Biases in Legal Listing under Canadian Endangered Species Legislation

Introduction

In many countries wild species can be granted legal protection when they are deemed at risk of extinction or extirpation. Protection is the first step in a process of recovering the species and can reverse declining population trajectories by reducing human-caused threats (Male & Bean 2005). Canada was the first major industrialized nation to ratify the Rio Convention on Biological Diversity (CBD 1992). As part of its responsibilities under the convention (CBD 1992, section 8k), the Canadian government passed the Species at Risk Act (Bill C-5, or SARA 2002) in December 2002 to offer some legal protection and a framework for recovery of species at risk (reviewed in VanderZwaag & Hutchings 2005). Here, we explore taxonomic and geographic factors that influence the legal listing process and comment on particular institutional factors that may lie behind these patterns.

In contrast to the U.S. Endangered Species Act of 1973 (ESA 1973), but broadly similar to Australia's Endangered Species Act (Woinarski & Fisher 1999), legal listing of species in Canada is a two-stage process. The Committee on the Status of Endangered Wildlife in Canada (COSEWIC), an independent scientific advisory body that has assessed the status of species since 1977, was established under SARA as the entity responsible for the assessment of species at risk. On receipt of a species assessment by COSEWIC, the federal government can accept the assessment of COSEWIC and add the species to the legal list, decide not to add the species to the list, or refer the assessment back to COSEWIC for further consideration. Although reasons for not listing and for species referrals have to be made public, the decision is entirely a discretionary one. For comparison, there is only one overt stage in the United States where the responsible government agency may legally list species in response to public proposals.

Listing under SARA sets in motion a number of regulations. Individuals of listed species are protected, and there are steep fines for killing them or destroying their "residences" without a permit (SARA, section 97). Following listing, the government must make public first a recovery strategy and then an action (or management) plan for recovery. The recovery strategy determines the technical and biological feasibility for recovery (SARA, section 40), whereas the action plan details socioeconomic trade-offs and implementation strategies (SARA, section 49). If legal listing is denied, or if the species is referred back to COSEWIC, there are no legal obligations for recovery action and the species obtains no federally legislated protection under SARA.

Methods

We obtained the decisions made from 2004-2006 by the Canadian Ministry of Environment to list species as at risk of extinction (SARA Public Registry, www.sararegistry.gc.ca; see Supplementary Material). The COSEWIC proposes all species, subspecies, or populations (hereafter species) that it ranks as imperiled (extinct, extirpated, endangered, threatened, and special concern) for listing. In 2000 COSEWIC adopted a modified version of World Conservation Union quantitative criteria as a basis for species assessment (COSEWIC 2004*a*). These criteria incorporate information on population decline, abundance, and geographical range. We recorded the conservation rank, taxonomic category, and provinces or territories of occurrence for each species assessed by COSEWIC. The taxonomic categories were marine mammal, terrestrial mammal, marine fish, freshwater fish, bird, amphibian, reptile, arthropod, mollusk, vascular plant, moss, and lichen. Marine fish included wholly and partially marine species (e.g., anadromous salmonids, green sturgeon [*Acipenser medirostris*]). We combined amphibians and reptiles into "herpetofauna"; arthropods and mollusks into "invertebrates"; and vascular plants, mosses, and lichens into "plants" (for a total of eight categories). For mammals and fishes we determined whether species were harvested by examining COSEWIC species status reports (www.sararegistry.gc.ca). Species taken only as by-catch were recorded as nonharvested.

When SARA took effect in 2003, all 233 species previously assessed by COSEWIC as imperiled were

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Table 1. Number of imperiled species, subspecies, and populations proposed for legal listing in Canada and the listing fates under the Canadian Species at Risk Act, 2004–2006.

Group[a]	*Proposed*	*Listed*	*Not listed*[b]	*Listed (%)*
Herpetofauna	26	26	0	100
Birds	12	12	0	100
Plants	71	69	2 (1)	97
Invertebrates	19	17	2 (2)	89
Freshwater fish	17	13	4 (2)	76
Marine mammals	19	13	6 (1)	68
Terrestrial mammals	11	5	6	45
Marine fish	11	1	10 (3)	9
Total	186	156	30 (9)	84

[a]*See text for details of groupings.*
[b]*Numbers of species referred back to COSEWIC for further consideration are in parentheses.*

automatically included on the legal list. Since then, the Government decides whether to list each species individually. Our analysis is restricted to the 186 species recommended for listing by COSEWIC since 2003, up to August 2006 (Government of Canada 2006). Species that were either denied listing or referred back to COSEWIC were scored as not listed (21 denied, 9 referred back). (The full list is available; see Supplementary Material.) We compared the proportion of listed and not listed species across the eight taxonomic categories and across geographic regions and harvest status with standard tests of association (JMP v. 6.0).

Results

The proportions of species listed differed among taxonomic groups (Table 1; test of marginal homogeneity: $n = 186$, $G^2 = 69.2$, $p < 0.0001$, df = 7). Post hoc tests based on 95% credible intervals of proportions showed that more plants and herpetofauna, but fewer marine fish and terrestrial mammals, were accepted onto the legal list (Table 1). Harvested fish and mammals were far less likely to be listed than nonharvested ones. Only 5 of 29 harvested fish and mammals were listed, whereas 27 of 29 nonharvested fish and mammals were listed ($n = 58$, $G^2 = 38.57$, $p < 0.0001$, df = 1).

None of the 10 species occurring in Nunavut was listed, and northern species in general (i.e., occurring north of 60° in Nunavut, the Yukon, the Northwest Territories, or the Arctic Ocean) were less likely (5/18) to be listed than were non-northern species (151/168; $n = 186$, $G^2 = 33.0$, $p < 0.0001$, df = 1; Fig. 1). This difference was driven primarily by mammals: only 17% of northern mammals were listed (2/12) compared with 88% of non-northern mammals (15/17). None of the results changed when we excluded species that were referred back to COSEWIC (analyses not shown).

Discussion

The primary correlate of taxonomic group was governmental jurisdiction. In most of southern Canada (below 60° N), terrestrial plants and animals are the responsibility of the provinces. Responsibility for northern plants and terrestrial animals is shared among the territories, wildlife management boards, and the federal government. Marine species are the sole responsibility of the federal government. Marine fish were almost always denied listing, as were many imperiled northern species. In addition, although we did not identify freshwater fish as being significantly less likely to be listed than other taxonomic groups, 22% of them were not listed, which is substantially higher than the average of 3% that were not listed for plants, birds, herpetofauna, and invertebrates; the federal government has joint jurisdiction over freshwater fish.

We outline two factors that seem to have contributed to the taxonomic and geographic biases in legal listing decisions under Canada's endangered species legislation. The first is a reluctance by wildlife management boards and the Department of Fisheries and Oceans to accept the additional stewardship responsibilities required by SARA. The second pertains to deficiencies in the cost–benefit analyses that precede the legal listing decisions.

Wildlife management boards (WMBs), whose responsibilities are primarily in the north, are involved in the legal listing decisions for species in their jurisdictions. The stated governmental reason for not listing northern mammals is to allow for further consultation with WMBs, notably the Nunavut WMB (Government of Canada, 2006). The SARA provides no timelines for such post-assessment consultations, and the WMBs are consulted by COSEWIC before each assessment. The resulting delays may elevate the extinction risk for some species. For example, Bourdages et al. (2002) estimated that current harvesting rates of the eastern Hudson Bay beluga whale (*Delphinapterus leucas*) population, which was denied listing, will lead to its extinction within 10–15 years. These consultations also affect populations outside Nunavut insofar as Nunavut-based delays have prevented the listing of the

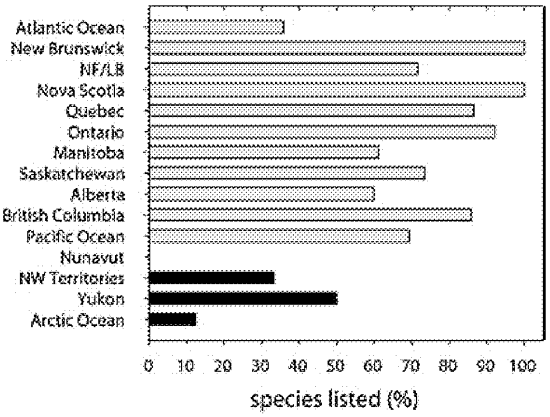

Figure 1. Percentage of imperiled species occurring in each region of Canada that were granted legal protection under the Species at Risk Act in Canada, 2004–2006 (northern regions, black; NF/LB, Newfoundland and Labrador; NW Territories, Northwest Territories).

wolverine (*Gulo gulo*), grizzly bear (*Ursus arctos*), and polar bear (*U. maritimus*) elsewhere in Canada.

Although not made explicit in SARA (Government of Canada 2003), the legal listing process includes something called a regulatory impact analysis (RIAS). The RIASs are cost–benefit analyses undertaken by the federal government, promulgated under the Financial Administration Act (PCO 1999). A RIAS typically take place during the 9 months that immediately precede a listing decision, prior to the development of any form of recovery strategy or action plan. This timing is clearly problematic; A RIAS will be unable to provide a complete assessment of the costs and benefits of species recovery, potentially biasing the perception of the socioeconomic impact of a listing decision. In addition, these cost–benefit analyses are not subject to external review.

A major deficiency of RIAS is that relatively little effort is expended in estimating benefits. By one estimate, half of all RIASs examined do not quantify benefits at all (EARG 1997, section 4.1). Quantifying the benefits of recovering species is obviously critical if cost–benefit analyses are to be taken seriously. Globally, the loss of habitats and populations deprives humanity of goods and services with a net worth of perhaps US$250 billion annually (Balmford et al. 2002). In Canada failure to take meaningful action to reduce fishing mortality on Newfoundland's northern Atlantic cod (*Gadus morhua*) in the late 1980s led to a subsequent expenditure of C$2–C$3 billion for income support, buy outs of commercial fishing licenses, and training for alternative employment for displaced fishers and processors (CEC 2001).

Benefits to listing must also account for nonuse economic values. These are the benefits of conservation that can be reflected in part by the value that society holds for the preservation of species. One such value is termed "willingness to pay" (e.g., Tisdell et al. 2005). For example, the listing of the porbeagle shark (*Lamna nasus*) may exact costs to the fishing industry of C$865,000–C$1.82 million over 20 years (DFO 2006). These costs would be readily exceeded by the nonconsumptive value of the porbeagle if willingness to pay exceeded pennies per Canadian.

In short, species are most likely not listed because current benefits of status quo activities (e.g., fishing) are quantified as a matter of course, whereas the benefits of recovery are not. The single marine (anadromous) fish that was listed, the green sturgeon, has a "disagreeable taste" and is not fished commercially (COSEWIC 2004*b*). Of the freshwater fish proposed for listing by COSEWIC, only the white sturgeon (*Acipenser transmontanus*) has substantial commercial value (Froese & Pauly 2006), and the government chose to exclude populations valuable to sport fishers from protection under SARA (Government of Canada 2006).

The Canadian government's failure to list species such as Newfoundland's northern cod, despite a decline estimated to exceed 99% (Hutchings & Reynolds 2004), sends an ominous but revealing signal to society. More worrisome, however, may be the 2006 decision not to list the porbeagle shark. The species has experienced a near-90% reduction in abundance (COSEWIC 2004*c*) and its life-history traits place it at high risk of extinction (Reynolds et al. 2005). By the government's own reckoning, only one or two fishers are economically dependent on porbeagle. Under a worst-case scenario, listing might have led to a loss of eight jobs and an economic reduction of 2% to a single community (DFO 2006). We interpret the government's decision not to add the endangered porbeagle to the legal list, despite the minimal economic losses that might ensue, to reflect an implicit policy not to list any marine fish perceived to

be of economic value, no matter how small.

Conclusion

Canada's Species at Risk Act is a direct response to the international endeavor to better steward natural resources. Nevertheless, if an imperiled species is not listed by the federal government, any debate on the costs and benefits of changing its trajectory to potential extinction may only take place in the narrow context of in-house analyses conducted under the purview of a financial regulatory act. We document here a pattern consistent with bias against marine and northern species in legal listing. In June 2008 a parliamentary review of the act must take place (SARA, section 129). The biases we have identified should be given due scrutiny at that time. Biodiversity conservation would be best served by strict, transparent, legislated timelines for all aspects of the listing process following receipt by the Minister of the Environment of the status assessments undertaken by COSEWIC. We also recommend that, within the RIAS framework, SARA require that the full costs of extinction and the full benefits of recovery be quantified in externally reviewed reports so that they can be fairly weighed against the impacts of legal protection.

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Supplementary Material

The listing fates of imperiled species presented to the Canadian Government from 2004 through 2006 are available in conjunction with the on line version of this article from http://www.blackwell-synergy.com (Appendix S1).

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