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Threats to Canadian species at risk: An analysis of finalized recovery strategies

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ABSTRACT

In order to reverse the decline of imperilled species, we need to know what is threatening their survival. Canada's Species at Risk Act (SARA) is intended to provide for the protection and recovery of species listed under the Act. Threats to SARA-listed species must be documented in recovery strategies, which also define recovery goals and critical habitat. We reviewed finalized recovery strategies for 146 species to determine the major threats to these species and whether designation of critical habitat or the relative ambition of recovery goals is associated with the nature of threats. We then compared our findings to the threats described in reports prepared by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), the independent body which prepares status reports for all imperilled species (including those not listed under SARA). Human disturbance, in particular due to recreation, was the most frequently listed threat in recovery strategies, followed by invasive species and residential and commercial development. Threats differed among taxonomic groups and broad habitat types, but there was no evidence that low ambition of recovery goals or failure to designate critical habitat were correlated with particular threats. However, species with certain threats, including biological resource use, were less likely either to be listed under SARA and/or to have a finalized recovery strategy once listed. Documenting threat-based differences in the recovery process is an important first step toward ensuring that SARA results in timely and effective measures to recover all listed species.

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1. Introduction

In order to implement actions that can halt and reverse the continuing decline of species at risk, managers need to understand the threats to those species (Hayward 2009; Lawler et al., 2002; Wilcove et al., 1998). For this reason, the description of threats is a key part of recovery planning under legislation designed to improve the status of imperilled species. For example, the Endangered Species Act (ESA) of the USA (1973), the Environmental Protection and Biological Conservation Act of Australia (1999),

and the Species at Risk Act of Canada (2002) all require that recovery planning documents include a description of the threats to each listed species (Foin et al., 1998; Clark et al., 2002; Mooers et al., 2010; Walsh et al., 2012).

Many analyses have characterized the threats to groups of imperilled species with the aim of determining the primary causes of species endangerment and how these differ by taxonomic group, geographic region, or habitat type. Habitat loss and degradation, exotic invasive species, overexploitation, and pollution are generally the top threats to imperilled species (e.g. Croxall et al., 2012; Czech et al., 2000; Foin et al., 1998; Hayward 2009; Kappel, 2005; Li and Wilcove, 2005; Schipper et al., 2008; Venter et al., 2006; Wilcove et al., 1998). However, these categories are too

broad to indicate which activities are responsible for declining bio-diversity. For example, habitat loss and degradation can result from multiple activities including residential or commercial development, agricultural operations, oil or mineral extraction, road construction, logging, or recreational activities. Because the activities that cause habitat loss or degradation are likely to affect the choice of approaches to abate or reverse threat impacts, a classification that parses the causes can help promote the development of effective conservation strategies (Prugh et al., 2010; Salafsky et al., 2008).

We have undertaken an analysis of threats based on recovery strategies written for species listed under Canada's Species at Risk Act (hereafter 'SARA'; SARA, 2002). Species that are candidates for listing under SARA are assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), an independent scientific advisory body that has assessed the status of Canadian wildlife species since 1977, long before SARA was enacted (Government of Canada, 2009). COSEWIC produces a status report for each candidate species that outlines the evidence for its designation as at-risk. Risk categories under SARA include extirpated, endangered (equivalent to the IUCN category Critically Endangered), threatened (IUCN Endangered), or special concern (IUCN Vulnerable). Wildlife species designated at-risk by COSEWIC are candidates for formal listing under SARA, but the Government of Canada has the option of listing or not listing the species under SARA, and may incorporate economic analyses and consultation with stakeholders and the public in its decision (Mooers et al., 2010).

All species listed under SARA as extirpated, endangered or threatened must receive a recovery strategy which outlines the major threats to the species, identifies critical habitat (to the extent possible), and defines population and distribution objectives for species recovery (SARA, 2002). Critical habitat is defined as the habitat necessary for the survival or recovery of the species (SARA, 2002), and destruction of designated critical habitat is prohibited. Under SARA, recovery strategies must be finalized within 1–2 years of a species being listed (depending on the species' status). Following this, an action plan must be written that specifies actions that will be carried out to promote species recovery.

Previous studies have documented biases in government decisions to list or not list a species under SARA, including a tendency for harvested species and species from the north not to be listed (Findlay et al., 2009; Mooers et al., 2007). In addition, there have been long delays in the production and finalization of recovery strategies (Mooers et al., 2010). In spite of the requirement to designate critical habitat in recovery strategies, to the extent possible, many recovery strategies produced before 2010 did not include critical habitat designation, and legal action has been taken to challenge the government to do so (Mooers et al., 2010). To date, action plans have been finalized for only seven species (5% of species with finalized recovery strategies).

As SARA passes the 10 year anniversary of its enactment and faces potential revisions by the Canadian government, it is timely to assess patterns and potential biases in the completion and content of recovery strategies. In the US, analyses of recovery plans produced under the ESA have provided key insights into how the process of recovery planning can be improved (e.g. Clark et al., 2002). Recovery strategies are arguably the most important step in the implementation of SARA as they establish objectives for on-the-ground recovery actions. They also provide an as-yet untapped resource for determining which human activities are the primary threats to species listed under SARA. This knowledge could enable the prioritization of threat-abatement strategies that will benefit the greatest number of species.

In particular, it is important to reveal whether the recovery process under SARA is working for certain species, but not others. For example, Metrick and Weitzman (1996) found that listing and spending decisions under the ESA were biased towards larger species. In Australia there is a bias in listing and recovery planning favouring amphibians and birds over other groups (Walsh et al., 2012). Similarly, Laycock et al. (2009) found spending on recovery in the UK to be highly biased towards vertebrates. In Canada, harvested species are already known to be less likely than non-harvested species to be listed under SARA (Findlay et al., 2009; Mooers et al., 2007), but whether or not this pattern extends to the recovery planning process has not been explored.

We compiled information on threats and related features from the finalized recovery strategies of 146 wildlife species listed under SARA. We used these data to ask three main questions:

(1) What are the most common threats to Canada's SARA-listed species as described in finalized recovery strategies, and how do threats differ by taxonomic group and broad habitat type? We use the IUCN standardized threat classification system (Salafsky et al., 2008) to identify the particular activities or industries causing the threat (e.g. residential and commercial development) rather than broadly described threats (e.g. habitat loss).

(2) Does the presence of particular threats correlate with the identification of critical habitat (or not), or with the relative ambition of recovery goals? Given the biases detected in the SARA listing process (Findlay et al., 2009; Mooers et al., 2007), such correlations might indicate similar biases in recovery planning. For example, species with threats related to economically important industries might be less likely to have critical habitat designated or they might have less ambitious population and distribution objectives. Such associations could have consequences in terms of species recovery. For example, there is evidence from the US that species with designated critical habitat are more likely to show improving population trends (Taylor et al., 2005), and are more likely to see implementation of recovery actions (Lundquist et al., 2002).

(3) Finally, are the most common threats reported in recovery strategies the same as the most common threats reported by COSEWIC? To answer this question, we used data previously compiled from COSEWIC status reports using the same threat classification system we used for analyzing recovery strategies (Prugh et al., 2010). Here we are testing whether certain threats are associated with the likelihood of recovery strategies being finalized. Because SARA has only been in force since 2003, it may be too early to judge the role of recovery strategy production in improving the actual status of imperilled species. However, there is evidence from the US that the production of a recovery strategy itself is correlated with improved species status (Kerkvliet and Langpap, 2007; Taylor et al., 2005). Therefore, delays in the production of recovery strategies for imperilled species may contribute to their continued decline.

2. Methods

2.1. Data collection

We obtained finalized recovery strategies from the Species at Risk Public Registry website (www.sararegistry.gc.ca, Government of Canada, 2011). We divided the 146 species with finalized recovery strategies (as of December 2011) randomly among 14 participants in a graduate student seminar at the University of British Columbia, with each participant scoring between 4 and 13 species. We assessed each wildlife species (these may comprise species, subspecies, or populations) independently even if it was part of a multi-species recovery strategy. Before individual data compilation