threatened species in 2009, and
451 despite recovery efforts (Figure 3). A strategy for the recovery of woodland caribou,
452 including the Gaspé population, has yet to be established as of March 2024. A similar
453 situation occurred in the case of three bat species after the arrival of White-nose
454 Syndrome in Quebec (Mainguy et al. 2011 and Government of Quebec 2016). Although
455 the three species were designated as endangered in 2013 at the federal level (COSEWIC
456 2013), Quebec only designated them in 2022. Given the significant and rapid declines of
457 the three species in Quebec, a recovery team had to be urgently appointed before
458 designation and publication of an official plan. Several other species are affected by the
459 slowness of the Quebec designation process, but they cannot be discussed here since the
460 content of the meetings and the recommendations of the Advisory Committees are kept
461 confidential and their disclosure is prohibited. Except for rare recent exceptions, the
462 confidentiality of the process is not a direct requirement of the ARTVS or the Policy. In
463 contrast, it seems to be imposed as a result of an interpretation of the Quebec Act
464 respecting access to documents held by public bodies and the protection of personal
465 information. Because it is not explicitly written that the process must be made public, it is
466 interpreted as confidential by default.

467

468 The notion of "critical" habitat, as defined by SARA, does not exist in Quebec
469 legislation, which represents a major weakness. SARA states that it is illegal to destroy
470 any part of the critical habitat of a species at risk, and this prohibition is not mitigated by
471 a set of exceptions, as is the case with the RRWH. Moreover, it gives the federal minister

472 the power to impose restrictions on construction, development, and land-use projects.
473 Without such a concept and the associated clear and rigorous provincial legislation,
474 Quebec is deprived of tools necessary for the conservation of its species in precarious
475 situations. Indeed, a recovery plan for a species that does not include a definition and
476 delimitation of its critical habitat has little chance of ensuring the species' long-term
477 viability. In Quebec, habitat characterization for designated wildlife species can be
478 described in the RRTVWSH. However, to date, this characterization has only been
479 carried out for 19 of the 37 animal species designated as threatened and 14 of the 28
480 designated as vulnerable. Habitat mapping has only been completed for four threatened
481 species and two vulnerable species. For these six species, 27 wildlife habitats have been
482 mapped. Of the 86 plant species designated as threatened or vulnerable, 58 habitats are
483 described in the RRTVPSH. We therefore strongly recommend that Quebec legislation
484 clearly incorporate the notion of critical habitat into its legislation (Recommendation #4,
485 Box 3), and that a maximum timeframe is established for identifying and mapping it
486 (Recommendation #5, Box 3).

487

488 Another major limitation of the ARTVS and its associated laws and regulations is that
489 habitat protection for designated wildlife species applies only to provincially owned
490 lands. The presence alone of a threatened or vulnerable species in a natural environment
491 is not sufficient to prevent a development project from destroying its habitat if the
492 environment is on private land. The case of the Western chorus frog (*Pseudacris*
493 *triseriata*) is a good illustration of the limits of the application of Quebec legislation. The
494 decline of this species can be explained by habitat loss resulting from the destruction of

495 breeding sites caused by urban and residential development, intensive agriculture, and the
496 drainage of seasonal wetlands (COSEWIC 2008). This species was designated as
497 vulnerable by the Quebec government in 2001 and as threatened in 2023, although it was
498 designated as threatened by the federal government in 2010. Although the species
499 received a protected status at both levels of government, the degradation of its habitat by
500 urban development on the south shore of Montreal, a key area in its distribution in
501 southern Quebec, has continued. In response to Quebec's inaction, the federal
502 government was forced to issue emergency decrees in 2016 (Government of Canada
503 2016) in La Prairie and in 2021 in Longueuil (Government of Canada 2023) to halt
504 habitat degradation and protect the species. It is therefore essential to amend Quebec
505 legislation to improve habitat protection for species designated as threatened or
506 vulnerable on private land. These species are mainly found in southern Quebec, an area
507 characterized by greater biodiversity, but which also consists mainly of private land and
508 is therefore subject to greater anthropogenic pressures (recommendation #6, Box 3).

509

510 Another major concern about Quebec's legislation is the amendments made to the
511 ARTVS (art. 18) in 2021 for plant species and to the ARCDW (art. 128.7) for wildlife
512 species. These amendments now make it possible to pay financial compensation
513 corresponding to the amounts required to conserve or develop a replacement plant or
514 wildlife habitat. Such an amendment had already been made in June 2017 to the Quebec
515 Act Respecting the Conservation of Wetlands and Bodies of Water. The sums recovered
516 through this measure should, in theory, be used to restore or create wetlands and habitats
517 to compensate for the losses incurred if authorization is given to destroy certain

518 environments. Last April, Quebec's Sustainable Development Commissioner identified in
519 her annual report several shortcomings in the implementation of these compensation
520 measures by the MELCCFP (Sustainable Development Commissioner 2023).
521 Specifically, she noted that the ministry was not managing the wetlands and aquatic
522 environments restoration and development program in a way that effectively
523 compensated for the losses these areas had suffered. She reported that the Quebec
524 government had collected over \$100 million (M\$) in compensation funds for the
525 destruction of wetlands, and that less than 3% of these funds (~\$2.6M) had been
526 reinvested in the restoration or creation of replacement wetlands (Sustainable
527 Development Commissioner 2023, ch. 3, p. 91).

528

529 In addition to the administrative delays associated with the implementation of such
530 measures, it is not surprising that there is a time lag between the establishment of
531 compensation funds and the creation of new wetlands or the restoration of existing ones.
532 Such an approach, which aims to re-establish the ecosystem functions of these
533 environments and their biodiversity, is very difficult, and takes several years, even
534 decades, before its success can be assessed. If this is the case for wetlands, whose
535 characteristics and uses are generally well documented, the obstacles are more numerous
536 and significant, and the chances of success are even lower, when it comes to recreating or
537 restoring the essential habitats of rare species whose biology is not well known. In the
538 event of failure, which will generally occur long after the habitats have been destroyed, it
539 will be impossible to reverse the consequences. Moreover, there is nothing to suggest that
540 lost habitats can be fully replaced. Indeed, there is currently no scientific evidence to

541 show that the creation of a replacement habitat allows the viability of a species with
542 precarious status, or that it will be used by the species targeted by this action. It therefore
543 seems essential to repeal the section of the ARTVS (art. 18) and the ARCDW (art. 128.7)
544 authorizing the payment of financial compensation corresponding to the sums required
545 for the conservation and development of a replacement habitat (recommendation #7, Box
546 3).

547

548

549 Identifying, conserving, and restoring plant and animal species in precarious situations
550 requires reliable, well-targeted knowledge of their abundance, distribution, and life cycle,
551 as well as of the natural and anthropogenic factors limiting their viability. Yet, limited
552 data exist for species that have no socio-cultural or economic importance, which is the
553 case for many invertebrate, algal, and fungal species (Langor 2019, Bazzicalupo et al.
554 2022). Moreover, rare species are often under-studied. Expert committees (including
555 federal ones) must therefore issue designation opinions based on little information. For
556 some species, it is not even possible to assess their status, as the necessary biological
557 information is not available ("data deficient" category at COSEWIC or IUCN). A recent
558 study suggested that these species have an even higher probability of extinction than
559 better-known ones (Borgelt et al. 2022). In addition, in Quebec, the financial and human
560 resources allocated to the recovery of designated species are insufficient, leading to
561 significant delays in certain stages such as habitat mapping or the development of
562 recovery plans. It is therefore crucial to increase financial support for the acquisition of
563 data to more effectively assess the status of species in all taxonomic groups, as well as for

564 the development and implementation of recovery plans for threatened or vulnerable
565 species in Quebec (recommendation #8, Box 3).

566

567 Another source of complexity for the legal protection of species at risk in Quebec is the
568 lack of similarity between provincial and federal statuses (Box 2). Indeed, there are two
569 designation statuses in Quebec, i.e., vulnerable and threatened (ARTVS 1989), while
570 there are three at federal level, i.e., species of special concern, threatened and endangered
571 (SARA 2002, Mooers et al. 2010). This lack of uniformity between the two levels of
572 government inevitably leads to inconsistencies in species designation. There are
573 biological reasons that may explain why there are certain disparities in status between
574 these two levels. For example, a species may be in a more (or less) favourable situation in
575 Quebec than in other Canadian provinces. However, many of the discrepancies are due to
576 administrative delays (e.g., the caribou and bat cases mentioned above), lack of
577 agreement on definitions, the unequal number of categories between the two
578 governments, and the absence of clear quantitative criteria for designation in Quebec.
579 Thus, of the 23 species designated as endangered in Canada in October 2022 and which
580 have a historical occurrence in Quebec, three had vulnerable status and 16 had no
581 provincial protection status. Standardization of provincial species designation statuses
582 with federal statuses, particularly by adding a third status in Quebec, is desirable for the
583 sake of consistency, but also to facilitate the coordination of efforts between the two
584 levels of government. In addition, it is necessary to identify clear quantitative criteria for
585 status designation in order to make the whole designation process more robust and to

586 promote the conservation and recovery of species at risk in Quebec (recommendation #9,
587 Box 3).

588

589 **Conclusion**

590

591 To guarantee the accountability of the various stakeholders in the application of the
592 ARTVS, environmental legislation must clearly recognize the independent role of science
593 in the implementation of species conservation measures (Mooers et al. 2010). Over the
594 past two decades, several protection recommendations have been forwarded to
595 government officials in Quebec, but unfortunately have not been acted upon. We have
596 identified what we believe to be the main obstacles related to Quebec's biodiversity
597 conservation legislation and its implementation. We have proposed nine
598 recommendations that we believe would strengthen our collective ability to protect and
599 restore Quebec's animal and plant biodiversity. We also strongly encourage a broader
600 consultation involving scientists, representatives of Indigenous communities, and
601 conservation organizations to identify improvements that could be made to this
602 legislation.

603

604 To meet the commitments made at COP15 in Montreal, the Quebec government urgently
605 needs to increase the level of biodiversity protection on its lands. Indeed, as explained in
606 this article, many species in decline do not currently benefit from adequate protection.
607 From a broader perspective, effective legislative tools for the conservation of species in
608 precarious situations and their habitats are also needed since northern regions, including

609 Quebec, will play a role as refuges for biodiversity in the face of climate change
610 (Berteaux et al. 2018). Studies suggest that many species whose distribution was once
611 limited by low temperatures will migrate northwards as the climate warms (Thuiller et al.
612 2005, Lawler et al. 2009, Berteaux et al. 2018). Environmental issues are increasingly
613 politicized in a Canadian and North American context (Anderson and Stephenson 2011,
614 Oreskes and Conway 2010, Scrimshaw Botchwey and Cunningham 2021). However,
615 species at risk and their habitats will be the legacy of future generations, well beyond the
616 term of office of any political party in power. Quebec therefore has, and must continue to
617 play, a key role in the fight against biodiversity loss, and has a duty to take the necessary
618 measures to ensure that biodiversity is maintained on its lands.

619

620

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630

631 **Data availability**

632

633 No new data have been collected. All information presented is available online.

634

635 **Contributions**

636

637 All authors conceived and developed the article. FP, PD and JVW contributed to the
638 drafting and editing of the manuscript.

639

640

641 **Conflict of interest**

642

643 The authors declared that there was no conflict of interests.

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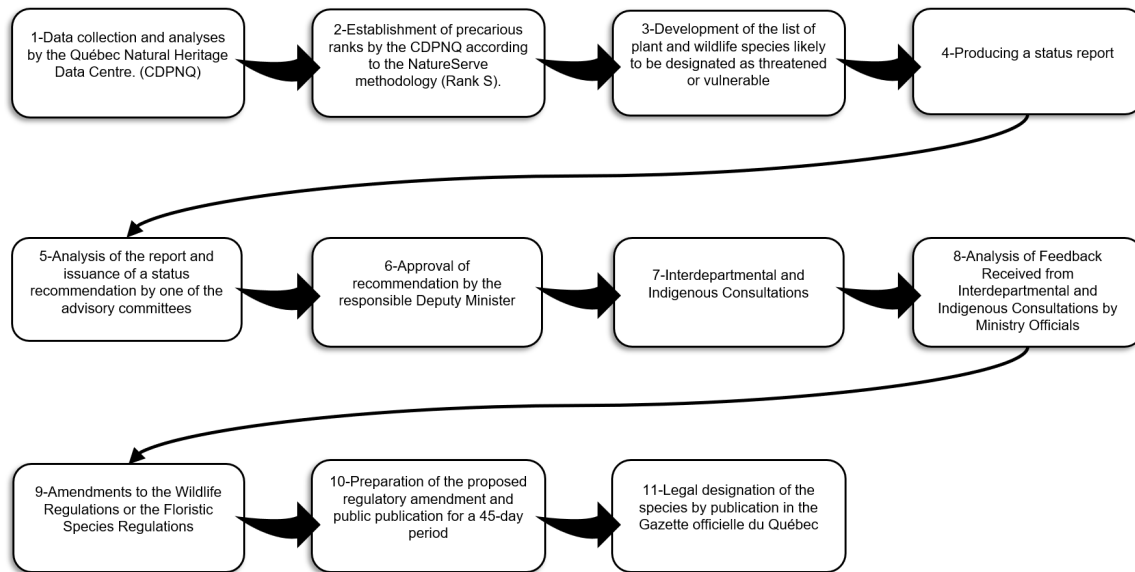
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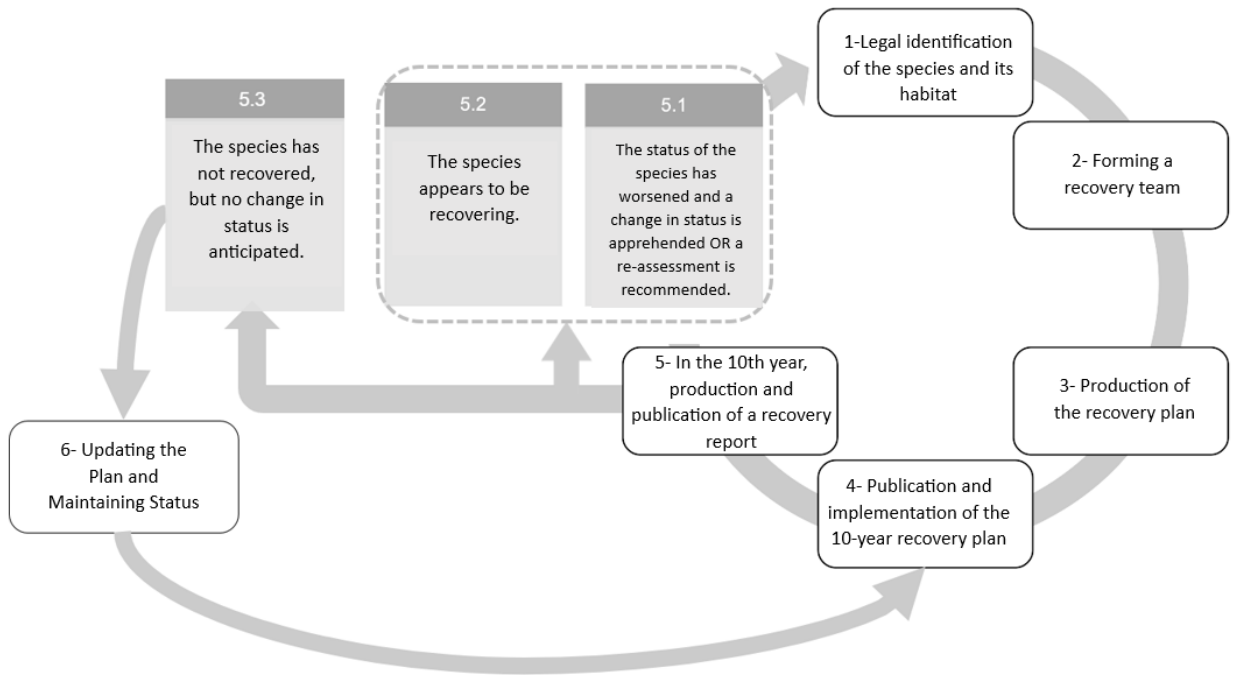


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912 Figure 1. Diagram illustrating the main stages in the process of designating wildlife
913 species at risk in Quebec under the Act respecting threatened or vulnerable species. The
914 legal designation of a species is formalized by publication in the *Gazette officielle du*
915 *Québec* (step 11). Adapted from Gauthier (2015).

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922 Figure 2. Diagram illustrating the main steps involved in implementing the recovery
 923 process for wildlife species designated as threatened and vulnerable by the Quebec
 924 government. Note that this frame of reference only covers wildlife species since the
 925 equivalent does not exist for plant species. Adapted from Gauthier (2015).

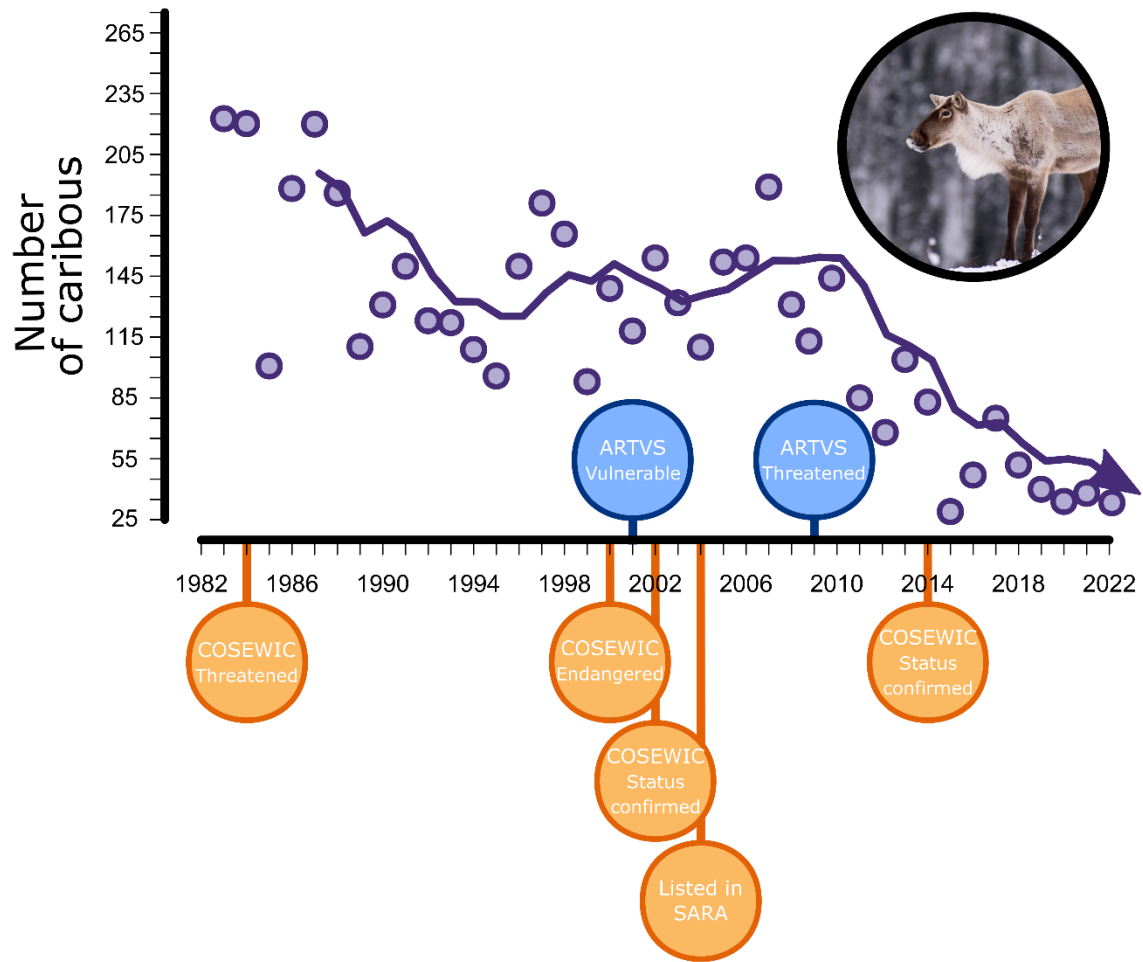
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933 Figure 3: Milestones in the establishment of federal and provincial protection status for
 934 Quebec's Gaspé population of mountain caribou (federally named Gaspé-Atlantic
 935 population). Estimates of caribou population size, based on aerial surveys (corrected for
 936 visibility), are also shown. Data taken from Morin et al. (2022). The blue line represents
 937 the five-year moving average. Please note that at the provincial level, a threatened species
 938 for which no change in status is apprehended by the Recovery Committee will not be
 939 reassessed by the Advisory Committee (see Figure 2). Photo credit:
 940 RRichard29/Shutterstock (<https://www.shutterstock.com/es/g/RRichard29>).

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943 Table 1: Number of wildlife and plant species with precarious status in the threatened and
 944 vulnerable designation categories, as defined by the Act respecting threatened or
 945 vulnerable species, and awaiting designation status in July 2023. Sources: wildlife, legal
 946 document consulted (Government of Quebec 2023b, June 2023 version); plants,
 947 regulation consulted (ARTVS 2023, January 2023 version); lists of wildlife species likely
 948 to be designated (Government of Quebec 2023d) and plant species likely to be designated
 949 (Government of Quebec 2020, February 12, 2020 version). * This number includes 9
 950 species designated vulnerable to harvesting.

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Group	Endangered	Vulnerable	Total	Likely to be designated
Fauna				
Molluscs	2	0	2	10
Insects	4	1	5	32
Fish	6	8	14	25
Amphibians	2	1	3	4
Turtles	4	2	6	1
Snakes	1	2	3	6
Birds	12	10	22	16
Mammals	6	4	10	21
Total fauna	37	28	65	115
Flora				
Vascular plants	59	27*	86	235
Bryophytes	0	0	0	187
Total flora	59	27	86	422
TOTAL	96	55	151	537

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954 Box 1: Definitions of federal and provincial protection statuses for wildlife species at
955 risk.

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Federal Status
1.- Special concern: wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.
2.- Threatened: a wildlife species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction.
3.- Endangered: a wildlife species that is facing imminent extirpation or extinction.
4.- Extinct: a wildlife species that no longer exists.
Provincial Status
1.- Vulnerable: Any species whose survival is precarious even if extinction is not apprehended.
2.- Threatened: Any species whose extinction is apprehended.

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962 Box 2: Specific objectives for the application of Act respecting threatened or vulnerable
963 species (ARTVS) in Quebec, as set out in the Quebec Policy for threatened or vulnerable
964 species.

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Objectives of the ARTVS
1.- Prevent the extinction of species living in Quebec.
2.- Avoid a decrease in the number of wildlife or plant species designated as threatened or vulnerable.
3.- Ensure the conservation of habitats for species designated as threatened or vulnerable.
4.- Restore populations and habitats of species designated as threatened or vulnerable.
5.- Prevent any species from becoming threatened or vulnerable.

966

967 Box 3: Recommendations for action deemed necessary by members of the Quebec
 968 Advisory Committee on threatened or vulnerable wildlife species to improve legislation
 969 for safeguarding wildlife and plant species at risk in Quebec.

Summary of recommendations
<p>1.- Establish a legal obligation to make public and transparent all stages of identification and designation of threatened or vulnerable species, including the recommendations and arguments of the two Advisory Committees involved in the process, as well as the government's justifications for the designation or not of the species concerned.</p>
<p>2.- Conduct an in-depth review of the Act Respecting Threatened or Vulnerable Species, the Act Respecting the Conservation and Development of Wildlife and the regulations made under them so that the responsible minister has not only the authority to enforce them, but also the obligation to exercise the responsibilities conferred on him or her by these acts with respect to the protection of species at risk.</p>
<p>3.- Clearly identify the expected length of time for each step in the process of designating threatened or vulnerable species and have a legal obligation to comply with it.</p>
<p>4.- Clearly incorporate the concept of critical habitat into Quebec legislation and provide for effective protection measures for these habitats.</p>
<p>5.- Predetermine a maximum time to identify, and if necessary, delineate the habitat of an officially designated species, and to identify and implement steps in the recovery process.</p>
<p>6.- Continue efforts to amend legislation to include habitat protection for wildlife species designated as threatened or vulnerable on private lands. This change would improve the chances of success of the implemented recovery plans as well as the sustainability of the designated species, particularly in southern Quebec.</p>
<p>7.- Repeal the section of the Act respecting threatened or vulnerable species (section 18) and the Act respecting the conservation and development of wildlife (section 128.7) authorizing the destruction of the habitat of a designated species in exchange for the payment of financial compensation corresponding to the sums necessary for the conservation and development of an alternative plant or wildlife habitat.</p>
<p>8.- Increase financial support for the acquisition of data to assess the status of species more effectively, as well as for recovery teams in their roles in developing and implementing recovery plans for threatened or vulnerable species.</p>
<p>9.- Harmonize provincial designation statuses for species at risk with federal statuses and integrate the use of clear quantitative criteria for their designation in Quebec.</p>

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