

**Assessing the Viability of the *Species at Risk*  
Act in Managing Commercial Exploitation and  
Recovery of Threatened and Endangered Marine  
Fish in Canada**

**by**

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B.A. (Communication/Geography), Simon Fraser University, 2007

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## **Abstract**

Commercially exploited threatened or endangered marine fish are consistently declined for listing under Canada's *Species at Risk Act* (SARA), largely due to predicted socio-economic impacts associated with SARA's prohibitions. However, commercial exploitation can be exempted from SARA's general prohibitions. If exemptions were utilized, commercially exploited species could benefit from other aspects of SARA listing, and support continued economic opportunities for fishers. I conducted a literature review, key expert workshop, and interviews to develop potential criteria to determine when this management approach might be appropriate. I administered a questionnaire to experts and stakeholders to evaluate the importance of the criteria, and elicit opinions on SARA's possible role in marine fisheries management. Respondents favoured criteria that supported the biological feasibility of species recovery, and promoted compliance with management objectives, but disagreed over how at-risk marine fish could best be managed. Recommendations focus on ways to resolve the listing bias against marine fish.

**Keywords:** *Species at Risk Act*; marine fish; commercial exploitation; management; *Fisheries Act*; recovery.

## **Dedication**

To my parents, who instilled in me a love of learning, and a respect for public service.

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# Table of Contents

|   |           |
|---|-----------|
| Approval.....   | ii        |
| Partial Copyright Licence .....   | iii       |
| Abstract.....   | iv        |
| Dedication.....   | v         |
| Acknowledgements.....   | vi        |
| Table of Contents.....  | vii       |
| List of Tables.....   | ix        |
| List of Figures .....   | x         |
| <br>  |           |
| <b>1. Introduction .....</b>  | <b>1</b>  |
| <br>  |           |
| <b>2. Background .....</b>  | <b>3</b>  |
| 2.1. SARA and the United Nations Convention on Biological Diversity .....                                   | 3         |
| 2.2. The SARA Process .....   | 4         |
| 2.2.1. Assessment.....  | 4         |
| 2.2.2. Protection .....   | 6         |
| 2.3. Criticism of SARA Listing Decisions .....  | 9         |
| 2.4. Enabling Commercial Exploitation Under SARA.....   | 13        |
| 2.5. Potential Benefits and Drawbacks of Exploitation and Regulated<br>Commercial Activity under SARA ..... | 15        |
| 2.6. Research Goal and Objectives .....   | 17        |
| 2.6.1. Research Objective 1 .....   | 17        |
| 2.6.2. Research Objective 2 .....   | 17        |
| 2.7. Potential Research Implications.....   | 17        |
| <br>  |           |
| <b>3. Methodology.....</b>  | <b>19</b> |
| 3.1. Research Objective 1.....  | 19        |
| 3.1.1. Literature Review .....  | 20        |
| 3.1.2. Expert Workshop.....   | 20        |
| 3.1.3. Expert Interviews.....   | 22        |
| 3.2. Research Objective 2.....  | 22        |
| 3.2.1. Questionnaire .....  | 23        |
| 3.3. Compilation of Results .....   | 24        |
| 3.4. Research Limitations .....   | 25        |
| <br>  |           |
| <b>4. Results .....</b>   | <b>29</b> |
| 4.1. Research Objective 1 Results.....  | 29        |
| 4.1.1. Criteria that Support the Biological Feasibility of Species Recovery .....                           | 32        |
| 4.1.2. Criteria that Promote Compliance with Management Objectives .....                                    | 35        |
| 4.1.3. Criteria that Capture Socio-economic Benefits that would Otherwise<br>be Lost .....                  | 39        |
| 4.2. Research Objective 2 Results.....  | 43        |
| 4.2.1. Likert-type Survey Results .....   | 44        |
| 4.2.1.1. DFO Expert Scores .....  | 46        |
| 4.2.1.2. Stakeholder Scores .....   | 48        |



|  |            |
|--|------------|
| 4.2.1.3. Comparing DFO Expert and Stakeholder Results .....  | 49         |
| 4.2.2. Questionnaire Results .....   | 50         |
| 4.2.2.1. Additional Criteria .....   | 50         |
| 4.2.2.2. Support for Allowing Exploitation and Commercial Activity<br>under SARA .....   | 51         |
| 4.2.2.3. Support for Allowing Commercial Fishing for At-risk Marine<br>Fish in Canada .....  | 53         |
| <b>5. Discussion and Recommendations .....</b>   | <b>55</b>  |
| 5.1. Research Objective 1.....   | 55         |
| 5.2. Research Objective 2.....   | 55         |
| 5.3. Research Implications.....  | 66         |
| 5.3.1. How can recovery be achieved? .....   | 66         |
| 5.3.2. Do marine fish declined for SARA listing face diminished recovery<br>prospects?.....  | 66         |
| 5.4. Recommendations .....   | 76         |
| 5.4.1. Option 1: Amend the Fisheries Act to explicitly adopt recovery-<br>focused objectives.....  | 77         |
| 5.4.2. Option 2: Establish clear DFO policy that specifies management<br>actions to be taken for commercially exploited at-risk marine fish<br>that are declined for SARA listing .....                    | 78         |
| 5.4.3. Option 3: Amend SARA to provide a straight-forward exemption<br>mechanism from the s. 32(1) and s. 32(2) prohibitions .....   | 79         |
| 5.4.4. Option 4: Use the exemption approach described in this study to list<br>at-risk marine fish under SARA and allow exploitation and regulated<br>commercial activity to occur, when appropriate ..... | 80         |
| 5.4.5. Additional Information Needs .....  | 81         |
| <b>6. Conclusion .....</b>   | <b>83</b>  |
| <b>References.....</b>   | <b>87</b>  |
| <b>Appendices.....</b>   | <b>101</b> |
| Appendix A. Expert Workshop Agenda and Questions .....   | 102        |
| Appendix B. Expert Interview Protocol.....   | 104        |
| Appendix C. Stakeholder and Expert Questionnaire .....   | 106        |

## List of Tables

|           |  |    |
|-----------|--|----|
| Table 1.  | SARA Listing Outcomes for Endangered or Threatened Marine Fish Species .....   | 10 |
| Table 2.  | Criteria developed to identify circumstances in which exploitation and regulated commercial activity for SARA-listed threatened and endangered marine fish might be considered as an appropriate management alternative .....  | 29 |
| Table 3.  | Criteria grouped into three categories, according to function .....  | 30 |
| Table 4.  | Affiliation of expert and stakeholder questionnaire respondents. ....  | 43 |
| Table 5.  | Average index scores for the 16 criteria across all survey respondents .....   | 44 |
| Table 6.  | Average index scores for the 16 criteria, grouped according to category .....  | 45 |
| Table 7.  | Average index scores for the 16 criteria across expert respondents .....   | 47 |
| Table 8.  | Average index scores for the 16 criteria across stakeholder respondents. ....  | 48 |
| Table 9.  | Criteria that received widely divergent different scores from stakeholders and experts .....   | 49 |
| Table 10. | Responses to the question “If DFO used the criteria presented in [this study] to determine that it would recommend a threatened or endangered marine fish be listed under SARA and have commercial fishing and commercial activity exempted from the SARA general prohibitions, would you, or would you not, support this listing recommendation? Why?” broken down by affiliation. .... | 52 |
| Table 11. | Responses to the question “Do you think that commercial fishing of at-risk marine fish should be allowed in Canada? Please explain your answer” broken down by affiliation.....  | 53 |
| Table 12. | Criteria to be included and excluded from consideration when determining the circumstances under which exploitation and regulated commercial activity for at-risk marine fish could occur under SARA.....  | 60 |

## List of Figures

|  |    |
|--|----|
| Figure 1. Species at Risk Conservation Phases. ....  | 5  |
| Figure 2. A potential approach for using the criteria to determine whether<br>exploitation and regulated commercial activity should be considered<br>for an at-risk marine fish if listed under SARA. .... | 64 |

# 1. Introduction

The purpose of Canada's *Species at Risk Act* (SARA, SC 2002, c. 29) is threefold: to prevent indigenous Canadian wildlife species from becoming extinct or extirpated, to provide for the recovery of species that are currently at risk of extinction (i.e., threatened or endangered), and to manage species of special concern to prevent them from becoming further at risk (SARA s. 6). Species that have been assessed as at-risk are eligible for listing under Schedule 1 of SARA, which affords species a series of legal protections. The decision to list a species under Schedule 1 of SARA remains a political decision and, to date, listing decisions have shown a bias in that marine fish and northern species are far less likely to be listed than other species groups (Mooers *et al.*, 2007). For marine fish, the federal government has commonly cited socio-economic reasons as a justification for declining to list at-risk species including Atlantic cod (*Gadus morhua*), Cultus Lake sockeye salmon (*Oncorhynchus nerka*), and porbeagle shark (*Lamna nasus*) (Government of Canada, 2005; 2006a; 2006b).

For threatened, endangered or extirpated species, SARA listing automatically invokes a series of general prohibitions against killing, harm, harassment, capture, take, possession, collection, buying, selling and trading (s. 32). For commercially targeted or bycaught marine fish, a SARA listing decision triggering these prohibitions could shut down commercial fishing operations, thus resulting in the negative socio-economic impacts cited by the government in non-listing decisions. However, it is possible, in principle, to exempt exploitation and associated commercial activities (i.e. buying, selling, and trading) from SARA's general prohibitions, thereby allowing commercial fishing to continue for a species once it is listed. If exemptions of this type could be successfully implemented, commercially exploited species could benefit from other aspects of SARA listing, while still providing limited economic opportunities for fishers. This type of exemption has not yet been attempted; implementing an exemption would require both a regulation and development of a recovery strategy prior to a listing decision, both of which may present barriers to success. My study is focused on

exploring whether, and under what conditions, SARA should be used to allow exploitation and regulated commercial activity for at-risk marine fish. Results may help inform fisheries management for commercially exploited at-risk marine fish in Canada, and contribute to better understanding of the interplay between SARA and the *Fisheries Act*. Additionally, my research can contribute more broadly to literature on managing natural resources for which there are competing priorities, and for which there may be important differences in the views of experts and stakeholders.

I begin this report (Chapter 2) by discussing relevant background information and literature regarding the SARA listing process and biases in federal government listing decisions. I describe my methodological approach in Chapter 3, and summarize the results in Chapter 4. I interpret these results, and provide recommendations for decision-makers in Chapter 5, and summarize my conclusions in Chapter 6.

## 2. Background

To discuss potential opportunities for allowing commercial exploitation of at-risk marine fish under the *Species at Risk Act* (SARA), it is important to first set the context for SARA by describing its origins, process, and the literature concerning biases in listing outcomes. In this chapter I provide explanations of key phases in the identification and recovery of at-risk species under SARA, including species assessment, protection, and recovery planning. I then discuss how socio-economic analysis and consultation affect the listing process, and I document trends in species listing outcomes. I outline how SARA's provisions could potentially be used to allow exploitation and regulated commercial activity for at-risk marine fish, the possible benefits of this approach, and the potential concerns. I conclude by stating my research goal and objectives.

### 2.1. SARA and the United Nations Convention on Biological Diversity

SARA's proclamation in 2003 represented the culmination of more than ten years of effort by environmental, academic, industry and government actors to meet a key part of Canada's commitments under the United Nations Convention on Biological Diversity (UNCDB). The UNCDB, first signed by Canada at the United Nations Conference on Environment and Development (the Rio Earth Summit) in June 1992, contains several provisions aimed at encouraging conservation and sustainable use of the world's biological diversity (Secretariat of the Convention on Biological Diversity, No Date). Among these provisions is Article 8(k), which states:

Each Contracting Party shall, as far as possible and as appropriate:

(k) Develop or maintain necessary legislation and/or other regulatory provisions for the protection of threatened species and populations; (UNEP, 1993, p. 149)

Despite the fact that the Canadian federal Parliament's Environment Committee provided a clear recommendation in 1993 to Environment Canada that such legislation should be developed and adopted both provincially and federally (Bourdages and Labelle, 2000; Elgie, 2009), SARA was not proclaimed until June 5, 2003, after two previous federal attempts to institute endangered species legislation had failed<sup>1</sup>.

## **2.2. The SARA Process**

Overall responsibility for SARA administration lies with Environment Canada; however the Parks Canada Agency (PCA)<sup>2</sup> and Fisheries and Oceans Canada (DFO) are the responsible authorities for species occurring in national parks, and aquatic species, respectively (s. 2(1)). SARA applies on all federal lands and waters (s. 2(1)), and to aquatic species and migratory birds wherever they occur. Lands under provincial or territorial jurisdiction are subject to SARA only if specific provisions (the "safety net") are triggered and acted upon by the federal government (e.g. s. 34, 35, 61, 80).

The federal government can use a number of instruments within SARA to achieve species recovery and protection. Environment Canada (2009) has grouped these instruments into five major phases: assessment, protection, recovery planning, implementation, and monitoring and evaluation (Figure 1). The following overview focuses primarily on the assessment and protection phases.

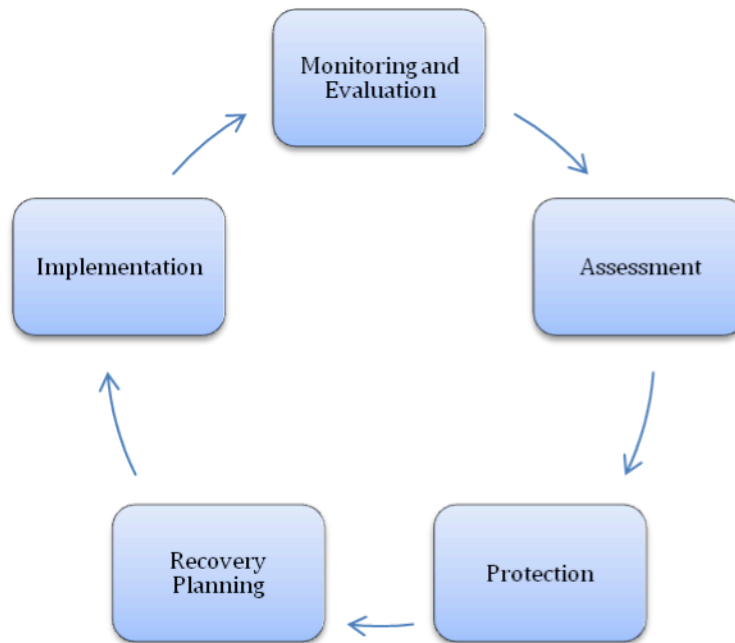
### **2.2.1. Assessment**

Only those species considered to be at risk of extinction in Canada are eligible for listing under SARA. The responsibility for scientifically determining which wildlife

<sup>1</sup> See Elgie (2009) for a full account of the legislative history behind SARA's development and its previous incarnations.

<sup>2</sup> At the time of SARA's proclamation, the Minister of Canadian Heritage, as the head of PCA, was responsible for administering SARA in national parks, national historic sites or heritage sites. Subsequently, the Department of Canadian Heritage was disbanded, and the responsibility for PCA was assigned to the Minister of Environment.

species are at risk lies with the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), an arms-length advisory body originally established in 1977 (COSEWIC, 2011).



**Figure 1. Species at Risk Conservation Phases.**

Note: Reproduced from Environment Canada (2009).

COSEWIC's 31 members are appointed by the federal Minister of Environment (SARA s. 16(1)), and include representatives of relevant provincial, territorial, and federal government wildlife agencies, non-governmental scientists, the chairs of COSEWIC's Species Specialist Subcommittees, and the chair of the Aboriginal Traditional Knowledge Committee (COSEWIC, 2011). All COSEWIC members must have relevant knowledge or expertise from areas such as conservation biology, taxonomy, genetics, or community or aboriginal traditional knowledge related to wildlife conservation (SARA s. 16(2)).

COSEWIC bases its species assessments on status reports (SARA s. 21(1)), which are prepared initially by independent contractors chosen through a competitive bidding process, and then edited and revised by the responsible Species Specialist Subcommittee (COSEWIC, 2010a). The biologically-focused status reports are required to be based on the best available scientific, aboriginal traditional and community



knowledge (SARA s. 15(2)), and must contain information on current and potential threats, and the species' range (SARA s. 15(1)(a) and (c.1)). COSEWIC has established further information requirements for status reports, including "...distribution, extent of occurrence, area of occupancy, abundance (including population estimates or number of occurrences, where available), population and habitat trends, and factors or threats limiting the wildlife species" (COSEWIC, 2010a). After initial assessment, COSEWIC must review each species assessment "at least once every ten years, or at any time if it has reason to believe that the status of the species has changed significantly" (SARA s. 24). In order to determine which species to assess, COSEWIC Species Specialist Subcommittees maintain Candidate Species Lists, which identify and rank candidate species into high, medium, and low priority for assessment, based on expert judgment (COSEWIC, 2012a).

If COSEWIC assesses a species as extinct, data deficient, or not at risk, then the species is not eligible for SARA listing. COSEWIC can also assess a species as extirpated, endangered, threatened or of special concern; if so, the species moves forward into the federal listing process. To determine a species' status, COSEWIC employs a modified version of the Red List criteria established by the International Union for the Conservation of Nature (IUCN) (COSEWIC, 2010a). The IUCN criteria, which include various metrics to assess population and range sizes and trends, are designed to be flexible enough to work in both data poor and data rich circumstances (Wood and Gross, 2008; IUCN Standards and Petitions Subcommittee, 2010).

COSEWIC meets semi-annually, in April/May and November, to review completed status reports and assess species based on those reports. Completed assessments are forwarded to the Minister of Environment annually, and published on the SARA Public Registry web site (SARA s. 25(1) and (2)). These species assessments are then used as the basis for the SARA listing process, and must be considered by the Minister when making listing decisions (SARA s. 27(2)(a)).

### **2.2.2. Protection**

SARA's protection phase encompasses the legal listing process and the protection provisions that come into force upon listing. Once COSEWIC has assessed a species as being at risk, the species moves forward into the legal listing process. The

process begins when the Minister of Environment releases a response statement, which is required within 90 days of receiving a species assessment from COSEWIC. In the response statement, the Minister must indicate his or her intended course of action concerning possible listing of the species, including timelines, to the extent possible (SARA s. 25(3)). After providing a response statement, the Minister then forwards COSEWIC's species assessment to the Governor in Council (GiC); there is no statutory time limit for this step. Within nine months of receiving the COSEWIC assessment from the Minister, the GiC may make a listing decision, taking into consideration the Minister's recommendation (SARA s. 27(1.1)). During this nine-month time period, the Minister typically releases to the public a proposed listing recommendation, and provides a 30-day comment period for members of the public to submit their comments on the proposal. When making a listing decision, the GiC has three options: accept COSEWIC's assessment and list the species under Schedule 1 of SARA; decline to list the species; or refer the species back to COSEWIC for further consideration (SARA s. 27(1.1)(a)(b) and (c)). If the GiC does not make a listing decision, by failing to choose one of these options within nine months of having received the species assessment, the Minister is compelled to list the species (SARA s. 27(3)).

The COSEWIC assessment process is explicitly separate from the SARA listing decision process; declining to list a species under SARA does not negate COSEWIC's assessment that the species is threatened or endangered, it merely denies the species the protections and benefits of SARA. This separation between biological assessment and legislated protection and recovery of species at risk is one of SARA's key features (Mooers *et al.*, 2010), and is notably different from the approach in the United States under the *Endangered Species Act* (Illical and Harrison, 2007). Some researchers have applauded Canada's approach (Farrier *et al.*, 2007; Wood and Gross, 2008; Mooers *et al.*, 2010; VanderZwaag *et al.*, 2011) for challenging the implicit assumption that automatic, legislated recovery actions should be implemented for all at-risk species.

Though the legal listing process is explicitly laid out in SARA, federal government departments currently undertake a number of additional steps that inform listing decisions. One such step is socio-economic analysis. Socio-economic considerations are not part of the SARA legal listing process; rather, they come into play in the development of a Regulatory Impact Analysis Statement (RIAS), as required currently

under the *2007 Cabinet Directive on Streamlining Regulation* and previously under the *Government of Canada Regulation Policy* (Environment Canada, 2009). When any regulatory change is contemplated, the Cabinet Directive compels federal government departments to conduct a benefit-cost analysis to determine whether the proposed change will provide net benefits to Canadians (Treasury Board of Canada Secretariat, 2007). Listing a species under SARA requires that a regulatory order be developed to add a species to SARA's List of Wildlife Species at Risk (Schedule 1), therefore the federal government must conduct a benefit-cost analysis prior to making a listing decision. The Cabinet Directive additionally requires federal government departments to undertake consultations with potentially affected parties, while SARA mandates little in the way of consultations at the listing stage<sup>3</sup>.

A socio-economic analysis and associated consultations can take a substantial amount of time to complete, thus hampering the federal government's ability to make listing decisions in a timely manner (Standing Committee on the Environment and Sustainable Development, 2009a). The solution often adopted by responsible agencies has been to informally extend the time period during which consultation and socio-economic analysis take place (Environment Canada, 2009). According to Environment Canada (2009), this additional time is required for the consultations necessary to assess whether a species should be listed under SARA. Since SARA does not specify a deadline for the Minister to forward a COSEWIC species assessment to the GiC – the action that triggers the nine-month legal timeline for a listing decision – a loophole exists allowing the Minister to effectively delay listing decisions indefinitely (Hutchings and Festa-Bianchet, 2009). This phenomenon has been both documented (Standing Joint Committee on the Scrutiny of Regulations, 2007) and criticized (Sierra Legal Defense Fund, 2006; Standing Committee on the Environment and Sustainable Development, 2009b). Jeffrey Hutchings, the former chair of COSEWIC, noted in his evidence

<sup>3</sup> Under SARA, the Minister is only obliged to consult with other competent Ministers (i.e. the Minister of Environment consults with the Minister of Fisheries and Oceans in the case of aquatic species), and relevant wildlife management boards for species located in any areas that fall under land claims agreements (SARA s. 24(2)(b) and (c)).

presented to the House Standing Committee on the Environment and Sustainable Development during SARA's 2009 Parliamentary Review that the average time span for the extended listing processes of 19 aquatic species awaiting listing decisions was 3.5 years (2009b). Examples of more lengthy listing processes include bocaccio rockfish (*Sebastes paucispinis*) and Lake Winnipeg physa snail (*Physa sp.*), each of which had its at-risk status confirmed by COSEWIC in December 2006 (COSEWIC, 2006a), yet were eventually declined for listing 4.5 years later in July 2011 (Government of Canada, 2011).

Species listed under SARA as threatened or endangered benefit from several provisions. Individuals of the species are immediately protected from killing, harm, harassment, capture, take, possession, collection, buying, selling, and trade by a series of general prohibitions (s. 32(1) and (2)). Species' residences and critical habitats, once identified, are also protected from destruction (s. 33 and s. 58). The federal government is also required to undertake recovery and action planning activities within mandated timelines and to report on progress towards meeting objectives every five years until they are met (s. 37-46 and s. 47-55). Recovery planning documents must be publically released via the SARA Public Registry website. Species of special concern are not subject to any of SARA's prohibitions or recovery planning provisions; however, a management plan must be developed (s. 65). Species that are declined for listing do not receive any of these benefits under SARA.

### **2.3. Criticism of SARA Listing Decisions**

Questions have been raised about biases in the process of determining which species receive listing and protection, and which do not (e.g., VanderZwaag and Hutchings, 2005; Mooers *et al.*, 2007; David Suzuki Foundation, 2007; Findlay *et al.*, 2009). A 2007 study found that marine fish and species residing in northern latitudes were far less likely to be listed than all other taxonomic and geographic species groups (Mooers *et al.*, 2007). A follow-up study found that species for which DFO was the responsible agency were also less likely to be listed than species for which Environment Canada or PCA were the responsible agencies (Findlay *et al.*, 2009).

A total of five marine fish are currently listed under SARA as threatened or endangered, three of which were automatically listed when SARA was proclaimed in 2003 (Government of Canada, No Date (a)). Since SARA's proclamation, 11 of the 13 marine fish that COSEWIC has assessed as threatened or endangered have been declined for SARA listing (Table 1) (Government of Canada, No Date (a)). For all of these species declined for listing, potential negative socio-economic impacts resulting from the automatic application of SARA's general prohibitions were cited as a primary reason for denying listing (Government of Canada, 2005; 2006a; 2006b; 2010; 2011). These 11 non-listed species remain under the purview of the *Fisheries Act* (RSC 1985, c F-14), the primary legislative tool DFO uses to manage and regulate commercial fishing activity.

**Table 1. SARA Listing Outcomes for Endangered or Threatened Marine Fish Species**

| Species   | Scientific Name             | Range                                      | COSEWIC Status                                  | SARA Listing Outcome   | Length of Listing Process                                 |
|---|-----------------------------|--|---|--|---|
| Atlantic cod (Newfoundland and Labrador population) | <i>Gadus morhua</i>         | Atlantic Ocean                             | Endangered<br>May 2003; Apr 2010*               | Not Listed<br>Apr 2006                                       | 34 months   |
| Atlantic cod (Laurentian North population)          | <i>Gadus morhua</i>         | Atlantic Ocean                             | Threatened<br>May 2003; Endangered<br>Apr 2010* | Not Listed<br>Apr 2006                                       | 34 months   |
| Atlantic salmon (Inner Bay of Fundy population)     | <i>Salmo salar</i>          | New Brunswick, Nova Scotia, Atlantic Ocean | Endangered<br>May 2001; Nov 2006†; Nov 2010*    | Listed Upon Proclamation<br>Jun 2003                         | N/A   |
| Basking shark (Pacific population)                  | <i>Cetorhinus maximus</i>   | Pacific Ocean                              | Endangered<br>Apr 2007                          | Listed<br>Mar 2010   | 35 months   |
| Bocaccio  | <i>Sebastes paucispinis</i> | Pacific Ocean                              | Threatened<br>Nov 2002; Dec 2006†               | Referred back to COSEWIC<br>Apr 2006; Not Listed<br>Jul 2011 | 35 months to Refer Back to COSEWIC; 55 months to Not List |
| Canary  | <i>Sebastes</i>             | Pacific Ocean                              | Threatened                                      | Not Listed   | 44 months   |

|   |                                 |                                 |                                |  |           |
|---|---------------------------------|---------------------------------|--------------------------------|--|-----------|
| rockfish  | <i>pinniger</i>                 |                                 | Nov 2007                       | Jul 2011   |           |
| Chinook salmon (Okanagan population)                    | <i>Oncorhynchus tshawytscha</i> | British Columbia, Pacific Ocean | Threatened Apr 2006            | Not Listed Mar 2010                                      | 47 months |
| Coho salmon (Interior Fraser River population)          | <i>Oncorhynchus kisutch</i>     | British Columbia, Pacific Ocean | Endangered May 2002            | Not Listed Apr 2006                                      | 34 months |
| Northern Wolffish                                       | <i>Anarhichas denticulatus</i>  | Arctic Ocean, Atlantic Ocean    | Threatened May 2001            | Listed upon proclamation Jun 2003                        | N/A       |
| Porbeagle shark   | <i>Lamna nasus</i>              | Atlantic Ocean                  | Endangered May 2004            | Not Listed Aug 2006                                      | 27 months |
| Sockeye salmon (Sakinaw population)                     | <i>Oncorhynchus nerka</i>       | British Columbia, Pacific Ocean | Endangered May 2003; Apr 2006‡ | Not Listed Jan 2005; Emergency Listing Declined May 2007 | 19 months |
| Sockeye salmon (Cultus population)                      | <i>Oncorhynchus nerka</i>       | British Columbia, Pacific Ocean | Endangered May 2003            | Not Listed Jan 2005                                      | 19 months |
| Spotted wolffish  | <i>Anarhichas minor</i>         | Arctic Ocean, Atlantic Ocean    | Threatened May 2001            | Listed Upon Proclamation Jun 2003                        | N/A       |
| White shark (Atlantic population)                       | <i>Carcharodon carcharias</i>   | Atlantic Ocean                  | Endangered April 2006          | Listed Jul 2011  | 63 months |
| Winter skate (Southern Gulf of St. Lawrence population) | <i>Leucoraja ocellata</i>       | Atlantic Ocean                  | Endangered May 2005            | Not Listed Feb 2010                                      | 57 months |
| Winter skate (Eastern Scotian Shelf population)         | <i>Leucoraja ocellata</i>       | Atlantic Ocean                  | Threatened May 2005            | Not Listed Feb 2010                                      | 57 months |

\* Species re-assessment

† Species status confirmation (see COSEWIC's 2006 response to wildlife species referrals by the Governor in Council. Available from: [http://www.cosewic.gc.ca/rpts/2006\\_12\\_ref\\_e.pdf](http://www.cosewic.gc.ca/rpts/2006_12_ref_e.pdf)).

‡ COSEWIC emergency assessment

Notes: For the purposes of calculating the length of the listing process for a particular species, (1) Emergency assessments and listing decisions were not counted; and, (2) COSEWIC assessments that

occurred prior to SARA's proclamation were counted as having occurred in June 2003 (when SARA was proclaimed). Length of listing process was calculated as the number of months between the COSEWIC assessment and the announcement of the SARA listing decision.

Sources: SARA Public Registry Advanced Search. Accessed July 19, 2011 from [http://www.sararegistry.gc.ca/search/advSearchResults\\_e.cfm?styp=species&lng=e&advkeywords=&op=1&locid=0&taxid=4&desid=3,4,9,10&schid=0&](http://www.sararegistry.gc.ca/search/advSearchResults_e.cfm?styp=species&lng=e&advkeywords=&op=1&locid=0&taxid=4&desid=3,4,9,10&schid=0&); COSEWIC Wildlife Species Search. Accessed July 19, 2011 from [http://www.cosewic.gc.ca/eng/sct1/searchform\\_e.cfm](http://www.cosewic.gc.ca/eng/sct1/searchform_e.cfm)

Both Mooers *et al.*, (2009) and Findlay *et al.*, (2009) have criticized SARA listing trends, suggesting that the federal government is inappropriately prioritizing socio-economic considerations over ecological concerns in denying listing specifically to species of commercial importance. These critics, however, do not explore the underlying reasons for the federal government's failure to list marine fish. Once a species is listed as threatened or endangered under SARA, it becomes illegal to "...kill, harm, harass, capture or take" and "...collect, possess, buy, sell, or trade" individuals of that species (SARA s.32 (1) and (2)). As SARA applies mainly to federal lands and waters (s. 34(1)), the prohibitions do not apply equally across taxonomic and geographic species groups. Since federal lands in the provinces consist mostly of national parks, where species protection often already exists, SARA prohibitions for terrestrial species do not typically present an additional economic or regulatory burden (Illical and Harrison, 2007). For some terrestrial species including migratory birds, species managed by Wildlife Management Boards, and species occurring in the territories, SARA prohibitions can apply; however, it is beyond the scope of my research to address SARA's applicability and efficacy for such species.

In contrast to most terrestrial species, all aquatic species are under federal jurisdiction, making them subject to SARA prohibitions if listed. The prohibitions, if applied to commercially exploited marine fish, could lead to closure of any existing fisheries that either target or incidentally catch an at-risk marine fish, resulting in the negative socio-economic consequences cited by the federal government in declining to list these species under SARA. Critics contend that marine fish are denied listing because the economic benefits of exploitation and costs of fishery closures are easily quantified in benefit-cost analyses, while many of the benefits associated with species recovery are more difficult to specify and quantify, and are therefore under-emphasized or ignored altogether (Mooers *et al.*, 2007; Hutchings and Festa-Bianchet, 2009; Powles, 2011). Some argue that the federal government's track record amounts to an implicit

policy to deny listing to any species of economic value, no matter how great or small the value may be (Mooers *et al.*, 2007).

## 2.4. Enabling Commercial Exploitation Under SARA

The disparity between calculated costs and benefits of listing threatened and endangered commercially exploited marine fish arises in part because many of the socio-economic analyses focus mostly on future management scenarios in which all exploitation and any commercial activity are prohibited under SARA. There are, however, provisions in SARA that could make it possible for limited exploitation and commercial activity affecting listed threatened and endangered species to continue (Hutchings and Rangeley, 2011). SARA s. 83(4) exempts from the s. 32 prohibitions persons who are "...engaging in activities that are permitted by a recovery strategy, an action plan or a management plan and who [are] also authorized under an Act of Parliament to engage in that activity." In principle, this mechanism could allow continued exploitation, if the exploitation is authorized under the federal *Fisheries Act* and explicitly permitted in a species' recovery strategy, action plan or management plan. Current Government of Canada draft policy states that any activities exempted from the prohibitions through s. 83(4) must first meet a series of pre-conditions, set out in s. 73(3)<sup>4</sup> (Environment Canada, 2009). Chief among these pre-conditions is that the activity must not jeopardize the survival or recovery of the species. Any fishing activity would therefore have to be consistent with population and distribution objectives for the species established in recovery planning documents.

While s. 83(4) can be used for the purposes of exempting harvest, it cannot be used to provide an exemption for buying, selling, or trading of a listed species, because those activities are not covered under the *Fisheries Act* or another federal Act of

<sup>4</sup> The SARA s. 73(3) pre-conditions establish requirements for obtaining a permit to conduct activities that would otherwise violate the prohibitions. While SARA itself does not require that activities being exempted from the prohibitions under s. 83(4) must meet the s. 73(3) pre-conditions, the draft SARA Overarching Policy Framework (Environment Canada, 2009) sets this test when using s. 83(4).



Parliament. Exempting the buying, selling, or trading of a species caught through a s. 83(4) exemption would require an additional regulation. SARA s. 83(5)(g) exempts persons from the prohibitions against buying, selling, or trading (SARA s. 32(2)), as long as a regulation is in place for this purpose. SARA s. 84 grants authority to the GiC, on the recommendation of the Minister of Environment, to make the regulation referenced in s. 83(5)(g).

To summarize, it may be possible to allow exploitation, whether targeted or incidental, and commercial activity, for a species listed under SARA as threatened or endangered if the following conditions are met:

- A federal Act of Parliament (e.g., a licence under the *Fisheries Act*) is in place that authorizes fishing;
- A final species recovery strategy is posted on the SARA Public Registry that includes a s. 83(4) exemption for commercial harvest consistent with the s. 73(3) pre-conditions and species population and distribution objectives; and,
- A s. 84 regulation is established by the GiC that exempts individuals from the s. 32(2) prohibitions against buying, selling, or trading, as allowed for under s. 83(5)(g).

Recovery strategies and action plans are typically produced after a species is listed under SARA, but the above conditions would need to be in place at the time a species listing decision is rendered in order to minimize negative socio-economic impacts that would otherwise be incurred in the time between listing and development of a recovery strategy. Nothing in SARA precludes preparing recovery documents prior to listing, and precedents have been set for this type of approach<sup>5</sup>. With the listing process for marine fish averaging 40 months (Table 1), it is plausible that DFO could prepare a recovery strategy in advance of a species listing decision, especially given that SARA

<sup>5</sup> Recovery strategies for Cultus Lake sockeye, Sakinaw Lake sockeye, and Interior Fraser coho were under development well before their listing decisions were rendered. Upon being declined for listing, the documents were converted into Conservation Strategies and released by DFO Pacific Region (see Fisheries and Oceans Canada, 2005a; 2005b, and 2006a)

allows only one or two years<sup>6</sup> for this task post-listing (s. 42(1)). The exact length of time necessary to create a s. 84 regulation has not been demonstrated; no new regulations have thus far been established under any SARA section (Government of Canada, No Date (b)); regulatory powers have only been exercised to add species to Schedule 1 of SARA, and to protect species' critical habitat.

## **2.5. Potential Benefits and Drawbacks of Exploitation and Regulated Commercial Activity under SARA**

Allowing exploitation and regulated commercial activity under SARA may mitigate some of the potential socio-economic impacts that might otherwise result from listing a commercially exploited marine fish under SARA. This course of action may allow some economic benefits to continue to be realized from fishing activities, while still providing at-risk marine fish with many of the additional protection and recovery mechanisms available through SARA. Though permitted harvesters would be exempted from the prohibitions barring catch and commercial activity, and overall fisheries management would still take place through the *Fisheries Act*, SARA listing would provide additional management constraints through the s. 73(3) pre-conditions and population and distribution objectives.

Additionally, listed species benefit from the provisions in SARA for critical habitat identification and protection. While current or historical catch, either directed or incidental, is cited as a key threat for all 11 threatened or endangered marine fish declined for SARA listing (COSEWIC, 2002a; 2002b; 2003a; 2003b; 2003c; 2004; 2005; 2006b; 2007), protection of species' critical habitats (s. 2(1)) may provide an additional means through which progress towards recovery can be made. Recent court decisions (*Alberta Wilderness Association v. Canada (Environment)*, 2009 FC 710; *Environmental Defence Canada v. Canada (Fisheries and Oceans)*, 2009 FC 878; *Canada (Fisheries*

<sup>6</sup> Recovery strategies for endangered species are due one year after the species is listed, while two years are given for threatened species.

*and Oceans) v. David Suzuki Foundation, 2012 FCA 40*) have confirmed both the necessity of identifying species' critical habitats in SARA recovery strategies to the extent possible, and the need for critical habitat protection to be enacted through SARA Protection Orders (s. 58). Listing might also increase the species' public profile and could possibly lead to supplementary funding sources being made available for species management, stewardship and recovery, given SARA's legislative mandate. The Habitat Stewardship Program, the Interdepartmental Recovery Fund and the Aboriginal Fund for Species at Risk currently provide millions of dollars in funding for groups to pursue stewardship activities for listed species across the country (Environment Canada, No Date.; VanderZwaag *et al.*, 2011)). Finally, SARA has numerous requirements for posting recovery documents and information about species to the SARA Public Registry website. These requirements can increase management transparency for listed species, by making governmental recovery and protection commitments publicly known and available in a way not required under the *Fisheries Act*.

While SARA may offer several potential benefits to commercially exploited at-risk marine fish, there are also several concerns with actively implicating SARA in fisheries management. Since SARA's proclamation in 2003, the federal government has struggled to meet mandated timelines for developing recovery strategies and action plans (Office of the Auditor General, 2008; David Suzuki Foundation *et al.*, 2009; Species at Risk Advisory Committee, 2009; VanderZwaag *et al.*, 2011), and many species still remain without these guiding documents. For both catch and commercial activity to be exempted under SARA, a regulation and a species recovery strategy would need to be in place by the time the listing decision was rendered; producing both pieces in a timely fashion presents a potential barrier to successful implementation of this management approach. Finally, while SARA can allow both catch and commercial activity for a listed species, it is possible that some stakeholders and the public may feel that using SARA in this manner falls outside SARA's overall purpose, spirit and intent. Potential opposition based on such beliefs may present an additional impediment to DFO or other SARA-responsible agencies, should they choose to pursue the option.

## **2.6. Research Goal and Objectives**

The primary goal of this study is to assess the viability of SARA as a tool for the sustainable exploitation, management and recovery of commercially valuable<sup>7</sup> threatened and endangered marine fish. To meet this goal, two supporting objectives have guided research:

### **2.6.1. Research Objective 1**

My first objective is to develop a set of possible criteria that specify circumstances in which exploitation and regulated commercial activity for SARA-listed threatened and endangered marine fish may be considered as an appropriate alternative to either declining to list under SARA and continuing management under the *Fisheries Act*, or listing under SARA with full application of the general prohibitions.

### **2.6.2. Research Objective 2**

My second objective is to elicit key stakeholder and expert evaluations of the criteria developed under Objective 1, and use those evaluations as a foundation to assess the feasibility and desirability of implementing a SARA management option that would allow exploitation and regulated commercial activity affecting listed threatened and endangered marine fish.

## **2.7. Potential Research Implications**

My research may provide a foundation for determining whether to pursue an alternative fisheries management approach for at-risk marine fish, predicated on allowing limited exploitation and regulated commercial activity under SARA. Many resource management agencies, both nationally and internationally, grapple with how

<sup>7</sup> For the purposes of this study, “commercially valuable” refers to species that fishers would retain, land and sell, if allowed, rather than discard. The species may be caught through either a targeted fishery, or as bycatch in other fisheries.

best to manage commercially valuable endangered species; any insight into what characteristics or circumstances favour particular management options may broadly inform endangered species management literature and practices.

It is important to investigate key stakeholder views about the possibility of implementing a SARA management option allowing for exploitation and regulated commercial activity in order to inform managers and government officials about how this option may potentially be received. In addition, understanding if stakeholders may or may not accept this management option, and under what conditions they may accept it, can help the federal government, if it ever chooses to pursue exemptions under SARA for exploitation and commercial activity, to craft an effective public and stakeholder communication strategy that addresses key concerns. If there are indications that stakeholders are willing to accept SARA as a regulatory tool for the sustainable exploitation, management and recovery of commercially valuable threatened and endangered marine fish, federal policy makers may be encouraged to consider this option in the SARA listing decision process. Conversely, if stakeholders do not favour using SARA to regulate commercial exploitation of at-risk marine fish, my results may still provide important insight into priorities for managing such species under the *Fisheries Act*. Finally, comparing DFO expert and stakeholder views on the potential for using SARA to regulate and help manage commercial exploitation of at-risk marine fish may also help government foster more productive relationships with stakeholders concerning species at risk and fisheries management.

### **3. Methodology**

I used a mix of qualitative and quantitative methodological approaches in this study. Berg (2004) defines qualitative research as "...meanings, concept definitions, characteristics, metaphors, symbols, and descriptions of things" (p. 3). I used a qualitative approach based on concepts and descriptions obtained from DFO experts, stakeholders and relevant literature to explore potential opportunities for, and the resulting implications of, commercial exploitation of SARA-listed at-risk marine fish. Qualitative methods included conducting a workshop with DFO experts, semi-structured interviews of DFO experts, a literature review, and the qualitative portion of a written questionnaire for expert and stakeholder participants. Quantitative methods included an evaluation of the responses to a Likert-type survey, in which the participants were asked to rate possible criteria. The methods used for each objective are discussed below in more detail.

I conducted this study while on education leave from DFO Pacific Region, where I was employed in the position of Species at Risk Officer in the Fisheries and Aquaculture Management Branch. The conception and design of this study, the interpretation of study results, this report, and any other publications, papers or reports that I may write from these results, should not be taken as representative of DFO's views, policies or positions in any way.

#### **3.1. Research Objective 1**

I used existing expertise and literature to develop a set of criteria that could be used to identify circumstances in which exploitation and regulated commercial activity for SARA-listed threatened and endangered marine fish might be considered as an appropriate alternative to either declining SARA listing and continuing management under the *Fisheries Act*, or listing under SARA with full application of the general prohibitions.

### **3.1.1. Literature Review**

I surveyed literature related to endangered species management practices, endangered species legislation in other jurisdictions, and broader natural resource management approaches. Given that SARA is a relatively new piece of legislation, limited literature specific to SARA is available yet on these topics, and none that specifically addresses exempting commercial exploitation and regulating commercial activity in particular. Other endangered species legislation, including the United States *Endangered Species Act*, and the United Nations Convention on International Trade in Endangered Species (CITES), was therefore examined as a potential source of information on management of commercially valuable endangered species.

### **3.1.2. Expert Workshop**

In April 2011, I convened a workshop with key DFO experts to develop potential criteria. Participants for this workshop were selected based on my knowledge of relevant professional expertise within DFO regarding SARA and marine fisheries management. A total of 10 DFO experts participated in person, while one expert participated in the workshop by speakerphone. Participants provided ideas and suggestions based on their experiences and professional expertise, but were not speaking on behalf of DFO or representing departmental positions.

I served as the workshop facilitator and chose the 'focus group' as a methodological model.

Focus groups traditionally have been used primarily for market research, but they are gaining acceptance for use in broader social science research (Babbie and Benaquisto, 2002; Berg, 2004; Blaikie, 2010). Focus groups encourage group interaction, which can be useful for exploring underlying reasons for participants' views (Babbie and Benaquisto, 2002; Berg, 2004; Blaikie, 2010). This type of interaction can be especially useful in preliminary or exploratory research (Babbie and Benaquisto, 2002). The focus group approach emphasizes facilitated group interaction and discussion based on shared characteristics and experiences among participants (i.e., being colleagues and DFO experts on SARA and marine fisheries). The focus group provides a flexible, cost-effective method of sampling multiple participants (Blaikie,

2010), and allows for a non-representative selection of participants with important knowledge or perspectives (Babbie and Benaquisto, 2002).

My workshop differed from traditional focus groups in several ways: the workshop had a greater number of participants (11) than does a typical focus group (6-10); the participants already knew and worked with each other, whereas focus groups tend to call for little or no prior interaction among participants; and only one meeting or iteration was held, while the focus group approach typically involves several groups or meeting iterations (Babbie and Benaquisto, 2002).

The workshop format included an opening presentation where I introduced my study topic, provided necessary background information on SARA, outlined my research goal and objectives, and explained the workshop's purpose (see Appendix A for the Expert Workshop Agenda). This presentation re-iterated information from a research backgrounder that I provided to DFO experts prior to the workshop. Following the presentation, I posed a broad question about whether exploitation of at-risk marine fish should be allowed in Canada, in order to generate some initial opinions and ideas and to promote discussion of the general research topic. In subsequent questions, I then began to focus on more specific issues, such as what biological, social, economic, or administrative issues should be considered when determining whether to allow exploitation of SARA-listed threatened or endangered marine fish. Potential criteria were generated primarily through the discussions resulting from these more specific questions.

Group consensus was not sought for the criteria. Given that a regulation to enable commercial activity for SARA-listed threatened and endangered marine fish has never been pursued, I thought it was unlikely that the group would agree on all the criteria to evaluate whether a species should be managed in that manner. Not having to achieve consensus allowed the group to have wide-ranging discussions and consider many potential criteria. In addition, each workshop participant was subsequently given the opportunity in the survey to rate all of the criteria generated in the workshop.



### **3.1.3. Expert Interviews**

It was not feasible to include all relevant DFO experts in the workshop due to timing, geographical constraints, and the resources available for this research. To overcome these obstacles, I invited DFO experts who were unable to take part in the workshop to participate in individual semi-structured interviews. Three interviews were performed; two on the phone, and one in-person. The interviews were held in May and June 2011.

In these semi-structured or semi-standardized interviews (Berg, 2004), DFO experts were asked a series of questions similar to those asked in the workshop (see Appendix B for the Expert Interview Protocol). The purpose of these interviews was to generate additional potential criteria and to investigate how these DFO experts responded to the criteria developed during the workshop. The semi-structured approach allowed for flexibility to adjust questions and probes within and between interviews based on participant responses (Berg, 2004).

## **3.2. Research Objective 2**

The second research objective had two primary elements: to determine the perceptions of DFO experts and other stakeholders about the importance of each criterion generated in Research Objective 1, and to investigate the general views of these experts and stakeholders about the feasibility and desirability of allowing exploitation and regulated commercial activity for SARA-listed at-risk marine fish. These elements were explored using a written questionnaire that included a Likert-type survey and accompanying questions, delivered to selected DFO experts and stakeholders.

All DFO experts who participated in the workshop or semi-structured interviews were subsequently invited to complete the written questionnaire. Invitations to complete the questionnaire were also extended to key stakeholders from the following groups: representatives of potentially affected sectors of the commercial fishing industry; representatives of environmental non-governmental organizations (ENGOS); and academics. All commercial fishing industry representatives targeted were from Pacific Ocean-based fisheries, and were chosen based on my professional knowledge,

recommendations from DFO experts, and whether they had experience with SARA listing processes for at-risk marine fish. ENGO representatives were targeted based on my professional knowledge and whether their organization was visibly involved in SARA or marine fisheries-related issues or campaigns. Academics were targeted based on their having published relevant articles or research on SARA. In total, 36 stakeholders were invited to participate: 22 commercial fishing industry representatives, nine ENGO representatives, and five academics. Twenty-three people responded to the questionnaire: 12 DFO experts and 11 stakeholders. Stakeholder affiliation breakdowns are provided in Chapter 4.

### **3.2.1. Questionnaire**

The questionnaire consisted of four components (see Appendix C for the Stakeholder and Expert Questionnaire):

1. A brief backgrounder which included my research goal and objectives, and presented the research problem and background information on SARA necessary to understand and complete the questionnaire. Participants were instructed to read the backgrounder before completing the questionnaire. This backgrounder was similar to the one provided to workshop participants.
2. A table containing the 16 potential criteria, including a definition for each criterion and an explanation of why the criterion might be important to consider. I developed the definitions and explanations based on the literature review and information provided by DFO experts in the workshop and interviews.
3. A survey to assess perceptions of the importance of each criterion. The exercise utilized a five-point Likert-type scale (Babbie and Benaquisto, 2002). Participants were asked to rate each criterion as “Should Not Consider”; “Not Very Important to Consider”; “Somewhat Important to Consider”; or “Very Important to Consider”. Participants were also given the option to choose “I Don’t Know”. Neither the categories nor the criteria were numbered, and the criteria were presented in an arbitrary sequence. The same sequence was used for all questionnaires. Rating was chosen rather than ranking for the following reasons:
  - Ranking a complex set of criteria from 1 to 16 in order of importance would be so difficult and time consuming for participants that they might be unwilling to participate.
  - Asking for ranks might have complicated the survey to the point where participants could not provide meaningful answers, thus impacting the reliability of results.

- Asking for ranks might imply that no two criteria were equally important or unimportant, and that their importance was only meant to be relative, when it is reasonable to assume that several criteria may be equally important. Additionally, since there has been no previous research on this aspect of SARA, I felt that it was most important to determine whether participants thought various criteria were or were not of some importance to consider; the objective was more easily achieved using rating, rather than ranking.
  - Participants were likely to be familiar with Likert-type surveys, as they are common in questionnaire design (Babbie and Benaquisto, 2002).
4. Following the survey, the questionnaire included either one or four open-ended questions, depending on the type of respondent. DFO experts were asked one question, while stakeholders were asked four. This discrepancy is due to stakeholders being asked questions similar to those that DFO experts had already answered and discussed during the workshop and interviews.

The questionnaires were administered by email between June and September 2011, and participants were given the option to fill out the questionnaire electronically or in hard copy. All responses were received electronically.

### **3.3. Compilation of Results**

For Research Objective 1, potential criteria were compiled following completion of the workshop and interviews. All criteria put forward were included, though I formulated the final wording of each criterion, and developed specific definitions and explanations based on the workshop and interview discussions. Additional criteria were developed based on my literature review and included in the questionnaire as well. The discussions at the workshop and during interviews also informed my discussion and conclusions in this report.

For Research Objective 2, following a typical Likert scoring protocol (Babbie and Benaquisto, 2002), each Likert category was assigned a numerical value (“Very Important to Consider” = 2 “Somewhat Important to Consider” = 1; “Not Very Important to Consider” = -1; “Should Not Consider” = -2; “I Don’t Know” responses were not scored). Responses were tallied to determine the overall score for each criterion. From this overall score, the average index score (Babbie and Benaquisto, 2002) for each

criterion was determined, with 2 being the maximum positive score a criterion could receive, and -2 being the maximum negative score.

Responses to the question “*Do you think that commercial fishing of at-risk marine fish should be allowed in Canada?*”, asked of both DFO experts and stakeholders, were categorized as positive or negative. Responses to the question “*If DFO used the criteria presented in [the survey] to determine that it would recommend a threatened or endangered marine fish be listed under SARA and have commercial fishing and commercial activity exempted from the SARA general prohibitions, would you, or would you not, support this listing recommendation?*”, asked of stakeholders only, were also categorized as positive or negative. Additionally, all written question responses and any comments on the criteria from both DFO experts and stakeholders were analyzed qualitatively to draw out key themes that informed my discussion and conclusions.

### **3.4. Research Limitations**

The research approaches and methods used in this project have a number of limitations:

- Participants’ knowledge of the potential for commercial fishing to be exempted from SARA prohibitions may have varied prior to participation. Participants’ responses may therefore have been influenced by their prior knowledge of the study topic. The research background paper was produced to help address any knowledge gaps, and promote common understanding of the research context.
- My professional relationships with several of the DFO experts and stakeholders may have introduced bias into workshop, interview and questionnaire results. Further, my employment history with DFO may have also influenced stakeholder responses. To reduce the effects of this potential bias to the extent possible, participants in the questionnaire were given the option of having their responses remain anonymous. I also provided a disclaimer in the workshop as well as the questionnaire disclosing my DFO employment and stating that the conception, analysis and results of the research were not to be taken as representative of DFO’s views, policies, or positions in any way.
- Since DFO experts generated a majority of the criteria and most experts participated in the focus group discussion that led to the criteria being developed, it is likely that they better understood the justifications for each criterion and how they could be used. This prior interaction may have caused

DFO experts to rate the criteria more favourably than stakeholders, who had no prior interaction with the criteria.

- Due to logistical and scoping constraints, several potentially affected or interested groups, including (1) other federal government agencies; (2) provincial government agencies; (3) First Nations members; (4) recreational fishing industry representatives; and (5) other commercial fishing representatives, were not incorporated in the study. A rationale for these exclusions is provided below:

1. Other federal government agencies: PCA, a SARA-responsible agency, was excluded from this study because while commercial fishing operations can take place within National Marine Conservation Areas (Parks Canada Agency, No Date), numerous additional management considerations exist for planning fisheries in these zones, making the potential implications of allowing exploitation of SARA-listed species unclear and likely complex. Additional investigation may help ascertain potential implications of SARA-regulated commercial fisheries for NMCA's. Environment Canada, responsible for overall administration of SARA, was excluded from this study due to its relative lack of expertise in marine fisheries management. Should the federal government choose to pursue a s. 84 regulation to exempt individuals from the prohibitions against buying and selling commercially exploited marine fish, the Minister of Environment, after consulting the Minister of Fisheries and Oceans, would be responsible for recommending to the GiC that the regulation be enacted. Further research could be conducted to determine Environment Canada's interest in working with DFO to create a s. 84 regulation, though this research may be better carried out through inter-agency cooperation than through outside inquiry.
2. Provincial government agencies: Marine fisheries and aquatic species at risk are under federal jurisdiction pursuant to the *Constitution Act*, 1867 ((UK), 30 & 31 Victoria, c 3) and are managed under the *Fisheries Act* (RSC 1985, c F-14) and SARA respectively. However, provinces also play a key role in commercial fisheries. For example, the British Columbian provincial Commercial Fisheries Program is responsible for licensing and permitting numerous activities (Ministry of Agriculture, No Date), including fish vending and processing (*Fisheries Act* (BC). (RSBC 1996, c 149), s. 13). It is reasonable to assume that provincial governments may be interested in the potential for commercial fisheries to take place for SARA-listed threatened or endangered marine fish. However, engaging coastal provinces was beyond the scope of this research, and though provincial participation would likely have been informative, it was not considered necessary in order to meet the research goal and objectives.
3. First Nations: First Nations are involved in numerous marine fisheries in Canada, and their priority access to fish for Food, Social and Ceremonial (FSC) purposes has been confirmed by the Courts (e.g., *R. v. Sparrow*, [1990] 1 S.C.R. 1075). First Nations representatives

were not specifically sought out in this study for a number of reasons. First Nations interests are central to fisheries management, and any federal efforts to pursue a s. 84 regulation to enable commercial activity for a SARA-listed at-risk marine fish must include meaningful consultations with interested or affected First Nations. Commercial fishing arrangements for First Nations vary substantially across the country, depending on location, treaty status, court precedent, and other important factors. Though it was beyond the scope of my research to investigate and account for all of these various arrangements in evaluating whether commercial exploitation of at-risk marine fish should be exempted under SARA, court cases regarding the Aboriginal right to trade or sell fish (e.g. *Ahousaht Indian Band and Nation v. Canada (Attorney General)*, 2011 BCCA 237) affirm the importance of investigating First Nations views. The complex legal environment surrounding First Nations interests, combined with the number of different First Nations in Canada with a likely interest in at-risk marine fish and fisheries management precluded meaningful investigation into First Nations issues within the scope of this research project.

4. Recreational fishing industry representatives: The recreational fishing sector is a major component of overall fishing activity in Canada, having contributed \$7.5 billion dollars to the Canadian economy in 2005 (Office of the Auditor General, 2009). This sector was excluded from my study largely because recreational fishing is non-commercial by nature (Fisheries and Oceans Canada, 2007a), and recreational fishers are not permitted to sell their catch (*Fishery (General) Regulations* s. 35(2)). Due to this prohibition, the question of whether to create a s. 84 regulation to exempt a SARA-listed species from the s. 32(2) prohibitions against buying, selling, and trade, is not of immediate relevance for recreational fisheries. However, it is likely that recreational fishers would have an interest if DFO decided to pursue this course of action for species that have both high recreational and commercial values.
5. Other commercial fishing industry representatives: Many commercial fisheries across Canada interact with at-risk marine fish. Consequently, there are likely other commercial fishing industry representatives with relevant SARA knowledge and experience that could have been contacted for this study. However, it was beyond the scope of my research and available resources to systematically evaluate all commercial marine fisheries in Canada for their relevancy to my study, and then contact their representatives regarding potential participation. Also, contacting additional commercial fishing industry representatives would have increased the discrepancy between commercial fishers and other stakeholder groups in the study sample.

It is acknowledged that the limited scope of this research project leaves significant information and knowledge gaps, and that results cannot be generalized to

represent the full suite of potential stakeholders or First Nations. Further research to address those knowledge gaps would help provide a more comprehensive assessment of relevant views on the potential for exploitation and regulated commercial activity for SARA-listed threatened and endangered marine fish. Additionally, it is important to note that all fishing sectors must be given due consideration when making fisheries management decisions. Any efforts to pursue a s. 84 regulation to allow commercial activity for a SARA-listed at-risk marine fish would need to include an evaluation of the potential effects on other sectors and groups. Particular consideration should be given to addressing First Nations interests.

Despite these limitations, my research provides valuable insight into DFO expert and stakeholder views on whether and how SARA should be used to manage and regulate exploitation and commercial activity for at-risk marine fish in Canada. To date, no academic literature has explored how SARA could be used in this manner. SARA is still a relatively new piece of legislation; research into how it can best be implemented to achieve its mandate can both complement existing literature and offer new avenues of investigation and debate.

## 4. Results

Results are presented below for the study's two research objectives. Results from the first research objective – a series of criteria to determine when and if a commercial fishery should be exempted from the SARA prohibitions – provided the foundational data for the second research objective.

### 4.1. Research Objective 1 Results

Sixteen potential criteria were developed from the literature review, expert workshop, and subsequent expert interviews, to identify circumstances in which exploitation and regulated commercial activity for SARA-listed at-risk marine fish might be considered as an appropriate alternative to either declining SARA listing and continuing management under the *Fisheries Act*, or listing under SARA with full application of the general prohibitions (Table 2). Literature documenting conditions that can lead to successful natural resource management outcomes yielded two criteria that were proposed to workshop and interview participants, and included in the survey. Eleven additional criteria were generated in the workshop itself, and three arose through interviews.

**Table 2. Criteria developed to identify circumstances in which exploitation and regulated commercial activity for SARA-listed threatened and endangered marine fish might be considered as an appropriate management alternative**

| Criteria  |
|---|
| (1) The species can sustain the mortality rate of a viable commercial fishery without jeopardizing species survival or recovery, or the potential for the species to meet population and distribution objectives. |
| (2) The species is designated as Threatened by COSEWIC.   |
| (3) The species has high substitutability.  |
| (4) The species cannot be visually distinguished from other commercial catch.   |



|   |
|---|
| (5) The species has relatively low market value on a per-unit basis (e.g. price/kg).  |
| (6) The fishery has local benefits, or a local community or communities are dependent on the fishery.   |
| (7) The species is managed as part of a mixed stock fishery or a larger species aggregate.  |
| (8) The social and economic benefits of the fishery are geographically diffuse.   |
| (9) Fishers have an economic incentive—because they own defined catch shares (e.g. individual transferable quotas), have made investments in specialized boats/gear, or have participated in species stock assessment or monitoring activities—to comply with fishery catch limits so as not to jeopardize the future value of the fishery. |
| (10) Fishers have a functioning and representative advisory group or industry association that enables face-to-face communication between participants.   |
| (11) Other pieces of legislation or agreements, both domestic and international, are not adversely affected by the species' exemption from commercial harvest under SARA.   |
| (12) Traceability measures are in place, or are readily available in the fishery.   |
| (13) Fishers' efforts to attain Marine Stewardship Council (MSC) certification are not precluded by exempting the fishery from the SARA prohibitions.   |
| (14) There is the capacity for adequate monitoring and enforcement to be put in place, incorporating uncertainty.   |
| (15) DFO has the ability to address one or more of the main threats facing the species, as outlined in the species' COSEWIC Status Report.  |
| (16) The fishery does not cause significant negative effects on other species or fisheries.   |

Note: This table shows the criteria as they were presented in the questionnaire, though the criteria were not numbered in the questionnaire. Criteria are numbered here for reference purposes

I have grouped the criteria into three categories, according to the functions they perform: criteria that support the biological feasibility of species recovery; criteria that promote compliance with management objectives (such as catch limits and existing agreements); and, criteria that are designed to capture socio-economic benefits that would otherwise be lost if the species was listed under SARA, and subject to the full suite of prohibitions (Table 3). This categorization, which was undertaken after having received completed questionnaires back from participants, serves to highlight the main considerations that DFO experts and the literature supported.

**Table 3. Criteria grouped into three categories, according to function**

| <b>Criteria that Support the Biological Feasibility of Species Recovery</b>   |
|---|
| (1) The species can sustain the mortality rate of a viable commercial fishery without jeopardizing species survival or recovery, or the potential for the species to meet population and distribution objectives. |

|   |
|---|
| (2) The species is designated as Threatened by COSEWIC.   |
| (15) DFO has the ability to address one or more of the main threats facing the species, as outlined in the species' COSEWIC Status Report.  |
| <b>Criteria that Promote Compliance with Management Objectives</b>  |
| (3) The species has high substitutability.  |
| (5) The species has relatively low market value on a per-unit basis (e.g. price/kg).  |
| (9) Fishers have an economic incentive—because they own defined catch shares (e.g. individual transferable quotas), have made investments in specialized boats/gear, or have participated in species stock assessment or monitoring activities—to comply with fishery catch limits so as not to jeopardize the future value of the fishery. |
| (10) Fishers have a functioning and representative advisory group or industry association that enables face-to-face communication between participants.   |
| (11) Other pieces of legislation or agreements, both domestic and international, are not adversely affected by the species' exemption from commercial harvest under SARA.   |
| (12) Traceability measures are in place, or are readily available in the fishery.   |
| (14) There is the capacity for adequate monitoring and enforcement to be put in place, incorporating uncertainty.   |
| (16) The fishery does not cause significant negative effects on other species or fisheries.   |
| <b>Criteria that Capture Socio-economic Benefits that Would Otherwise be Lost</b>   |
| (4) The species cannot be visually distinguished from other commercial catch.   |
| (6) The fishery has local benefits, or a local community or communities are dependent on the fishery.   |
| (7) The species is managed as part of a mixed stock fishery or a larger species aggregate.  |
| (8) The social and economic benefits of the fishery are geographically diffuse.   |
| (13) Fishers' efforts to attain Marine Stewardship Council (MSC) certification are not precluded by exempting the fishery from the SARA prohibitions.   |

Criteria that support the biological feasibility of species recovery are those that work to increase certainty that the species' population and distribution objectives remain achievable if commercial fishing is allowed under SARA. Criteria that promote compliance with management objectives are those that minimize enforcement concerns, allow DFO to meet domestic and international obligations, and increase consumer confidence that fishery resources are being exploited in an appropriate and sustainable manner. Criteria that are designed to capture socio-economic benefits that would otherwise be lost aim to identify species for which full application of the SARA prohibitions would eliminate significant positive social or economic fishery effects. Some criteria may overlap, conflict, or work in tandem; however, this reflects the variety of

implications that DFO experts considered and literature supported regarding potentially allowing limited commercial fisheries under SARA.

Rationales for the criteria are provided below, presented in the three categories. Within each category, criteria that may conflict, work in tandem, or overlap are presented and discussed together where appropriate. The criteria suggested by DFO experts reflect their subjective insights, knowledge and assumptions. Where possible, I have provided evidence and examples from literature and primary documents that help further explain the criteria, but I have not sought to confirm or refute the assumptions behind DFO experts' ideas and suggestions.

#### **4.1.1. *Criteria that Support the Biological Feasibility of Species Recovery***

(1) The species can sustain the mortality rate of a viable commercial fishery without jeopardizing species survival or recovery, or the potential for the species to meet population and distribution objectives.

(15) DFO has the ability to address one or more of the main threats facing the species, as outlined in the species' COSEWIC Status Report.

DFO experts were emphatic in their support for a criterion to ensure that, as a condition of allowing a commercial fishery, a SARA-listed species must be able to still meet population and distribution objectives established for it during the recovery planning process. The Draft SARA Policy Framework establishes that any exemptions created under s. 83(4) must first meet the pre-conditions for permits under s. 73(3), including ensuring that activities do not jeopardize species survival or recovery (Environment Canada, 2009). The above criterion may serve to satisfy that condition; however, neither 'survival' nor 'recovery' are legally defined under SARA, which may make it difficult for managers to align broad fisheries management practices with specific species population and distribution objectives. Though there are no legal definitions, the SARA-responsible agencies have made some efforts to establish what it means to achieve 'recovery' under SARA. In the preamble to the standard DFO recovery strategy document template, 'recovery' is defined as: "the process by which the decline of an endangered, threatened, or extirpated species is arrested or reversed, and threats are removed or reduced to improve the likelihood of the species' persistence in the wild"

(e.g. Fisheries and Oceans Canada, 2007b). Further, in the recent decision of the Federal Court in *Adam v. Canada (Environment)*, 2011 FC 962, the judge found that 'recovery' under SARA is not defined solely by objectives established in the recovery strategy for a species, but that those objectives are one consideration in determining what 'recovery' means. However, no parties in that case provided submissions on the meaning of the words "imminent threat to its survival or recovery", causing the judge to "...defer any such further determinations to another day, when the meaning of those words has been the subject of more fulsome submissions" (*Adam v. Canada (Environment)*). Clearly, more efforts are needed to define both 'survival' and 'recovery' so that managers can design appropriate population and distribution objectives for at-risk species.

For a species to be able to sustain the mortality rate of a viable commercial fishery without having its survival or recovery jeopardized, or losing its potential to meet population and distribution objectives, two determinations would have to be made: (1) population and distribution objectives for a species would have to be established in a recovery strategy; and (2) the mortality level a species could sustainably support while still meeting its population and distribution objectives and the s. 73(3) pre-conditions would have to be outlined in the species' Recovery Potential Assessment that informs the listing decision. The DFO Sustainable Fisheries Framework (2009a) would also likely serve to provide guidance on allowable mortality.

DFO experts also suggested that in order for a fishery to be considered for an exemption from the SARA prohibitions, actions should be undertaken to address one or more main threats to the at-risk species, as provided in COSEWIC's Status Report for the species. For those marine fish for which the primary threat is overfishing, efforts to reduce fishing impacts or establish additional protected areas may serve to ensure that the species is on a recovery trajectory in accordance with established population and distribution objectives. This criterion is closely aligned with Criterion 1, as it may be difficult to establish a sustainable and defensible mortality rate for a species in cases where DFO has little or no ability to address the main threats affecting that species. DFO being unable to affect recovery outcomes would likely increase the uncertainty that species population and distribution objectives, and ultimately species recovery, could be achieved. An example of the link between the level of mortality a species can sustain

and the ability to address key threats can be seen in the Recovery Potential Assessment for White Sturgeon (*Acipenser transmontanus*). For the three declining populations of sturgeon, harm or mortality may only be permitted if recovery efforts are sufficiently successful that incidental harm will not jeopardize the populations' survival or recovery:

Recovery potential for the three declining populations depends entirely upon successful human interventions to increase natural recruitment. Given a commitment to engage in habitat restoration that is deemed sufficient to increase natural recruitment to historic levels, and to hatchery supplementation that is deemed sufficient to avoid future genetic bottlenecks, some level of continuing incidental harm might be exempted without jeopardizing the survival or recovery of these populations. (DFO, 2007c, pg. 6)

DFO experts felt that those species for which threats were not well understood, or for which DFO and other partners had a limited ability to reduce key threats, would be less suitable candidates for SARA-regulated fisheries.

(2) The species is designated as threatened by COSEWIC.

This criterion is aimed at establishing an impartial threshold for when commercial exploitation could be allowed, with only those species COSEWIC has assessed as threatened<sup>8</sup> (i.e., not yet endangered) being eligible for consideration. DFO experts suggested that using COSEWIC's existing status category of threatened could help to standardize the determination of whether a species can support a commercial fishery and meet population and distribution objectives and s. 73(3) pre-conditions. While not all threatened species may be able to support a commercial fishery, this criterion would help to ensure that no endangered species would be managed in this manner, given that such species face imminent threats to their survival or recovery.

<sup>8</sup> COSEWIC defines a threatened species as one "...that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction" (COSEWIC, 2010a).

#### **4.1.2. Criteria that Promote Compliance with Management Objectives**

(3) The species has high substitutability.

(5) The species has relatively low market value on a per-unit basis (e.g. price/kg).

DFO experts suggested both these criteria primarily as a means of discouraging potential black market activity in any SARA-regulated fishery. If a species has high substitutability (i.e., it is easily replaced by substitutes in the market), or it is worth relatively little on a per-unit basis, then poaching may be less likely to occur because market demand may not drive illegal exploitation. Similarly, some DFO experts felt that a species with low substitutability – meaning demand is focused on the particular species – may more readily suffer from poaching, because it is likely to be highly valued, since few or no alternatives exist to satisfy demand. Allowing a commercial fishery under SARA for species with low substitutability could give poachers easier access to valuable species, and make it more difficult to discern illegal activities from legitimate ones. Though concerns about illegal fishing are not limited to SARA, DFO experts felt that any commercial fisheries allowed under SARA should not provide poachers with attractive opportunities. These criteria, therefore, may remove some incentives for non-compliance, which in turn increases the certainty that established mortality rates are being adhered to and recovery remains feasible.

(9) Fishers have an economic incentive—because they own defined catch shares (e.g. individual transferable quotas), have made investments in specialized boats/gear, or have participated in species stock assessment or monitoring activities—to comply with fishery catch limits so as not to jeopardize the future value of the fishery.

(12) Traceability measures are in place, or are readily available in the fishery.

These criteria recognize that economic incentives play a role in contributing to sustainably managed fisheries. Defined catch shares, such as individual transferable quotas, are still uncommon in global fisheries management (Costello *et al.*, 2010), but have been implemented in a number of Canadian commercial fisheries in both Atlantic and Pacific waters. Though controversy surrounds the effectiveness, equitability, and

social desirability of quota-based fisheries (Pinkerton and Edwards, 2009; Clark *et al.*, 2010; Parslow, 2010), empirical studies have shown that individual transferable quotas and similar defined catch share arrangements can lead to reductions in overfishing, thereby reducing the likelihood of fisheries collapse (Costello *et al.*, 2008; 2010). The DFO experts in my research who suggested Criterion 9 shared this view. Beyond catch shares, fishers who have made substantial investments in boats and gear, or who have invested their time in fisheries monitoring and assessment activities, may stand to lose on those investments if the fishery does not persist. Some research supports the notion that fishers acting in their rational self-interest may have an incentive to protect their investments by complying with catch limits and engaging in behaviours that promote fishery sustainability (Sanchirico and Wilen, 2007; Festa *et al.*, 2008). One DFO expert respondent noted that the criterion focused too narrowly on the importance of quotas and defined catch shares; these types of management arrangements may not be appropriate for all fisheries, but fisheries that are managed through other means can still be successful, and should remain in consideration for exemptions under SARA.

DFO defines traceability as "...the ability to follow the movement of fish and seafood products through the seafood supply chain from harvesting to processing and distribution" (Fisheries and Oceans Canada, 2009b). Both DFO and the commercial fishing industry are pursuing traceability in response to market demands and to European Union (EU) regulations on the import of marine fisheries products (Fisheries and Oceans Canada, 2009b). As well, DFO initiatives such as the Pacific Integrated Commercial Fisheries Initiative (PICFI) emphasize the need for fisheries to establish or enhance traceability measures (Fisheries and Oceans Canada, 2008a).

DFO experts suggested that fisheries for which traceability measures were already implemented, or were being pursued, or were attainable, would be better suited to possible exemptions from SARA prohibitions than fisheries not engaged in traceability efforts. DFO experts felt that the public and consumers would view fisheries for which traceability measures had been implemented more positively than fisheries without such measures. Additionally, the presence of traceability measures might encourage fishers to comply with catch restrictions and regulations, especially in cases where fishers are pursuing MSC or other ecolabel certification for their fisheries.

(10) Fishers have a functioning and representative advisory group or industry association that enables face-to-face communication between participants.

Resource user groups that establish face-to-face interaction and work to build trust between users have been shown to contribute to successful management regimes for forests, fisheries, water and other natural resources. (Ostrom, 2007; 2009). Face-to-face group discussions can focus on positive efforts to build group norms, and can also act to encourage group members to conform to agreed-upon rules (Ostrom, 2007). These types of groups can build social capital by establishing common ethics and standards for resource use and group participation, which then serves to lower transaction costs for those resource users and increase compliance with management rules (Ostrom, 2009).

(11) Other pieces of legislation or agreements, both domestic and international, are not adversely affected by the species' exemption from commercial harvest under SARA.

DFO experts suggested that it would be important to consider Canada's legislative and international obligations when contemplating exempting a commercial fishery from the SARA prohibitions. It is beyond the scope of this study to evaluate all legislation or international agreements that could potentially be affected by such an action, and an evaluation of this nature would likely have to be done on a species-by-species basis. An example of a relevant international agreement under which Canada has obligations is the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). CITES is a United Nations-based program, enacted in 1975, aimed at ensuring "...that international trade in specimens of wild animals and plants does not threaten their survival." (CITES Secretariat, No Date(a)). As a party to CITES, Canada is responsible for managing its wildlife resources in accordance with the agreement, and implementing the convention nationally (Environment Canada, No Date).

Species can be listed by CITES under one of three Appendices, covering various levels of extinction risk (CITES Secretariat, No Date (b)). These Appendices function to control and regulate international trade in listed species through permitting and



compliance mechanisms (CITES Secretariat, No Date (b)). Species listed under any Appendix may still be traded internationally so long as certain conditions are met; however, Appendix I species cannot be traded for 'primarily commercial purposes' (CITES Secretariat, No Date (b)). Countries wishing to export species listed under Appendices II and III are required to issue a 'Non-Detriment Finding', providing evidence that the trade will not be detrimental to the survival of the species (CITES Secretariat, No Date (b)).

DFO is responsible for carrying out Canada's CITES obligations for marine and freshwater species managed under Canada's *Fisheries Act*. One of DFO's key roles in implementing CITES is assessing the status of relevant aquatic species and issuing 'Non-Detriment Findings' for CITES-listed species that Canada wishes to export. As of 2010, only two marine fish residing in Canada have been listed under CITES: basking shark (*Cetorhinus maximus*) and great white shark (*Carcharodon carcharias*), both of which are listed under Appendix II (Environment Canada, 2010). Interestingly, these two species are also the only two threatened or endangered marine fish listed under SARA, other than those that received automatic protection at the time SARA came into force<sup>9</sup>. Neither species is commercially exploited in Canada.

(14) There is the capacity for adequate monitoring and enforcement to be put in place, incorporating uncertainty.

DFO experts expressed strong support for the idea that a fishery should be adequately monitored and enforced before being considered for an exemption from the SARA prohibitions. Monitoring techniques that provided high certainty of catch data (such as 100% electronic monitoring) were preferred. DFO Pacific Region has developed a draft *Strategic Framework for Fishery Monitoring and Catch Reporting in the Pacific Fisheries* to address monitoring needs consistently across Pacific fisheries (Fisheries and Oceans Canada, 2010a). Efforts to improve monitoring and catch

<sup>9</sup> The Pacific population of basking shark has been listed under SARA as Endangered. The Atlantic population was assessed by COSEWIC as Special Concern, and is currently under consideration for SARA listing.

reporting in some fisheries may help to increase public confidence that fisheries are being managed sustainably and in accordance with the precautionary approach (Fisheries and Oceans Canada, 2010a). A variety of monitoring techniques may need to be employed due to unique operational demands in different fisheries.

(16) The fishery does not cause significant negative effects on other species or fisheries.

DFO experts felt that any fishery considered for an exemption from SARA prohibitions should be managed in such a way that the viability of other species and fisheries were not adversely impacted, particularly to the point where other species might become at risk, or fall into a higher category of risk. This concern for incidental effects may be better addressed in fisheries that are managed as mixed stocks, species aggregates, or at an ecosystem-based level, where fishery impacts are evaluated at a broad scale, rather than a narrow, single-species scale. Momentum towards MSC certification in some fisheries may also draw attention to mechanisms for reducing effects on non-target species.

#### **4.1.3. *Criteria that Capture Socio-economic Benefits that would Otherwise be Lost***

(7) The species is managed as part of a mixed-stock fishery or a larger species aggregate.

(4) The species cannot be visually distinguished from other commercial catch.

Fisheries that are managed at a mixed stock or species aggregate level, rather than as single species, may benefit from flexibility in SARA prohibitions. The term 'mixed-stock' can refer to many different types of species and fishery arrangements, including different fish stocks being targeted in a common fishery, or different ages of the same stock that co-occur (Ricker, 1958). Examples of mixed-stock fisheries in Canada include numerous Pacific salmon fisheries, where genetically distinct salmon stocks or populations co-occur in the marine environment and are targeted by fishers, before returning to a variety of natal spawning grounds (Wood, 2001).

An additional management difficulty in mixed-stock fisheries is that some include populations or stocks that cannot be visually distinguished from each other when caught. In announcing the federal government's decision to decline Cultus Lake and Sakinaw Lake sockeye salmon populations listing under SARA, then Fisheries Minister Geoff Regan stated:

It is not possible for fishers to visually distinguish Cultus and Sakinaw Lake sockeye from other larger sockeye populations, and therefore the Fraser River sockeye fishery would have to be virtually shut down if these two populations were listed under SARA (Environment Canada, 2004).

Under the full force of the SARA prohibitions, fishers' inability to distinguish an at-risk population from another, not-at-risk population could lead to closures of both fisheries, in order to protect the at-risk population from the chance of being caught. In these cases, the SARA prohibitions would likely cause considerable social and economic hardships to fishers. In my research, DFO experts suggested that potentially allowing some level of commercial exploitation under SARA might eliminate the need for full-scale fishery closures in mixed-stock fisheries and where stocks or populations cannot be visually distinguished. Allowing limited commercial exploitation in these cases could reduce potential socio-economic impacts from SARA listing by providing continued access to healthy fish stocks.

(6) The fishery has local benefits, or a local community or communities are dependent on the fishery.

(8) The social and economic benefits of the fishery are geographically diffuse.

User dependence on a resource has been identified in the literature as a common feature of successful community-level resource management (Pinkerton and Weinstein, 1995; Ostrom, 2009). While Pinkerton and Weinstein (1995) link the concept to co-management arrangements, the importance of local community dependence has also been recognized in DFO policy. The 2002 New Access Framework uses the concept of 'adjacency' as a key criterion in determining future access to commercial fisheries in Atlantic regions (Fisheries and Oceans Canada, 2002a), though no similar policy is in place for the West Coast. The Framework defines adjacency as:

Priority of access should be granted to those who are closest to the fishery resource in question. The adjacency criterion is based on the explicit premise that those coastal fishing communities and fishers in closest proximity to a given fishery should gain the greatest benefit from it, and on the implicit assumption that access based on adjacency will promote values of local stewardship and local economic development (Fisheries and Oceans Canada, 2002a).

The co-management literature (Pinkerton, 2009; Gutierrez, Hilborn & Defeo, 2011) also supports the notion that community-scale fisheries can provide local benefits, such as jobs, and opportunities to increase social capital through collaboration and stewardship. However, if adjacency brings local benefits, communities may be particularly vulnerable to management actions that threaten those benefits. The federal government cited disproportionate community-level socioeconomic effects as a reason for declining to list the Newfoundland and Labrador and Laurentian North populations of Atlantic cod (Government of Canada, 2006a), and porbeagle shark (Government of Canada, 2006b).

Conversely, Criterion 7 was suggested as a means of ensuring that the opportunity to benefit from commercial exploitation of SARA-listed marine fish was not concentrated in any one geographical location. This criterion would likely only be applicable to those species that have a significant spatial range (i.e. coastwide), and a relatively uniform and well-understood distribution within that range. Using this criterion could help to avoid geographically-based disputes over how fishery access is granted, though this may be difficult to apply in areas where DFO policy objectives prioritize preferential access to fisheries based on adjacency. This criterion stands somewhat in contrast to Criterion 6, which focuses on conferring social and economic benefits to local communities, rather than distributing those benefits more broadly. However, both of these criteria could be used as a means to address distribution of and access to the socio-economic benefits of marine fisheries that would be lost in cases where the SARA prohibitions were applied in full.

(13) Fishers' efforts to attain Marine Stewardship Council (MSC) certification are not precluded by exempting the fishery from the SARA prohibitions.

The Marine Stewardship Council is a third-party organization that independently certifies fisheries worldwide according to a variety of standards and criteria (Marine

Stewardship Council, No Date). Certified fisheries can then use the MSC eco-label when marketing products to consumers (Marine Stewardship Council, No Date). The standards that the MSC uses are intended to encourage widespread adoption of sustainable fisheries practices and promote certified fishery products in the marketplace, so as to influence consumers' purchasing preferences and economically reward fishers participating in certified fisheries (Marine Stewardship Council, 2011a).

Fisheries are evaluated by the MSC for sustainability according to three principles, and associated criteria. Of particular relevance to at-risk species is Principle 2, which states:

Fishing operations should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem (including habitat and associated dependent and ecologically related species) on which the fishery depends (Marine Stewardship Council, 2010, pg. 5).

Three criteria are used to evaluate whether a candidate fishery meets this principle:

1. The fishery is conducted in a manner that does not threaten biological diversity at the genetic, species or population levels and avoids or minimizes mortality of, or injuries to endangered, threatened or protected species;
2. Where exploited populations are depleted, the fishery will be executed such that recovery and rebuilding is allowed to occur to a specified level within specified time frames, consistent with the precautionary approach and considering the ability of the population to produce long-term potential yields (Marine Stewardship Council, 2010, pg. 6);
3. Fishing is conducted in a manner that does not alter the age or genetic structure or sex composition to a degree that impairs reproductive capacity.

Recently approved guidance (Marine Stewardship Council, 2011b) outlines the approach to scoring fisheries against these criteria. Fisheries are to be evaluated as to whether they cause 'unacceptable impacts' to an endangered species, with guidance being provided on what that term means. For species that are protected by national endangered species legislation (e.g. SARA), evaluation of unacceptable impacts focuses on whether legislated protection and population rebuilding requirements are being achieved, taking into account any impacts from the fishery being assessed (Marine Stewardship Council, 2011b). This MSC criterion is similar in spirit to the SARA s. 73(3)

pre-conditions against jeopardizing species survival or recovery; meeting the s. 73(3) pre-conditions may contribute to meeting some or all of the MSC Principle 2 criteria. Though evidence is mixed as to whether MSC certification actually confers a price premium on fishery products from certified fisheries (e.g. Goyert *et al.*, 2010; Roheim *et al.*, 2011), DFO experts who suggested this criterion felt that fishers were likely to oppose SARA listing of a species if it precluded fishers from pursuing MSC certification.

While it appears unlikely that a fishery that catches a protected at-risk marine fish could receive a perfect score from certifiers on the MSC Principle 2 criteria, it also appears that fisheries that catch SARA-listed species are not precluded from achieving certification. However, Ward (2008) has demonstrated significant inconsistencies in how MSC certifiers have previously interpreted and applied Principle 2 criteria when assessing fisheries, leaving the effect of SARA listing on the MSC fishery certification process uncertain.

## 4.2. Research Objective 2 Results

Twenty-three questionnaire responses were received in total. Table 4 presents the affiliations of the respondents. The response rate for DFO experts was 86% (12/14), and for stakeholders was 31% (11/36). One DFO expert and one stakeholder (from Academia) responded only to the Likert-type survey, and one stakeholder (from an ENGO) declined to respond to the Likert-type survey, and answered only questions 5 and 6 of the questionnaire.

**Table 4. Affiliation of DFO expert and stakeholder questionnaire respondents.**

| Key DFO Experts                                    |                       |
|--|-----------------------|
| Respondent Affiliation                             | Number of Respondents |
| Fisheries and Oceans Canada (DFO)                  | 12                    |
| Key Stakeholders                                   |                       |
| Academia   | 2                     |
| Commercial Fishing Industry                        | 5                     |
| Environmental Non-governmental Organization (ENGO) | 3                     |

|                          |           |
|--------------------------|-----------|
| Other                    | 1         |
| <b>Total Respondents</b> | <b>23</b> |

#### 4.2.1. *Likert-type Survey Results*

Table 5 presents the average index scores for the 16 criteria, aggregated from all respondents (22), and arranged from highest scoring to lowest scoring.

**Table 5. Average index scores for the 16 criteria across all survey respondents**

| Criterion   | Average Index Score |
|---|---------------------|
| (1) The species can sustain the mortality rate of a viable commercial fishery without jeopardizing species survival or recovery, or the potential for the species to meet population and distribution objectives.   | 2.00                |
| (14) There is the capacity for adequate monitoring and enforcement to be put in place, incorporating uncertainty.   | 1.27                |
| (15) DFO has the ability to address one or more of the main threats facing the species, as outlined in the species' COSEWIC Status Report.  | 1.23                |
| (16) The fishery does not cause significant negative effects on other species or fisheries.   | 1.00                |
| (12) Traceability measures are in place, or are readily available in the fishery.   | 0.95                |
| (7) The species is managed as part of a mixed stock fishery or a larger species aggregate.  | 0.86                |
| (11) Other pieces of legislation or agreements, both domestic and international, are not adversely affected by the species' exemption from commercial harvest under SARA.   | 0.77                |
| (9) Fishers have an economic incentive—because they own defined catch shares (e.g. individual transferable quotas), have made investments in specialized boats/gear, or have participated in species stock assessment or monitoring activities—to comply with fishery catch limits so as not to jeopardize the future value of the fishery. | 0.71                |
| (4) The species cannot be visually distinguished from other commercial catch.   | 0.45                |
| (13) Fishers' efforts to attain Marine Stewardship Council (MSC) certification are not precluded by exempting the fishery from the SARA prohibitions.   | 0.41                |
| (2) The species is designated as Threatened by COSEWIC.   | 0.27                |
| (6) The fishery has local benefits, or a local community or communities are dependent on the fishery.   | 0.15                |
| (10) Fishers have a functioning and representative advisory group or industry association that enables face-to-face communication between participants.   | 0.14                |
| (8) The social and economic benefits of the fishery are geographically diffuse.   | 0.11                |

|  |       |
|--|-------|
| (3) The species has high substitutability.   | -0.37 |
| (5) The species has relatively low market value on a per-unit basis (e.g. price/kg). | -0.40 |

Criterion 1 (*The species can sustain the mortality rate of a viable commercial fishery without jeopardizing species survival or recovery, or the potential for the species to meet population and distribution objectives*) was unanimously rated as “Very Important to Consider”, giving it an average index score of 2.00, the maximum positive score. It was the only criterion to receive that score. Other criteria that received high scores include Criterion 14 (*There is the capacity for adequate monitoring and enforcement to be put in place, incorporating uncertainty*) with an average index score of 1.27, Criterion 15 (*DFO has the ability to address one or more of the main threats facing the species, as outlined in the species’ COSEWIC Status Report*) with an average index score of 1.23, and Criterion 16 (*The fishery does not cause significant negative effects on other species of fisheries*), with a score of 1.00. A majority of criteria (14) received positive average index scores; however, many criteria received scores that could be considered “weakly positive” (less than 1.00). Two criteria were rated negatively, indicating a lack of support for their use in determining whether a species should be considered for commercial fishing if listed under SARA; Criterion 3 (*The species has high substitutability*) had an average index score of -0.37, and Criterion 5 (*The species has relatively low market value on a per-unit basis (e.g. price/kg)*) had an average index score of -0.40.

Table 6 presents average index scores for the 16 criteria, grouped into the three categories: criteria that support the biological feasibility of species recovery; criteria that are designed to capture socio-economic benefits that would otherwise be lost; and, criteria that promote compliance with management objectives. Criteria that support the biological feasibility of species recovery were rated most positively, with an average index score of 1.17, while criteria that promote compliance with management objectives had an average index score of 0.51. Criteria that capture socio-economic benefits that would otherwise be lost had an average index score of 0.40.

**Table 6. Average index scores for the 16 criteria, grouped according to category**

| Criterion | Average Index Score |
|-----------|---------------------|
|-----------|---------------------|



|   |             |
|---|-------------|
| <b>Criteria that Support the Biological Feasibility of Recovery</b>   | <b>1.17</b> |
| (1) The species can sustain the mortality rate of a viable commercial fishery without jeopardizing species survival or recovery, or the potential for the species to meet population and distribution objectives.   | 2.00        |
| (15) DFO has the ability to address one or more of the main threats facing the species, as outlined in the species' COSEWIC Status Report.  | 1.23        |
| (2) The species is designated as Threatened by COSEWIC.   | 0.27        |
| <b>Criteria that Promote Compliance with Legislative and Management Objectives</b>  | <b>0.51</b> |
| (14) There is the capacity for adequate monitoring and enforcement to be put in place, incorporating uncertainty.   | 1.27        |
| (16) The fishery does not cause significant negative effects on other species or fisheries.   | 1.00        |
| (12) Traceability measures are in place, or are readily available in the fishery.   | 0.95        |
| (11) Other pieces of legislation or agreements, both domestic and international, are not adversely affected by the species' exemption from commercial harvest under SARA.   | 0.77        |
| (9) Fishers have an economic incentive—because they own defined catch shares (e.g. individual transferable quotas), have made investments in specialized boats/gear, or have participated in species stock assessment or monitoring activities—to comply with fishery catch limits so as not to jeopardize the future value of the fishery. | 0.71        |
| (10) Fishers have a functioning and representative advisory group or industry association that enables face-to-face communication between participants.   | 0.14        |
| (3) The species has high substitutability.  | -0.37       |
| (5) The species has relatively low market value on a per-unit basis (e.g. price/kg).  | -0.40       |
| <b>Criteria that Capture Socio-economic Benefits that would Otherwise be Lost</b>   | <b>0.40</b> |
| (7) The species is managed as part of a mixed stock fishery or a larger species aggregate.  | 0.86        |
| (4) The species cannot be visually distinguished from other commercial catch.   | 0.45        |
| (13) Fishers' efforts to attain Marine Stewardship Council (MSC) certification are not precluded by exempting the fishery from the SARA prohibitions.   | 0.41        |
| (6) The fishery has local benefits, or a local community or communities are dependent on the fishery.   | 0.15        |
| (8) The social and economic benefits of the fishery are geographically diffuse.   | 0.11        |

#### 4.2.1.1. DFO Expert Scores

Table 7 presents the average index scores for the 16 criteria, calculated from only DFO expert respondents (12).

**Table 7. Average index scores for the 16 criteria across DFO expert respondents**

| Criterion   | Average Index Scores |
|---|----------------------|
| (1) The species can sustain the mortality rate of a viable commercial fishery without jeopardizing species survival or recovery, or the potential for the species to meet population and distribution objectives.   | 2.00                 |
| (14) There is the capacity for adequate monitoring and enforcement to be put in place, incorporating uncertainty.   | 1.67                 |
| (16) The fishery does not cause significant negative effects on other species or fisheries.   | 1.42                 |
| (15) DFO has the ability to address one or more of the main threats facing the species, as outlined in the species' COSEWIC Status Report.  | 1.33                 |
| (7) The species is managed as part of a mixed stock fishery or a larger species aggregate.  | 1.18                 |
| (12) Traceability measures are in place, or are readily available in the fishery.   | 1.17                 |
| (4) The species cannot be visually distinguished from other commercial catch.   | 1.10                 |
| (11) Other pieces of legislation or agreements, both domestic and international, are not adversely affected by the species' exemption from commercial harvest under SARA.   | 1.08                 |
| (13) Fishers' efforts to attain Marine Stewardship Council (MSC) certification are not precluded by exempting the fishery from the SARA prohibitions.   | 0.92                 |
| (9) Fishers have an economic incentive—because they own defined catch shares (e.g. individual transferable quotas), have made investments in specialized boats/gear, or have participated in species stock assessment or monitoring activities—to comply with fishery catch limits so as not to jeopardize the future value of the fishery. | 0.50                 |
| (2) The species is designated as Threatened by COSEWIC.   | 0.42                 |
| (9) Fishers have a functioning and representative advisory group or industry association that enables face-to-face communication between participants.  | 0.18                 |
| (8) The social and economic benefits of the fishery are geographically diffuse.   | 0.10                 |
| (6) The fishery has local benefits, or a local community or communities are dependent on the fishery.   | 0.09                 |
| (5) The species has relatively low market value on a per-unit basis (e.g. price/kg).  | 0.00                 |
| (3) The species has high substitutability.  | -0.33                |

DFO experts scored all but two criteria positively, and several criteria from all three categories received strong support. Criterion 5 was scored neutrally (0.00), while Criterion 3 was the only criterion to receive an negative average score.

#### 4.2.1.2. Stakeholder Scores

Table 8 presents the average index scores for the 16 criteria, calculated from only stakeholder respondents (10).

**Table 8. Average index scores for the 16 criteria across stakeholder respondents.**

| Criterion   | Average Index Scores |
|---|----------------------|
| (1) The species can sustain the mortality rate of a viable commercial fishery without jeopardizing species survival or recovery, or the potential for the species to meet population and distribution objectives.   | 2.00                 |
| (15) DFO has the ability to address one or more of the main threats facing the species, as outlined in the species' COSEWIC Status Report.  | 1.10                 |
| (9) Fishers have an economic incentive—because they own defined catch shares (e.g. individual transferable quotas), have made investments in specialized boats/gear, or have participated in species stock assessment or monitoring activities—to comply with fishery catch limits so as not to jeopardize the future value of the fishery. | 1.00                 |
| (14) There is the capacity for adequate monitoring and enforcement to be put in place, incorporating uncertainty.   | 0.80                 |
| (12) Traceability measures are in place, or are readily available in the fishery.   | 0.70                 |
| (7) The species is managed as part of a mixed stock fishery or a larger species aggregate.  | 0.50                 |
| (16) The fishery does not cause significant negative effects on other species or fisheries.   | 0.44                 |
| (11) Other pieces of legislation or agreements, both domestic and international, are not adversely affected by the species' exemption from commercial harvest under SARA.   | 0.40                 |
| (6) The fishery has local benefits, or a local community or communities are dependent on the fishery.   | 0.22                 |
| (8) The social and economic benefits of the fishery are geographically diffuse.   | 0.11                 |
| (2) The species is designated as Threatened by COSEWIC.   | 0.10                 |
| (10) Fishers have a functioning and representative advisory group or industry association that enables face-to-face communication between participants.   | 0.10                 |
| (4) The species cannot be visually distinguished from other commercial catch.   | -0.20                |
| (13) Fishers' efforts to attain Marine Stewardship Council (MSC) certification are not precluded by exempting the fishery from the SARA prohibitions.   | -0.20                |
| (3) The species has high substitutability.  | -0.40                |
| (5) The species has relatively low market value on a per-unit basis (e.g. price/kg).  | -0.89                |

Stakeholders scored 12 out of the 16 criteria positively. Criteria that support the biological feasibility of species recovery and criteria that promote compliance with management objectives received higher scores generally than did criteria that are designed to capture socio-economic benefits that would otherwise be lost. Additionally, three of the four criteria that received negative average scores from stakeholders are criteria that are designed to capture socio-economic benefits that would otherwise be lost.

#### 4.2.1.3. Comparing DFO Expert and Stakeholder Results

DFO expert and stakeholder responses exhibited some notable similarities and differences. A clear similarity is the maximum score (2.00) that Criterion 1 received from both groups, indicating that both DFO expert and stakeholder respondents highly weight the importance of commercial fishing mortality not jeopardizing the survival or recovery of at-risk marine fish. Criterion 15 also received broad support across DFO experts and stakeholders, demonstrating the perceived importance to participants of DFO being able to actively contribute to species recovery by mitigating key threats, in order to increase certainty that a species can sustain some level of fishing mortality.

Several criteria received widely divergent average scores from stakeholders and DFO experts. Table 9 presents criteria that have a 0.5 or greater difference between the average scores for stakeholders and DFO experts, respectively. In total, eight criteria received average scores that differed by 0.5 or more from DFO experts and stakeholders, and two criteria (4 and 13) had average scores that were greater than 1.0 apart. Criterion 4 (*The species cannot be visually distinguished from other commercial catch*) had the greatest difference in average score, receiving a score of 1.10 from DFO experts, and -0.20 from stakeholders. Interestingly, of the eight criteria with widely divergent average scores from DFO experts and stakeholders, only Criterion 9 (*Fishers have an economic incentive to comply with fishery catch limits so as not to jeopardize the future value of the fishery*) was scored more positively by stakeholders than experts.

**Table 9. Criteria that received widely divergent different scores from stakeholders and DFO experts**

| Criterion | Average DFO Expert Score | Average Stakeholder Score | Scoring Difference |
|-----------|--------------------------|---------------------------|--------------------|
|           |                          |                           |                    |

|   |      |       |      |
|---|------|-------|------|
| (4) The species cannot be visually distinguished from other commercial catch.   | 1.10 | -0.20 | 1.30 |
| (13) Fishers' efforts to attain Marine Stewardship Council (MSC) certification are not precluded by exempting the fishery from the SARA prohibitions.   | 0.92 | -0.20 | 1.12 |
| (16) The fishery does not cause significant negative effects on other species or fisheries.   | 1.42 | 0.44  | 0.98 |
| (5) The species has relatively low market value on a per-unit basis (e.g. price/kg).  | 0.00 | -0.89 | 0.89 |
| (14) There is the capacity for adequate monitoring and enforcement to be put in place, incorporating uncertainty.   | 1.67 | 0.8   | 0.87 |
| (11) Other pieces of legislation or agreements, both domestic and international, are not adversely affected by the species' exemption from commercial harvest under SARA.   | 1.08 | 0.40  | 0.68 |
| (7) The species is managed as part of a mixed stock fishery or a larger species aggregate.  | 1.18 | 0.50  | 0.68 |
| (9) Fishers have an economic incentive—because they own defined catch shares (e.g. individual transferable quotas), have made investments in specialized boats/gear, or have participated in species stock assessment or monitoring activities—to comply with fishery catch limits so as not to jeopardize the future value of the fishery. | 0.50 | 1.00  | 0.50 |

## **4.2.2. Questionnaire Results**

### **4.2.2.1. Additional Criteria**

Five stakeholders provided ideas for additional criteria to consider when determining the potential for an at-risk marine fish to be commercially exploited under SARA. A key theme among the responses was particular consideration for fishery monitoring; fisheries that employ 100% monitoring, with all sources of mortality accurately accounted for, were perceived to be more suitable for exemption from the SARA prohibitions than fisheries with less rigorous monitoring standards in place. This result suggests that Criterion 14 may not have conveyed the importance of fishery monitoring strongly enough for these respondents.

Additional considerations included whether a species can be returned to the water alive, and whether fishers can avoid catching a species as bycatch while fishing

for a different target species. For example, rockfish species are known to suffer high catch mortality due to barotrauma (Hannah *et al.*, 2008), meaning these species cannot generally be returned to the water alive. For management purposes, DFO considers Pacific rockfish species to suffer 100% catch mortality (Fisheries and Oceans Canada, 2011a). In cases where fishers cannot avoid catching certain species as bycatch, and also cannot return those species to the water alive, then the SARA prohibitions would act punitively to force discarding of catch, when fishers may otherwise have chosen to retain and sell those fish.

The “track record” of DFO in fisheries management was also brought up as a consideration when determining the potential for exempting fisheries from the SARA prohibitions. Consideration could be paid to whether DFO has previously changed fishery catch or mortality rates for declining populations of the candidate species in order to facilitate recovery, and whether DFO can quantitatively demonstrate that an at-risk species is on a recovering population trajectory before allowing exploitation. These questions play into a final theme in the responses: that the circumstances under which exploitation and commercial activity is exempted from the SARA prohibitions be very specific, and emphasize limited commercial catch, so that the species can still realize a net benefit from SARA listing.

#### **4.2.2.2. Support for Allowing Exploitation and Commercial Activity under SARA**

Stakeholders were asked “*If DFO used the criteria presented in [this study] to determine that it would recommend a threatened or endangered marine fish be listed under SARA and have commercial fishing and commercial activity exempted from the SARA general prohibitions, would you, or would you not, support this listing recommendation? Why?*”. Ten stakeholders responded to this question (Table 10). Four stakeholders indicated support, while six stakeholders were not supportive of the proposed approach to listing at-risk marine fish under SARA.

**Table 10. Responses to the question “If DFO used the criteria presented in [this study] to determine that it would recommend a threatened or endangered marine fish be listed under SARA and have commercial fishing and commercial activity exempted from the SARA general prohibitions, would you, or would you not, support this listing recommendation? Why?” broken down by affiliation.**

| Respondent Affiliation      | Yes      | No       |
|-----------------------------|----------|----------|
| Academia                    | 1        | 0        |
| Commercial Fishing Industry | 2        | 3        |
| ENGO                        | 0        | 3        |
| Other                       | 1        | 0        |
| <b>Total</b>                | <b>4</b> | <b>6</b> |

Among the stakeholders who indicated support, two responded that it would be logical to support listing if DFO based its determination on the criteria that the respondents had rated as important to consider. One of the four positive responses expressed several qualifications to his or her support; particularly that DFO must demonstrate a strong commitment to conservation in order to have a SARA-regulated fishery be successful. The remaining positive respondent indicated that the criteria presented provided a balanced approach to achieving stock rebuilding while allowing a fishery to proceed.

Six stakeholders indicated that they would not support a SARA listing recommendation that proposed to allow commercial fishing, based on the criteria presented. Key themes among the negative responses were opposition to SARA as a fisheries management tool, a preference for seeing recovery objectives prioritized above socio-economic concerns, and scepticism about DFO’s ability to implement both an exemption and the criteria. Two commercial fishing industry respondents indicated that they felt SARA is an inappropriate tool through which to manage a commercial fishery, and that using it would jeopardize other current, successful management approaches. Rather than managing a fishery under SARA, those respondents suggested that DFO should be better supported to carry out its fisheries management mandate under the *Fisheries Act*. One ENGO stakeholder expressed opposition to criteria other than whether the population can sustain fishing mortality without jeopardizing species survival or recovery (Criterion 1) and whether DFO has the ability to address key species threats

(Criterion 15). This respondent indicated that socio-economic considerations should only be evaluated where DFO can demonstrate that management has changed such that limited take could be allowed without compromising recovery. Similar to these concerns, other respondents expressed scepticism that the criteria would be sufficient to ensure that species recovery was not jeopardized by fishing mortality, and that DFO would be able to effectively implement the management measures associated with the criteria.

#### 4.2.2.3. Support for Allowing Commercial Fishing for At-risk Marine Fish in Canada

Both DFO experts and stakeholders were asked whether commercial fishing for at-risk marine fish should be allowed in Canada. “At-risk” was defined in this question (and in the study overall) as species that have been designated by COSEWIC as either threatened or endangered. At-risk species may also be listed under SARA, be under consideration for SARA listing, or have been declined for SARA listing. Twenty participants responded to this question; 16 answered positively, three answered negatively, and one answer was inconclusive, and is not included in the analysis (Table 11).

**Table 11. Responses to the question “Do you think that commercial fishing of at-risk marine fish should be allowed in Canada? Please explain your answer” broken down by affiliation.**

| Respondent Affiliation      | Yes       | No       |
|-----------------------------|-----------|----------|
| Academia                    | 0         | 0        |
| Commercial Fishing Industry | 4         | 0        |
| DFO                         | 10        | 1        |
| ENGO                        | 1         | 2        |
| Other                       | 1         | 0        |
| <b>Total</b>                | <b>16</b> | <b>3</b> |

Three stakeholders who indicated that they would not support a DFO recommendation to list an at-risk marine fish under SARA and allow commercial fishing on it answered that fishing for at-risk marine fish should be allowed in Canada. These answers suggest that the current approach that DFO has taken in declining commercially exploited at-risk marine fish for listing under SARA would be preferable to those three respondents,



rather than allowing commercial exploitation under SARA. Two stakeholders indicated opposition to both allowing commercial fishing under SARA, and to allowing commercial fishing for at-risk marine fish in Canada, suggesting a strong preference for species recovery over fishing considerations. Three stakeholders indicated support for both allowing commercial fishing under SARA, and more generally for allowing commercial fishing for at-risk marine fish in Canada, suggesting that, in their view, SARA is a potential tool for fisheries management.

Of the DFO expert responses, 10 experts indicated support for commercial fishing for at-risk marine fish in Canada, while one expert indicated opposition. Despite the clear support, a key theme drawn from these responses is a strong desire to see strict, clearly-defined criteria used in deciding when fishing is allowed under SARA, and to see precaution used in determining appropriate catch levels. In addition to the criteria presented in the Likert-type survey, some DFO experts felt that exemptions could be limited to bycatch only, rather than to fisheries targeting an at-risk marine fish. Several DFO experts also reiterated a strong preference for considering fisheries where monitoring, enforcement and traceability measures provide high certainty that species survival or recovery are not jeopardized.

Another key theme found in DFO experts' responses was consideration for the benefits that a species may receive under SARA, but may not receive under the *Fisheries Act*. Several DFO experts noted the potential for species to benefit from SARA listing, even with some commercial fishing being exempted from the prohibitions. Benefits mentioned included SARA's mandatory recovery planning provisions, an increased focus on threat mitigation, critical habitat identification and protection, greater accountability for fisheries management decisions because DFO would be required to post recovery planning documents on the SARA Public Registry website, and a move toward management practices that emphasize long-term ecosystem benefits. Several DFO experts also indicated that while allowing commercial exploitation for at-risk marine fish under SARA was not an ideal situation and may potentially be perceived poorly by the public, this management approach may be preferable in some situations to the status quo, in which species are declined for SARA listing, and DFO is then not legislatively compelled to initiate recovery actions.

## **5. Discussion and Recommendations**

In this chapter, I discuss my findings and explore the implications of these results for DFO fisheries management. I then provide a series of recommendations to inform future decision-making on the SARA listing process for at-risk marine fish in Canada.

### **5.1. Research Objective 1**

The literature review, expert workshop, and interviews yielded 16 potential criteria to determine under what circumstances exploitation and regulated commercial activity for SARA-listed at-risk marine fish may be considered as an appropriate alternative to either declining SARA listing and continuing management under the *Fisheries Act*, or listing under SARA with full application of the general prohibitions. The criteria cover a diverse array of considerations, reflecting DFO's challenging mandate to develop and implement "policies and programs in support of Canada's scientific, ecological, social and economic interests in oceans and fresh waters" (Fisheries and Oceans Canada, 2008b). Grouping the criteria into those that support the biological feasibility of species recovery, promote compliance with management objectives, or capture lost socio-economic benefits demonstrates DFO experts' attempts to address the key forces that have influenced previous SARA listing decisions for at-risk marine fish. This is particularly evident in the suggestions for several criteria that could work to minimize social and economic costs and capture otherwise-lost benefits, as socio-economic considerations have been heavily emphasized in supporting previous non-listing decisions (e.g., Government of Canada, 2005; 2006a; 2006b; 2010; 2011).

### **5.2. Research Objective 2**

Results from Research Objective 2 yielded numerous insights into DFO experts' and stakeholders' opinions on the importance of the criteria, and on the feasibility and

desirability of exploitation and regulated commercial activity for at-risk marine fish under SARA. Stakeholders and DFO experts scored several criteria similarly, while other criteria received widely divergent scores between the two groups. The unanimous Very Important to Consider rating for Criterion 1 (*The species can sustain the mortality rate of a viable commercial fishery without jeopardizing species survival or recovery, or the potential for the species to meet population and distribution objectives*) strongly suggests that all parties view species survival or recovery as a primary management consideration for commercially exploited at-risk marine fish in Canada. This result also implies that respondents believe that commercially exploited species for which recovery is not feasible with a continuing commercially viable fishery should either be listed under SARA with no exemptions enacted for commercial activity, or be declined for SARA listing and managed solely under the *Fisheries Act*. Another criterion that received strongly positive scores was Criterion 15 (*DFO has the ability to address one or more of the main threats facing the species, as outlined in the species' COSEWIC Status Report*), which had an average score of 1.10 with stakeholders and 1.33 with DFO experts. Scores for this criterion suggest that respondents would not support SARA-regulated commercial exploitation for species with unknown reasons for decline, or for which DFO cannot readily address the cause of decline in a manner that would effect species survival or recovery (e.g. ecosystem regime shift, climate change). These scores further demonstrate respondents' interest in seeing evidence that DFO can effect species recovery through management action, in order to support a fishery. This view is also consistent with DFO's Sustainable Fisheries Framework, which requires management actions to promote stock rebuilding for species that have fallen into the Critical Zone of stock status (Fisheries and Oceans, 2009a). In those cases, the harvest rate should be kept to a minimum until the species moves out of the Critical Zone, in order to secure the potential for long-term fishery benefits to be realized (Fisheries and Oceans, 2009a).

DFO experts and stakeholders also scored several criteria similarly weakly. Among those criteria are two that focus on how fishery benefits are shared. Criterion 6 (*The species has local benefits, or a local community or communities are dependent on the fishery*) would favour those species for which the SARA prohibitions would disproportionately affect one or more local communities. On the contrary, Criterion 8 (*The social and economic benefits of the fishery are geographically diffuse*) would favour fisheries with large distributions, such that social and economic benefits are realized

coastwide. The limited support shown for these criteria by both DFO experts and stakeholders may suggest a reluctance to identify a preferred approach to how both the costs and benefits of fisheries and species recovery are distributed, or uncertainty for how costs and benefits can be distributed equitably. Alternatively, the result may simply reflect that distributional issues are less important to these respondents than other considerations. This result is particularly notable in light of DFO's 2002 New Access Framework, designed to address distributional issues in Atlantic fisheries (DFO, 2002a). As a majority of DFO experts and stakeholders were located in the Pacific Region, the result may also be attributed to participation from respondents who were less familiar with DFO policies that include distributional goals in Atlantic fisheries management.

The widely divergent (0.5 or greater) average index scores from stakeholders and DFO experts on eight of the criteria may provide insight into areas where DFO may need to better engage stakeholders during the SARA listing process, and where more research is needed to better understand the reasons for respondents' divergent opinions. As noted in Chapter 4, former Fisheries Minister Geoff Regan cited the difficulty in visually distinguishing endangered Cultus Lake and Sakinaw Lake sockeye from other sockeye populations as a key reason the government declined to list those species under SARA, yet stakeholders in my study, on average, rated Criterion 4 negatively (-0.2), while DFO experts rated it positively (1.10). DFO experts' higher average score may be an attempt to acknowledge and address a factor in previous non-listing decisions. However, one stakeholder respondent indicated that the assumption made in the criterion that species distinguishability (or lack thereof) influences catch levels of identical looking, co-occurring species, is not necessarily true, and that evidence must be provided to support the assumption in order for the criterion to be of value. Whether or not distinguishability actually affects species catch levels may be irrelevant, however, given that one Fisheries Minister's perception that distinguishability was an important factor contributed to the non-listing of two commercially valuable at-risk marine fish. The Minister's response may reflect an emphasis on the perceived costs of having to implement broad fisheries closures in order to comply with SARA's prohibitions, rather than on considering the degree to which fishers being unable to visually distinguish at-risk populations from healthy ones affects catch levels and presents management risks. Another stakeholder responded that it was inappropriate to allow continued exploitation of at-risk species because they looked identical to other,

healthy species, perhaps reflecting a preference for a more precautionary management approach than exempting exploitation under SARA. An example of an alternative, precautionary management method to address species distinguishability problems can be seen in CITES's efforts to protect sturgeon species worldwide from illegal take and unsustainable harvest practices (CITES, No Date (c)). Because of declining sturgeon populations, particularly in the Caspian Sea, CITES Parties decided in 1997 to regulate all international trade for all sturgeon species (CITES, No Date (c)). Given the difficulty in distinguishing sturgeon species from each other, CITES has more recently embarked on efforts to develop an identification system for sturgeon to help enforce against illegal trade (CITES, 2006). This regulatory approach differs considerably from the approach taken by Minister Regan when he decided to decline Cultus Lake and Sakinaw Lake sockeye for listing; however, more research would be required to determine whether a similar approach would offer management benefits to any at-risk marine fish in Canada.

Criterion 13 (*Fishers' efforts to attain Marine Stewardship Council (MSC) certification are not precluded by exempting the fishery from the SARA prohibitions*) also received widely divergent average scores from DFO experts and stakeholders, with experts scoring the criterion much more favourably (0.92) than stakeholders (-0.2). It is difficult to speculate on the reason for this result. Fishery effects on protected at-risk species are a key consideration in the MSC certification process (Marine Stewardship Council, 2010; 2011), leaving open the possibility that a fishery's assessment scores could be affected due to negative effects on protected species. Further, the MSC criteria do differentiate between effects on nationally protected species at risk (i.e. listed under SARA in Canada) and unprotected at-risk species (Marine Stewardship Council, 2011). A fishery that interacts with the SARA-listed species could potentially face additional scrutiny or conditions in the MSC assessment process as compared to a fishery that interacts with species designated by COSEWIC but not listed under SARA. One potential explanation for the negative average score given by stakeholders is that they may have deemed it inappropriate for DFO to participate in or consider third-party eco-certification programs like the MSC when making management decisions in support of its mandate. One DFO expert also mentioned that external considerations like eco-certification should not play a major role in SARA listing decisions.

Another criterion that received widely divergent average scores from DFO experts and stakeholders was Criterion 16 (*The fishery does not cause significant negative effects on other species or fisheries*). The average index score from DFO experts for this criterion was 1.42, while stakeholders' scores averaged 0.44. While both average scores indicate support for the criterion, stakeholders' weaker support is difficult to explain. One stakeholder commented that this criterion was effectively non-operational, because a fishery would have to first be implemented in order to tell whether it had substantial negative effects on the viability of other species or fisheries. However, all of the at-risk marine fish declined for SARA listing so far were already being targeted or caught as bycatch in fisheries at the time of their listing decisions; therefore, fishery managers would likely already have had some data on the broader effects of those fisheries. A possible explanation for the substantial difference between DFO experts' and stakeholders' scores may be experts' greater sensitivity to fishery effects on non-target species and ecosystem functions, which can be a key fisheries management consideration. However, further research into this result is necessary in order to better understand DFO expert and stakeholder opinions on the importance of considering negative fishery effects on other species.

Overall, DFO experts rated a greater number of criteria positively than did stakeholders, and of the criteria that both groups rated positively, DFO experts' scores were more positive than stakeholders' scores, except for three criteria. Conversely, stakeholders rated more criteria negatively than did DFO experts. A possible explanation for these results is that DFO experts were more confident in the department's ability to successfully implement a new management approach for species at risk, and therefore were more comfortable adding complexity to the approach by suggesting that almost all of the criteria were somewhat or very important to consider. Conversely, stakeholders may have had less confidence in DFO's species at risk management ability or more scepticism in the department's motives, and thus chose fewer criteria as being important to consider. Some stakeholder responses to the qualitative questions also support the notion that stakeholders mistrust DFO's management of species at risk:

"DFO has not always shown a strong commitment to minimizing mortality on species at risk in its actions -- and people may be very sceptical about how this mechanism will be used because of that." – Stakeholder

Other stakeholder responses indicated their mistrust in COSEWIC and SARA, which may have led those respondents to rate the various criteria more negatively in general. Another potential explanation is that the DFO experts' scores reflect an attempt to address the department's broad mandate to meet social, environmental and economic goals, while stakeholders may have focused their support more narrowly on specific concerns, such as whether a species can be fished while still achieving recovery objectives, or whether fishers have the right economic incentives to comply with catch limits. Commercial fishing industry respondents, in particular, emphasized the importance of fishers having such economic incentives. Finally, as noted in Chapter 3, prior involvement of many of the DFO experts in developing most of the criteria may have affected their ratings, relative to stakeholders.

The questionnaire results can be used to inform decisions on whether the criteria should be included for management consideration or not. Criteria that received strong support across all respondents should be prioritized for consideration when determining the circumstances under which exploitation and regulated commercial activity for at-risk marine fish could occur under SARA, while criteria that were scored negatively should be considered to be of lower priority, until further research or evidence supports their importance. Other criteria that can be considered for exclusion are those that received similarly low scores across all respondents. Criteria that received widely divergent scores from stakeholders and DFO experts (0.5 or greater difference), but which are positive on average, should continue to be considered until the underlying reasons for the divergent results between the two groups are better understood. Based on respondents' average scores for the criteria, Table 12 presents criteria that could be included or excluded from consideration when determining the circumstances under which exploitation and regulated commercial activity for at-risk marine fish could occur under SARA.

**Table 12. Criteria that could be included or excluded from consideration when determining the circumstances under which exploitation and regulated commercial activity for at-risk marine fish could occur under SARA**

| Criteria | Average Index Score Across | Average DFO | Average Stakeholder | Difference Between | Included or Excluded |
|----------|----------------------------|-------------|---------------------|--------------------|----------------------|
|----------|----------------------------|-------------|---------------------|--------------------|----------------------|

|   | All Respondents | Expert Score | Score | Expert and Stakeholder Scores | From Further Consideration |
|---|-----------------|--------------|-------|-------------------------------|----------------------------|
| The species can sustain the mortality rate of a viable commercial fishery without jeopardizing species survival or recovery, or the potential for the species to meet population and distribution objectives. | 2.00            | 2.00         | 2.00  | 0.00                          | Included                   |
| There is the capacity for adequate monitoring and enforcement to be put in place, incorporating uncertainty.  | 1.27            | 1.67         | 0.80  | 0.87                          | Included                   |
| DFO has the ability to address one or more of the main threats facing the species, as outlined in the species' COSEWIC Status Report.   | 1.23            | 1.33         | 1.10  | 0.23                          | Included                   |
| The fishery does not cause significant negative effects on other species or fisheries.  | 1.00            | 1.42         | 0.44  | 0.98                          | Included                   |
| Traceability measures are in place, or are readily available in the fishery.  | 0.95            | 1.17         | 0.70  | 0.47                          | Included                   |
| The species is managed as part of a mixed stock fishery or a larger species aggregate.  | 0.86            | 1.18         | 0.50  | 0.68                          | Included                   |
| Other pieces of legislation or agreements, both domestic and international, are not   | 0.77            | 1.08         | 0.40  | 0.68                          | Included                   |



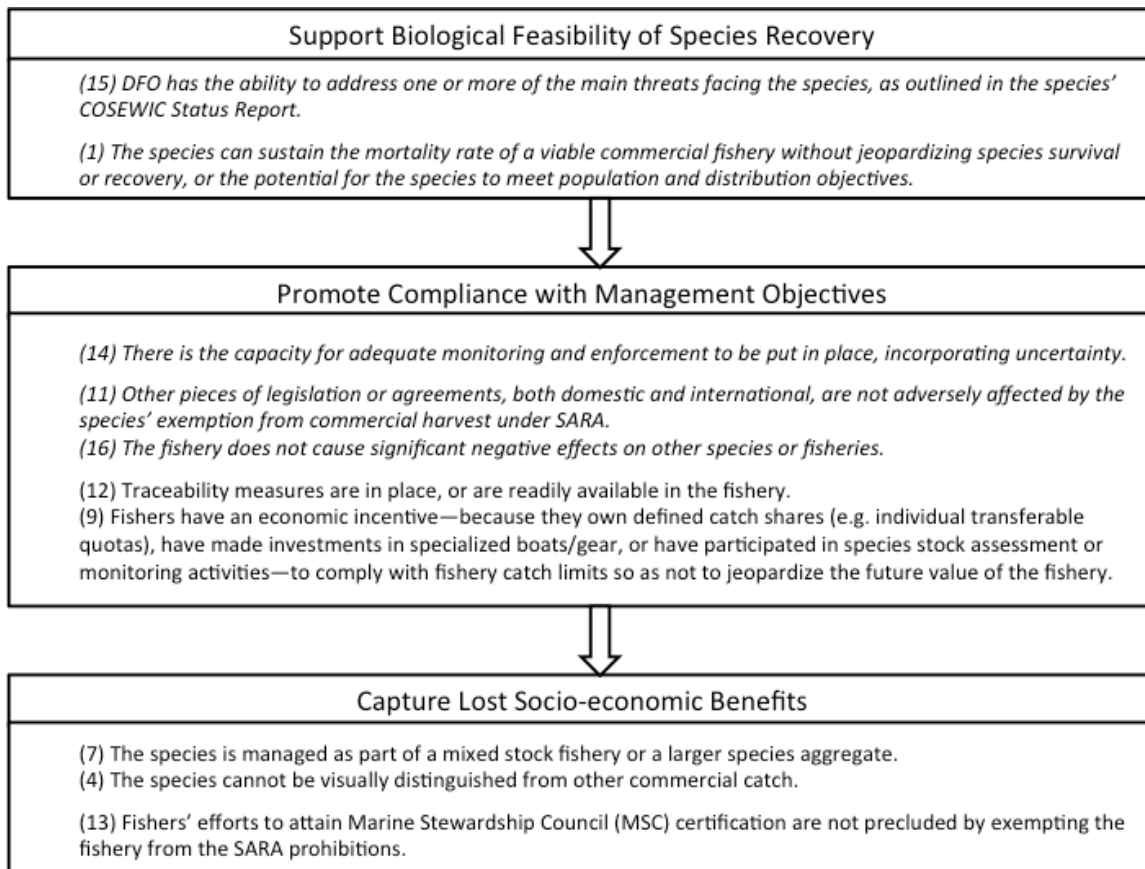
|   |      |      |       |       |          |
|---|------|------|-------|-------|----------|
| adversely affected by the species' exemption from commercial harvest under SARA.  |      |      |       |       |          |
| Fishers have an economic incentive—because they own defined catch shares (e.g. individual transferable quotas), have made investments in specialized boats/gear, or have participated in species stock assessment or monitoring activities—to comply with fishery catch limits so as not to jeopardize the future value of the fishery. | 0.71 | 0.50 | 1.00  | -0.50 | Included |
| The species cannot be visually distinguished from other commercial catch.   | 0.45 | 1.10 | -0.20 | 1.30  | Included |
| Fishers' efforts to attain Marine Stewardship Council (MSC) certification are not precluded by exempting the fishery from the SARA prohibitions.  | 0.41 | 0.92 | -0.20 | 1.12  | Included |
| The species is designated as Threatened by COSEWIC.   | 0.27 | 0.42 | 0.10  | 0.32  | Excluded |
| The fishery has local benefits, or a local community or communities are dependent on the fishery.   | 0.15 | 0.09 | 0.22  | -0.13 | Excluded |
| Fishers have a functioning and representative advisory group or industry association that   | 0.14 | 0.18 | 0.10  | 0.08  | Excluded |

|  |       |       |       |       |          |
|--|-------|-------|-------|-------|----------|
| enables face-to-face communication between participants.                         |       |       |       |       |          |
| The social and economic benefits of the fishery are geographically diffuse.      | 0.11  | 0.10  | 0.11  | -0.01 | Excluded |
| The species has high substitutability.   | -0.37 | -0.33 | -0.40 | 0.07  | Excluded |
| The species has relatively low market value on a per-unit basis (e.g. price/kg). | -0.40 | 0.00  | -0.89 | 0.89  | Excluded |

Using the included criteria from Table 12, Figure 2 presents a potential approach for using the criteria to determine whether exploitation and regulated commercial activity should be considered for an at-risk marine fish under SARA. The approach is sequential; first, Criteria 15 and 1 are used to determine whether conditions exist that could support the biological feasibility of recovery for an at-risk marine fish. These criteria serve as preconditions that must be met for a species to continue being considered for potential commercial fishery exemptions under SARA. Using these criteria as pre-conditions reflects their strong support across respondents as being important management considerations for at-risk marine species. Furthermore, they could be readily employed by DFO into the existing SARA listing decision process. In fact, the Recovery Potential Assessments that DFO conducts for at-risk species as part of the listing decision process already investigates the impact of fishing mortality (and other mortality sources) on survival or recovery of commercially harvested species, meaning that Criterion 1 could be addressed within DFO’s current listing process. In many cases, DFO’s ability to address and mitigate key species threats is likely to influence the rate at which a species can sustain commercial fishing mortality; therefore, if Criterion 15 cannot be met, the species should be excluded from further consideration.

If both criteria that support the biological feasibility of species recovery can be met, the next set of criteria to consider are those that promote compliance with management objectives. The criteria included in this category also received generally strong support from respondents. Criterion 14, which addresses DFO’s capacity to

monitor and enforce catch limits, directly supports the preceding criteria aimed at ensuring that species recovery remains feasible.



**Figure 2. A potential approach for using the criteria to determine whether exploitation and regulated commercial activity should be considered for an at-risk marine fish if listed under SARA.**

Note: Italics denote criteria that must be met in order for a species to be considered for exemptions from SARA prohibitions.

This criterion received the second-highest average score across respondents, a result that is also echoed by both DFO experts' and stakeholders' responses to the other questionnaire questions. As such, Criterion 14 should also be met in order for a species to continue being considered for potential commercial fishery exemptions under SARA. Other criteria in this category address management objectives including minimizing effects on the viability of non-target species (Criterion 16), and DFO's domestic and international obligations (Criterion 11). These are likely both important considerations for DFO in fisheries management, as reflected in DFO experts' much higher scores for both

criteria as compared to stakeholders (Table 9). Since DFO is likely to consider these factors anyway as part of regular fisheries management practices, they should also be met for species being considered for exemptions to the SARA prohibitions. The other two criteria, 12 and 9, address the economic incentives that may influence fishers' compliance with catch limits. Either or both criteria being met may positively influence compliance with management objectives; however, meeting these criteria should not be considered necessary. Traceability measures may not provide much additional certainty that management objectives will be complied with, as long as adequate monitoring and enforcement are in place (Criterion 14), making Criterion 12 somewhat redundant. For Criterion 9, one DFO expert noted in an interview that fishers must make substantial investments to participate in fisheries regardless of whether management occurs through defined catch share schemes or not, while another DFO expert commented that defined catch shares may not be an appropriate management tool for all fisheries, and use of this criterion could serve to exclude fisheries that are managed differently but effectively. In light of these responses, Criteria 12 and 9 may be useful to consider for some species, but should not be regarded as necessary.

The final set of criteria that can help determine whether exploitation and regulated commercial activity should be considered for an at-risk marine fish if listed under SARA are those that are designed to capture socio-economic benefits that would otherwise be lost due to full application of SARA's prohibitions. Criterion 7 and Criterion 4 primarily address situations in which an at-risk marine fish is incidentally caught in a fishery, or is targeted, but only as one stock in a larger fishery. In those cases, listing of the species and full application of SARA's prohibitions could have substantial socio-economic effects. While it should not be necessary for a species to meet these criteria to be considered for exemptions from the SARA prohibitions, the criteria may serve as useful predictors of species that are likely to be declined for listing in absence of a fishery exemption. Lastly, Criterion 13 addresses whether SARA listing would preclude fishers from pursuing MSC certification for a particular fishery. This criterion received fairly weak support overall, and widely divergent scores from DFO experts and stakeholders. DFO experts' higher scores point to their concern that SARA listing may affect fisheries' eligibility for MSC certification. However, as MSC certification is a third-party process that is outside DFO's direct control, and stakeholders were negative towards the criterion, its use can be considered optional.

## **5.3. Research Implications**

### **5.3.1. *How can recovery be achieved?***

Overall, the three criteria that received the highest average scores (Criteria 1, 14, and 15) support the biological feasibility of recovery, or promote compliance with management objectives that, in turn, increase certainty that recovery remains feasible. Participants' qualitative responses corroborate these scores, and illustrate respondents' prioritization of species' recovery objectives over other considerations. However, respondents disagreed over how DFO could best achieve recovery for at-risk marine fish. These responses illustrate important differences in opinions among stakeholders, and between stakeholders and DFO experts, on how at-risk marine fish can best be managed for both recovery and fishery objectives. A majority of stakeholders (six) were unsupportive of seeing SARA listing combined with commercial fisheries management – commercial fishing industry respondents because they felt that SARA did not have the necessary flexibility and management tools, and ENGO respondents because they believed that DFO had not reliably demonstrated that it could manage marine fish in a manner that would be consistent with SARA's recovery mandate. However, among the DFO experts, all but one were supportive of allowing fisheries for at-risk marine fish in Canada. This result, when considered in light of DFO experts' generally more positive ratings for the criteria, may indicate experts' overall willingness to use SARA as a fisheries management tool. A number of factors may be implicated in this finding, including more familiarity with how SARA fits into DFO's mandate, and more confidence in DFO's ability to manage fisheries in a manner consistent with SARA's overall purpose.

The next section will examine the implications of the listing biases identified by Mooers *et al.*, (2007) and Findlay *et al.*, (2009) in terms of management and recovery outcomes for commercially exploited at-risk marine fish.

### **5.3.2. *Do marine fish declined for SARA listing face diminished recovery prospects?***

Respondents prioritized criteria aimed at ensuring recovery objectives would be met for at-risk marine fish, yet disagreed on whether SARA was an appropriate mechanism through which to both effect recovery and allow limited commercial

exploitation. Given this disagreement, an examination of management and recovery trends for commercially exploited at-risk species managed under the *Fisheries Act* may help indicate whether species declined for SARA listing are likely to receive equivalent recovery-focused attention under the *Fisheries Act*. As SARA is relatively new legislation, it is difficult to evaluate recovery outcomes for the marine fish that have been denied listing so far, though some preliminary observations can be made. All of the species<sup>10</sup> that were subject to directed commercial fisheries at the time they were assessed by COSEWIC are still subject to directed fisheries currently (Fisheries and Oceans Canada 2002b; 2009c; 2011a; 2011b). DFO has decreased the permitted catch for some species since they were found to be at-risk. For example, the total allowable catch (TAC) for canary rockfish decreased from 1193t for the 2007-2008 season (Fisheries and Oceans Canada, 2007e) when it was assessed by COSEWIC as threatened, to 900t for the 2011-2013 season (Fisheries and Oceans Canada, 2011a). DFO also implemented new management measures for other species, including porbeagle shark, and Cultus Lake and Sakinaw Lake sockeye (Powles, 2011).

In contrast, Atlantic cod (Newfoundland and Labrador population) was under a fishing moratorium when it was denied listing in 2006<sup>11</sup>; however, less than two months after that decision, then-Minister for Fisheries and Oceans, Loyola Hearn, announced that the moratorium would be lifted for inshore portions of the population, and he introduced a limited fishery to "...allow fishers the opportunity to test their beliefs about the health of the stocks" (Fisheries and Oceans, 2006b). Shranck (2007) criticized this decision for ignoring scientific uncertainty in the face of economic and political pressure. While the Newfoundland and Labrador population has exhibited modest increases in recent years, its spawning stock biomass remains a small fraction of previous levels (Hutchings and Rangeley, 2011). Further, management tools such as reference points, harvest control rules, and a risk assessment framework, many of which were

<sup>10</sup> Sockeye salmon (Cultus Lake population), Atlantic cod (Laurentian North population), porbeagle shark, and canary rockfish. No information is available to determine whether a directed fishery for winter skate is still in place.

<sup>11</sup> Though Hutchings and Rangeley (2011) note that northern cod continued to be caught through a variety of means between 1993 and 2009.

recommended by the Newfoundland/Labrador Cod Action Team, have yet to be established for the population (Hutchings and Rangeley, 2011; Powles, 2011). The inshore fishery for the population remained open as of 2011 (Hutchings and Rangeley, 2011). While these examples demonstrate the inconsistent management directions that DFO has taken with non-listed marine fish (Powles, 2011), it is beyond the scope of this study to evaluate progress towards recovery for the 11 at-risk marine fish that have been declined for listing under SARA. As COSEWIC re-assesses these species over the next several years, clearer insight into their recovery outcomes may become available.

Recent broad analysis has emphasized the need for management actions to reduce fisheries exploitation rates in order to achieve recovery of collapsed stocks around the world (Worm *et al.*, 2009). Though some marine ecosystems worldwide have seen successful rebuilding efforts, additional management actions may be necessary to address depletion trends in individual stocks (Worm *et al.*, 2009). Further, if recovery of marine biodiversity is to be successful, efforts to reduce declines in populations or stocks should be coupled with explicit population targets, (Hutchings and Baum, 2005). Recent studies have examined whether the *Fisheries Act* is an effective tool to promote marine fish population recovery and manage and protect Canada's marine biodiversity (Hutchings and Rangeley, 2011; Hutchings *et al.*, 2012). In 2009, Canada's total catch of marine fish species was the third lowest since 1976 (Hutchings *et al.*, 2012), and, in comparison to other fishing jurisdictions, including the United States, Australia, New Zealand, South Africa, and the European Union, Canada's marine fish stocks are in poor health (Hutchings and Rangeley, 2011). A key difference between Canada and these other jurisdictions is that many of Canada's fisheries are not managed using formal target reference points or firm harvest control rules (Shelton and Sinclair, 2008; Hutchings and Rangeley, 2011; Hutchings *et al.*, 2012), despite strong enforcement and compliance mechanisms, including clear harvest control rules, being recognized as important for successful fisheries management (Beddington *et al.*, 2007; Mora *et al.*, 2009; Worm *et al.*, 2009). Though DFO has adopted a precautionary approach as part of its Sustainable Fisheries Framework, it utilizes default reference points that are not specifically attuned to any given fishery or species. The majority of commercially exploited marine fish in Canada remain at biomass levels below what is necessary to support maximum sustainable yields (Hutchings *et al.*, 2012).

Though there have been numerous recommendations for DFO to adopt specific, science-determined harvest control rules and objectives for its marine fish species similar to those in place in other jurisdictions like the United States, Australia and New Zealand (Shelton and Sinclair, 2008; Hutchings and Rangeley, 2011; Office of the Auditor General, 2011; Hutchings *et al.*, 2012), nothing in the *Fisheries Act* compels the Minister of Fisheries and Oceans to manage fisheries in this manner. Though the courts have affirmed that Canada's fisheries are common property resources to be managed for the benefit of all Canadians (*Comeau's Sea Foods v. Canada (Minister of Fisheries and Oceans)*, 1997 399 (SCC), [1997] 1 SCR 12; *Larocque v. Canada (Minister of Fisheries and Oceans)*, 2006 FCA 237), section 7 of the *Fisheries Act* provides broad discretion to the Minister in managing fishing activities (*Canada (Fisheries and Oceans) v. David Suzuki Foundation*, 2012 FCA 40). Hutchings *et al.*, 2012 note:

“The *Fisheries Act* (1868) reflects a period of time in Canadian history when Ministers were afforded ‘czar-like’ powers to approve, deny, or otherwise change proposals affecting activities coming under their aegis.”  
(pg. 219)

Both SARA and the United States' *Magnuson-Stevens Fishery Conservation and Management Act 1996* (U.S. Public Law 109-479), which governs marine fisheries resources in the US, contain prescriptive language that compels relevant jurisdictional authorities (in SARA, the competent Minister, and in the *Magnuson-Stevens Act*, the US Secretary of Commerce) to undertake various measures to implement the legislation (Hutchings and Rangeley, 2011; Hutchings *et al.*, 2012). Conversely, the *Fisheries Act* contains no provisions or objectives for protecting marine or freshwater biodiversity, or for pursuing or implementing sustainable fishing strategies, despite Canada having made numerous international commitments to do so (Hutchings *et al.*, 2012). There have been several recent attempts to modernize and amend the *Fisheries Act* (e.g. Fisheries and Oceans Canada, 2007); however, none have been successful (Office of the Auditor General, 2011), and it is presently unclear when or if they will be pursued again (Hutchings *et al.*, 2012). While DFO has developed numerous policies addressing sustainable fisheries management, implementation of effective harvest strategies has been hampered by a reluctance to abandon the discretionary approach to fisheries management afforded to the Minister under the *Fisheries Act* (Shelton and Sinclair, 2008).



In the absence of substantive quantitative data with which to compare recovery outcomes for at-risk marine fish in Canada, focus can instead be turned to understanding how SARA differs from the *Fisheries Act* in its potential management and recovery implications. This examination may, in turn, help inform whether using the approach presented in Figure 2 as the basis for potentially listing appropriate at-risk marine fish under SARA and allowing limited commercial fisheries to continue, could lead to improved management and recovery outcomes for those species. In Chapter 2 I noted key benefits that species receive upon being listed under SARA as threatened or endangered, including: protection from killing, harming, harassing, capturing, taking, possessing, collecting, buying, selling, and trading (s. 32(1) and (2)), protection from damage and destruction of residences (s. 33) and destruction of critical habitats once identified (s. 58), mandatory recovery planning (s. 37-46, s. 47-55), transparency in reporting (s. 123), and a likely increase in public profile and potentially in funding directed at research, stewardship and recovery. This section will explore in more detail how and whether these provisions would potentially benefit an at-risk marine fish, should the Minister list it under SARA and allow exploitation and regulated commercial activity to take place.

Clearly, if exploitation and regulated commercial activity were allowed for an at-risk marine fish under SARA, the species would not fully benefit from the s. 32(1) and s. 32(2) prohibitions. However, these prohibitions would still apply to any activities that are not otherwise permitted or exempted, perhaps conferring some additional protection. Residences have not yet been identified for any of the at-risk marine fish that have gone through the SARA listing process, and there remains uncertainty as to whether the residence concept applies to aquatic species (VanderZwaag and Hutchings, 2005; Fisheries and Oceans Canada, 2010b). These facts suggest that marine fish, as a taxonomic group, may be unlikely to benefit from s. 33. The federal government's obligation to identify and protect species' critical habitats has been established and confirmed in the courts (*Alberta Wilderness Association v. Canada (Environment)*, 2009 FC 710; *Environmental Defence Canada v. Canada (Fisheries and Oceans)*, 2009 FC 878; *Canada (Fisheries and Oceans) v. David Suzuki Foundation*, 2012 FCA 40). Though marine fish are threatened primarily by overexploitation (Venter *et al.*, 2006; Hutchings and Festa-Bianchet, 2009), marine fish species may still benefit from the s. 58 critical habitat protection provision, which provides compulsory protection against the

destruction of a species' critical habitat, once that habitat has been identified in a recovery strategy or action plan, and a Protection Order has been enacted. In contrast, habitat protection provisions for species under the *Fisheries Act* (s. 34-36) remain under Ministerial discretion (*Canada (Fisheries and Oceans v. David Suzuki Foundation, 2012 FCA 40*). Canadians may benefit from increased transparency in reporting, as fisheries management documentation online is inconsistent, incomplete and sometimes out of date across regions, and DFO is not compelled to publically post management decisions under the *Fisheries Act*. By comparison, under SARA, the Minister is compelled to post a significant amount of relevant information online, including recovery strategies (s. 42-43), action plans (s. 53), reports on progress towards recovery (s. 46; 55), permit explanations (s. 73), annual reports (s. 126) and the results of regular round tables (s. 127). The Office of the Auditor General (2011) notes that since the Minister must manage fisheries for the benefit of all Canadians, Canadians have a corresponding right to transparency in fisheries management and decision-making.

The most significant benefit commercially exploited marine fish might realize under SARA is from its mandatory recovery planning provisions (s. 37-46 and 47-55). Though there is no funding allocation mechanism under SARA for recovery planning activities, DFO may dedicate funds to undertake the work necessary to meet these mandatory provisions, whereas species that are declined for listing under SARA may not benefit from recovery planning funding or activities. For listed endangered and threatened species, the Minister is compelled to produce a recovery strategy within one or two years of listing, respectively (s. 42(1)). SARA specifies a number of requirements for the document, including a description of the species and its needs; identification of threats to its survival and to its habitat, and strategies to reduce those threats; identification of critical habitat to the extent possible, based on the best available information, and examples of activities likely to destroy it; population and distribution objectives to bring about survival or recovery; and, a statement on when one or more action plans will be developed (s. 41(1)). The recovery strategy is also part of the mechanism through which commercial exploitation of at-risk marine fish can be exempted. Exemptions to the s. 32(1) prohibitions can be included in a species' recovery strategy for activities affecting that species as long as they are consistent with its population and distribution objectives, and are also permitted under another federal Act of Parliament (s. 83(4)). Additionally, draft SARA Policy states that the s. 73(3) pre-

conditions must be met for an activity to be exempted in a recovery strategy (Environment Canada, 2009). This exemption mechanism offers an additional tool to focus fisheries management decisions in accordance with objectives specifically designed to achieve species recovery.

The Minister is similarly compelled under SARA to produce an action plan for all listed species, though there is no time constraint other than what is self-imposed through a preceding recovery strategy (s. 41(1)(g)). An action plan is meant to be the mechanism through which a species' recovery strategy is implemented, threats are addressed, and population and distribution objectives are met. The requirements for action plans include identification of critical habitat; a statement on the measures proposed to protect critical habitat; a statement of the measures to be undertaken to implement the recovery strategy; a description of the monitoring methods to be used to measure progress towards recovery; and, a socio-economic evaluation of action plan costs and benefits of its implementation (s. 49(1)). The Minister must also publically report on progress towards species recovery; for recovery strategies, reports must be given every five years until objectives have been met (s. 46), while for action plans, a report must be made five years after the action plan is posted (s. 55).

The federal government's track record for meeting its recovery planning obligations under SARA has been criticized by numerous parties (e.g. Sierra Legal Defense Fund, 2006; Office of the Auditor General, 2008; Species at Risk Advisory Committee, 2009; Mooers *et al.*, 2010; VanderZwaag *et al.*, 2011) and overdue recovery strategies have been noted for particular species in recent judicial reviews (*Environmental Defence Canada v. Canada (Fisheries and Oceans)*, 2009 FC 878; *Adam v. Canada (Environment)*, 2011 FC 962). As of March 2012, DFO has completed recovery strategies for 45 aquatic species, while recovery strategies are overdue for 20 aquatic species (Government of Canada, No Date (c)). Of the 19 action plans for aquatic species that are due as of March 2012 (according to DFO-imposed deadlines in the recovery strategies), one has been proposed for Northern abalone (*Haliotis kamschatkana*), and none have been finalized (Government of Canada, No Date (d)). DFO has clearly had limited success in producing action plans, the main mechanism through which recovery actions are to be implemented, for those species that it is responsible for. These timeframes and delays associated with action plans may, in turn,

serve to hinder species recovery (VanderZwaag *et al.*, 2011). As COSEWIC generally begins to assess fewer new species due to data constraints and other reasons (Pacific salmon being a notable exception) (Hutchings *et al.*, 2012), DFO and the other SARA responsible agencies may have the opportunity to address their recovery planning backlogs. Efforts to better define and operationalize important terms like 'survival' and 'recovery' may also be of use in improving recovery planning processes and outcomes (VanderZwaag and Hutchings, 2005; Species at Risk Advisory Committee, 2009; Mooers *et al.*, 2010; VanderZwaag *et al.*, 2011).

Marine fish that are declined for SARA listing are not precluded from recovery-focused management. DFO's Sustainable Fisheries Framework is designed to manage fisheries for conservation and sustainable use (Fisheries and Oceans Canada, 2009a). Though data is limited, existing evidence suggests that DFO's subsequent management approaches for at-risk marine fish that were declined for listing under SARA have so far been inconsistent (Powles, 2011); these species remain subject to broad Ministerial discretion, which may impede progress towards recovery and sustainability (Hutchings and Rangeley, 2011; Hutchings *et al.*, 2012). The notion that at-risk marine fish may not receive management attention under the *Fisheries Act* that is equivalent to what they would receive under SARA was echoed by half (6/12) of the DFO expert respondents in my research, who pointed out the lack of mandatory recovery planning and associated funding under the *Fisheries Act* as compared to SARA. Three stakeholder respondents also questioned DFO's commitment and track record for recovering and effectively managing at-risk marine fish species, while two stakeholders suggested that SARA could be amended to make listing automatic following COSEWIC assessment, but the subsequent suite of protections and recovery options discretionary, similar to the US *Endangered Species Act*, and suggestions in Mooers *et al.*, 2010.

The role of discretion in protecting and recovering at-risk species has also recently been legally tested in the courts. In *Canada (Fisheries and Oceans) v. David Suzuki Foundation, 2012 FCA 40*, the Federal Court of Appeal ruled that the *Fisheries Act* does not provide protection for resident killer whale critical habitats equivalent to the protection afforded under SARA, and that the Minister could not rely on discretionary powers to protect critical habitat. The judge noted:

“This Court should not approve the substitution of the non-discretionary and compulsory critical habitat protection scheme of section 58 of the SARA by the discretionary fisheries management scheme established under the *Fisheries Act* and its regulations.” (at *para. 148*)

While this case was centered on the protection of habitat for already-listed species, it demonstrates the legal non-equivalency between the protection schemes offered to species at risk by the *Fisheries Act* as compared to SARA. Unfortunately, it is not currently possible to directly assess whether SARA listing results in recovery benefits for commercially exploited at-risk marine fish<sup>12</sup>, and only time will tell whether Canada’s non-listed marine fish can successfully be managed to recovery.

SARA mandates that COSEWIC perform re-assessments for species at risk at least once every ten years (s. 24). Species are eligible to be listed under SARA every time they are re-assessed and still found to be at risk, regardless of previous listing decisions. A key benefit of this iterative assessment process is that it provides a structured opportunity to evaluate progress towards recovery for non-listed species, and, over time, may provide data that can help determine whether conventional *Fisheries Act* management regimes are successful in achieving species recovery for at-risk species. In April 2010, COSEWIC re-assessed two populations of Atlantic cod (Newfoundland and Labrador population and Laurentian North population) that were declined for SARA listing in 2006. Upon reassessment, the Newfoundland and Labrador population was confirmed as endangered, while the Laurentian North population was reassessed as endangered, up from its previous status of threatened (COSEWIC, 2010b). Fraser River sockeye salmon (encompassing Cultus Lake sockeye), and bocaccio rockfish are both due for COSEWIC reassessments in 2013 (COSEWIC, 2012b); these reassessments may provide further insight into the efficacy of DFO’s management approaches.

Considerable resources and time are required to undertake the steps necessary to support a SARA listing decision for marine fish species in Canada. DFO staff, First

<sup>12</sup> Though see VanderZwaag *et al.*, 2011 for an account of Inner Bay of Fundy Atlantic salmon recovery planning results to date under SARA.

Nations, commercial and recreational fishers, ENGOs, other government departments and stakeholders, and the public often devote significant amounts of time, energy and money into conducting socio-economic analyses, recovery potential assessments, consultations and other efforts that provide the information on which the Minister of Environment, in consultation with the Minister of Fisheries, must make a decision. For the 11 commercially exploited threatened or endangered marine fish that have so far been considered for listing under SARA, these extensive efforts produced the same listing outcome each time – the species was declined for SARA listing.

Given COSEWIC's mandate under SARA to reassess species every ten years (or sooner), thought should be given to whether the government's current approach to SARA listing represents an effective use of internal and external resources. If DFO consistently established management regimes that afforded equivalent attention to species recovery under the *Fisheries Act* as that which is required under SARA, then consideration could be put to amending the legislation to exclude marine fish from SARA eligibility. Scarce DFO resources could then be reallocated to either better serve SARA-listed species (primarily freshwater fish and marine mammals), or to increase fisheries management and science capacity to support recovery of commercially exploited at-risk marine fish. Four out of five commercial fishing representatives who participated in this study echoed the sentiment that COSEWIC and SARA are not appropriate assessment or management tools for commercially exploited marine fish. However, excluding marine fish from SARA's mandate is unlikely to be received well by ENGOs and academics, as can be seen in the existing literature criticizing the listing bias against marine fish (e.g., VanderZwaag and Hutchings, 2005; Mooers *et al.*, 2007; David Suzuki Foundation, 2007; Findlay *et al.*, 2009). Additionally, the public has historically displayed high levels of support for endangered species protection (Pollara, 1999 *in* Boyd, 2003). This type of approach may also appear at odds with Canada's commitments under the UN Convention on Biological Diversity, and may also seem inconsistent with SARA's legislative spirit and intent. Furthermore, removing the continual 'threat' of SARA listing may provide a disincentive to fisheries managers and fishers to pursue recovery-focused management approaches. One DFO expert noted in his or her questionnaire response that management changes often are made in response to COSEWIC designations and the subsequent SARA listing processes, even for species that eventually get declined for listing. Finally, Elgie (2008) noted that when governments have to explain species listing

decisions, as the Minister of Environment must do when declining to list species under SARA (s. 27(1.2)), more consideration is given to ensuring that species are only declined protection for publically defensible reasons. Removing at-risk marine fish from the SARA listing process, even if the conclusion is foregone, may therefore decrease transparency in management and decision-making.

## 5.4. Recommendations

The data collected in this study provide some preliminary insight into whether and how exploitation and regulated commercial activity for at-risk marine fish in Canada could occur under SARA. Additionally, the data highlight key areas where additional research would help to inform DFO as to whether exploitation and regulated commercial activity under SARA should be pursued. Recommendations from this study focus on how DFO can avoid expending substantial resources on marine fish listing decision processes that consistently result in non-listing decisions for primarily socio-economic reasons, and in inconsistent management and recovery commitments for those species. Though new COSEWIC assessments may begin to decrease for many taxonomic groups (Hutchings *et al.*, 2012), many assessments and reassessments will take place in the next several years for commercially exploited marine fish, as noted above. Pacific salmon species, including Chinook, pink, chum, coho, and steelhead, are currently on the COSEWIC Marine Fish Subcommittee's High Priority Candidate List (COSEWIC, 2012a) meaning that COSEWIC may turn its attention to assessing those species in the near-term, in addition to moving forward with its assessment of Fraser River sockeye, and reassessment of bocaccio rockfish (COSEWIC, 2012b). For the assessments that result in endangered or threatened designations, DFO will again have to embark on listing decision processes, including grappling with the socio-economic impacts of potential SARA listings and potential changes to fisheries management approaches.

Potential options to address the issues that contribute to the listing bias against marine fish include: (1) amending the *Fisheries Act* to explicitly adopt recovery-focused objectives; (2) establishing clear DFO policy that specifies management actions to be taken for commercially-exploited marine species that are declined for SARA listing; (3) amending SARA to provide a more straight-forward exemption mechanism from the s.

32(1) and s. 32(2) prohibitions; or, (4) using the exemption approach described in this study to list marine fish species under SARA and allow exploitation and regulated commercial activity to occur, when appropriate. Though it is beyond the scope of my study provide detailed recommendations for legislative amendments, or thorough analysis of their potential efficacy, I provide general suggestions for legislative change that could address key issues identified in this study as affecting management and recovery of commercially exploited at-risk marine fish. I also provide recommendations on what additional information is necessary or useful to gather if DFO were to implement the exemption approach (Option 4).

#### **5.4.1. Option 1: Amend the Fisheries Act to explicitly adopt recovery-focused objectives**

The federal government could renew its efforts to amend the *Fisheries Act*, in order to incorporate precautionary language and recovery-focused objectives. Amendments could follow suggestions provided in Hutchings *et al.*, (2012) and include triggers for non-discretionary recovery measures if species, populations or stocks fell below explicit, and quantitatively derived target reference points (Shelton and Sinclair, 2008) established in corresponding policies, and requirements to establish recovery objectives for species that fell below their targets. Efforts to establish prescriptive language in the *Fisheries Act* may, in turn, alleviate concerns that some DFO experts and stakeholders expressed that at-risk species are less likely to receive recovery-focused attention under the *Fisheries Act* than under SARA. If these concerns can be addressed through *Fisheries Act* amendments, there may be more agreement with the notion that the *Fisheries Act* is a more appropriate management tool for at-risk marine fish than SARA. However, given the federal government's previous failed attempts to implement *Fisheries Act* amendments (see Hutchings *et al.*, 2012), uncertainty exists as to the likelihood that changes can be successfully made, and as to the time frame necessary to undertake those changes.



#### **5.4.2. Option 2: Establish clear DFO policy that specifies management actions to be taken for commercially exploited at-risk marine fish that are declined for SARA listing**

DFO could establish, through policy, specific management actions to be undertaken in the event that a commercially exploited marine fish is declined for SARA listing. A suite of management actions may be necessary to account for the different threats that various marine fish face, and address the reasons for COSEWIC's designation. Potential management actions could include reductions in exploitation rates or total allowable catches, closures to certain fishing areas or closures at certain times of year, increased catch monitoring or enforcement, or additional funds to undertake important research or other recovery actions. The policy approach would allow the Minister to continue to use discretion in managing species and fisheries, and make trade-offs to balance species recovery and rebuilding with socio-economic objectives. Precedent for this approach exists with Cultus Lake sockeye, Sakinaw Lake sockeye, and Atlantic cod, in which Ministerial commitments were made to implement recovery plans and other conservation measures despite declining the species for SARA listing (Fisheries and Oceans Canada, 2004; 2005c; 2005d; 2006c). However, since this option relies upon Ministerial commitment rather than legislative compulsion, uncertainty would remain as to whether species would continue to receive the management attention necessary to facilitate recovery. Furthermore, the SARA-responsible agencies have finalized little in the way of SARA policy since the Act's proclamation in 2003<sup>13</sup>. While addressing non-listing of commercially exploited marine fish is an important policy question, policy items that affect listed species (i.e. recovery planning and permitting (VanderZwaag *et al.*, 2011) may need to be prioritized.

<sup>13</sup> A search under the "Policies and Guidelines" page of the SARA Public Registry yields four policy or guideline documents, only one of which (Environment Canada, 2009) pertains to DFO.

### **5.4.3. Option 3: Amend SARA to provide a straight-forward exemption mechanism from the s. 32(1) and s. 32(2) prohibitions**

The federal government could amend SARA to provide a specific mechanism to exempt species from the s. 32(1) and 32(2) prohibitions. In Chapter 2 I outlined how exploited and regulated commercial activity for listed species could be enabled under SARA; however, doing so requires the development of a species recovery strategy, and creation of a new regulation in advance of a species listing decision. Meeting these requirements is likely to be time- and resource-intensive, and may present a barrier to success. Additionally, the federal government's recent announcement that it is proceeding with implementing a "red tape cutting initiative" that will require federal departments to eliminate one regulation every time they propose to create a new one (Treasury Board of Canada Secretariat, 2012) may hinder DFO's ability to create the regulation necessary to exempt commercial activity from SARA's s. 32(2) prohibitions. Instead, potential SARA amendments could include:

- s. 73(2) could be amended to include activities that directly affect a species at risk, as long as the s. 73(3) pre-conditions are met; or
- s. 83(4) could be amended to expand the condition requiring that an activity be authorized by an Act of Parliament to include activities authorized under provincial or territorial legislation.

The first potential amendment could allow for SARA's existing permitting mechanism to cover directed fisheries and the buying and selling of at-risk marine fish. The second option could potentially resolve the current jurisdictional difficulty that DFO faces with SARA, whereby buying and selling fish caught in commercial fisheries are not subject to a federal Act of Parliament, and thus only able to be exempted through a s. 83(5)(g) regulation created under s. 84.

Either of these options could pave the way for at-risk marine fish to be exploited under SARA, but still subject to either the s. 73(3) pre-conditions that ensure survival or recovery are not jeopardized, or the population and distribution objectives developed in a species' recovery strategy (s. 41(1)(d)). Further, if both these amendments were made, s. 73 permits could be issued to fisheries immediately following a species being listed and until a recovery strategy was developed that included a s. 83(4) exemption. Once

developed and posted on the SARA Public Registry, the recovery strategy could then be used to exempt fishing and negate the need to continue to issue permits for all fishers that engage in exploitation and commercial activity for a listed species. DFO has undertaken similar approaches to address bycatch of Northern wolffish (*Anarhichas denticulatus*) and spotted wolffish (*Anarhichas minor*). Thousands of s. 73 permits were issued to fishers that may potentially bycatch these species (Fisheries and Oceans Canada, 2007e), until a recovery strategy that included a s. 83(4) exemption for bycatch was developed (Kulka *et al.*, 2007) and posted on the SARA Public Registry.

In 2009, the federal government undertook a Parliamentary Review of SARA, in accordance with SARA s. 129 (Government of Canada, No Date (e)). However, no report has been released yet from this review, so it is difficult to gauge whether legislative amendments are being contemplated at this time, and the Standing Committee on the Environment and Sustainable Development is not currently undertaking any studies or activities focused on SARA (Parliament of Canada, No Date). Numerous amendments to SARA have been suggested in the literature (e.g., Findlay *et al.*, 2009; Mooers *et al.*, 2010; VanderZwaag *et al.*, 2011; Hutchings *et al.*, 2012), and during the Parliamentary Review process (e.g., Standing Committee on the Environment and Sustainable Development, 2009b; 2009c; 2009d; Species at Risk Advisory Committee, 2009), though these suggestions focus primarily on other aspects of SARA implementation. However, some concerns have been expressed about the scope of s. 83(4) exemptions, and the potential for their broad application to a variety of activities (VanderZwaag and Hutchings, 2005; VanderZwaag *et al.*, 2011).

**5.4.4. Option 4: Use the exemption approach described in this study to list at-risk marine fish under SARA and allow exploitation and regulated commercial activity to occur, when appropriate**

DFO could adopt the exemption approach described in this study (Figure 2) to list marine fish species under SARA and allow exploitation and regulated commercial activity to occur, when appropriate. The approach determines which species are appropriate for potential exemptions using criteria developed by DFO experts, and the results of a Likert-type survey through which DFO experts and stakeholders rated the importance of the criteria. Some criteria, aimed at supporting the biological feasibility of

species recovery (Criteria 15, and 1), and promoting compliance with management objectives (Criteria 14, 11, and 16), would be necessary for species to meet in order to be considered for exemptions, while other criteria would be optional, but likely useful to include. If DFO uses this approach and finds that most at-risk marine fish meet the initial criteria, then more consideration would need to be put to whether additional criteria, including criteria suggested by stakeholder respondents (see Chapter 4), could be employed. In the absence of new data, my research could be used to inform selection of additional criteria.

I recommend that the federal government choose one of the above options to address the various causes leading to the listing bias against marine fish, so that DFO can shift its focus from documenting potential socio-economic costs of SARA listing toward management approaches that minimize those costs while affording species the recovery attention that study respondents prioritized. Each option has benefits and drawbacks; however, options focused on legislative amendments to the *Fisheries Act* or SARA would likely have a longer time-frame and more uncertain outcome than options that involve policy or regulatory development, and utilization of existing legislative tools.

#### **5.4.5. Additional Information Needs**

If Option 4 (*Use the exemption approach described in this study to list marine fish species under SARA and allow exploitation and regulated commercial activity to occur, when appropriate*) is adopted, I recommend that DFO focus attention on addressing key information and knowledge gaps that were beyond the scope of this study, and which could hamper efforts to include limited exploitation and regulated commercial activity as a management scenario in SARA listing decision processes for at-risk marine fish. It is important that more information is gathered to:

- Comprehensively evaluate and address potential First Nations considerations, including federal legal and fiduciary obligations;
- Conduct a broader evaluation of stakeholder attitudes, focusing on stakeholder groups that were included and excluded from this study; and
- Investigate whether the criteria can be further refined through weighting, beyond the current delineation of mandatory versus optional criteria to be met.

It is possible that much of this additional information could be collected during consultations conducted as part of the overall listing decision process. If DFO were to implement the exemption approach, it could structure a comprehensive consultation and engagement process to explicitly gauge participants' views and attitudes towards allowing commercial exploitation of a particular at-risk marine fish under SARA. Particular attention should be paid to adequately capturing and addressing First Nations considerations, in order to ensure that the government meets its legal and fiduciary obligations.

Outside of listing consultations, additional effort should be put into determining the scope and complexity of the process to create a s. 84 regulation to exempt commercial exploitation from the SARA prohibitions, especially in light of the federal government's recent "red tape cutting initiatives". This information could be used to establish a viable timeline for listing that includes a recovery potential assessment, socio-economic analysis, consultations, development of a recovery strategy, and creation of a s. 84 regulation. In recognition of the already-considerable amount of time the government takes in making listing decisions for at-risk marine fish (see Chapter 2 Table 1), opportunities to combine efforts on recovery strategy development and recovery potential assessment could be explored, as both processes share some similarities in focus and substance.

## 6. Conclusion

Since SARA's proclamation in 2003, no commercially harvested threatened or endangered marine fish have been listed, although 11 have been eligible. The reasons given by the federal government for denying listing in these cases focused primarily on negative socio-economic effects arising from SARA's general prohibitions, and DFO's ability to manage such species for recovery more flexibly under the *Fisheries Act* than under SARA. It is, however, possible for the government to establish a regulation under SARA that would allow limited commercial activity for listed at-risk marine fish. Utilizing this management option could then allow at-risk marine fish to receive other benefits from SARA listing, while still supporting economic opportunities for fishers. My research goal was to assess the viability of SARA as a tool for the sustainable exploitation, management and recovery of commercially valuable threatened and endangered marine fish in Canada. Through a literature review, an expert workshop and interviews, I assembled 16 potential criteria to determine under what circumstances exploitation and regulated commercial activity for SARA-listed at-risk marine fish may be considered (Research Objective 1). I subsequently elicited evaluations of those criteria from key stakeholders and DFO experts to provide insight into the feasibility and desirability of implementing this fisheries management approach (Research Objective 2), and whether fishing of at-risk marine fish in Canada is appropriate. Findings from those evaluations included:

- Both DFO experts and stakeholders favoured criteria that supported the biological feasibility of species recovery, and that promoted compliance with management objectives;
- DFO experts were more supportive of a greater number of criteria than stakeholders;
- Some stakeholders exhibited scepticism about DFO's management capabilities for species at risk, while half (6/12) of the DFO expert respondents mentioned the lack of mandatory recovery planning provisions in the *Fisheries Act*;

- A majority (16/20) of respondents were supportive of allowing fisheries for at-risk marine fish, including 10 of 11 DFO experts, four commercial fishing industry representatives, one ENGO representative, and one other; and
- Respondents disagreed over how at-risk marine fish could best be managed for recovery.

My findings offer key insights into DFO expert and stakeholder opinions on how at-risk marine fish species can best be managed for recovery. Despite mixed support among study respondents for allowing limited exploitation and regulated commercial activity for SARA-listed marine fish, the overall results suggest that there is a degree of willingness on the part of DFO experts and some stakeholders to try new management approaches. Since no commercially exploited at-risk marine fish have been listed under SARA, it is not possible to evaluate directly whether SARA confers recovery and management benefits to those species. However, DFO has so far taken a variety of approaches to managing the 11 species declined for SARA listing, with mixed results (e.g. Shranck, 2007; Powles, 2011; Hutchings and Rangeley, 2011; Hutchings *et al.*, 2012).

Though the federal government's implementation of SARA has been widely criticized (e.g., VanderZwaag and Hutchings, 2005; Sierra Legal Defense Fund, 2006; Mooers *et al.*, 2007; David Suzuki Foundation 2007; Office of the Auditor General, 2008; David Suzuki Foundation *et al.*, 2009; Findlay *et al.*, 2009; Species at Risk Advisory Committee, 2009; Mooers *et al.*, 2010; VanderZwaag *et al.*, 2011; Hutchings *et al.*, 2012), SARA imposes a legislative duty on the Minister of Fisheries and Oceans to recover at-risk marine fish, which could be a powerful management tool to effect change. Species that get declined for SARA listing remain susceptible to changing management priorities, because DFO is not legislatively compelled to pursue species recovery under the *Fisheries Act*. Recent DFO announcements have stressed the department's focus on economic prosperity in fisheries (Fisheries and Oceans Canada, 2011c; 2011d; 2012a; 2012b). A decision not to list at-risk marine fish under SARA may avoid short-term negative economic impacts of prohibitions; however, management must also focus on protecting biodiversity values so that social, environmental, and economic benefits can continue to be realized in the medium- and long-term. I recommend that the federal government address the issues that contribute to the listing bias against marine fish so that DFO can avoid expending substantial resources on decision processes that

consistently result in non-listing decisions for marine fish primarily for socio-economic reasons, and in inconsistent management and recovery commitments for those species. Potential options to address factors related to the listing bias against at-risk marine fish include:

1. amending the *Fisheries Act* to explicitly adopt recovery-focused objectives;
2. establishing clear DFO policy that specifies management actions to be taken for commercially-exploited at-risk marine fish that are eligible but declined for SARA listing;
3. amending SARA to provide a more straight-forward exemption from the s. 32(1) and s. 32(2) prohibitions; or,
4. using the exemption approach described in this study to list at-risk marine fish under SARA and allow exploitation and regulated commercial activity to occur, when appropriate.

Options that involve legislative amendments may take longer and be more difficult to implement than options focused on policy and regulatory development and use of existing legislative tools. If DFO pursues the exemption approach presented in this study, it should prioritize obtaining additional information and engaging a variety of interested and affected groups in consultative processes to better understand potential implications and concerns that were beyond this study's scope.

Allowing limited exploitation and regulated commercial activity for at-risk marine fish could reduce the socioeconomic costs associated with prohibitions so that marine fish could be listed and potentially benefit from many of SARA's provisions. This pragmatic approach could increase the effectiveness and accountability of management actions to promote species recovery, and increase flexibility for DFO in managing both environmental and socio-economic priorities. It could also serve to provide comparable data to help determine whether SARA confers additional recovery benefits to species, relative to management solely under the *Fisheries Act*. Finally, it could provide direct evidence through which to assess SARA's efficacy in contributing to recovery for at-risk marine fish, a taxonomic group currently underserved by the legislation. Barriers to this approach include the time- and resource-intensive efforts necessary to develop a recovery strategy and a regulation in advance of a listing decision, and the limited support shown from stakeholders who participated in this study. However, COSEWIC's



mandate to continue assessing and reassessing commercially valuable at-risk marine fish, including numerous Pacific salmon species, may necessitate efforts to create a more efficient and effective SARA listing process and to prioritize commitments to achieve species recovery.

## References

- Adam v. Canada (Environment)*, 2011 FC 962. Available from:  
<http://www.canlii.org/en/ca/fct/doc/2011/2011fc962/2011fc962.pdf> (accessed August 8, 2011).
- Ahousaht Indian Band and Nation v. Canada (Attorney General)*, 2011 BCCA 237. Available from:  
<http://www.canlii.org/en/bc/bcca/doc/2011/2011bcca237/2011bcca237.pdf> (accessed February 11, 2012).
- Alberta Wilderness Association v. Canada (Environment)*, 2009 FC 710. Available from:  
<http://www.canlii.org/en/ca/fct/doc/2009/2009fc710/2009fc710.pdf> (accessed July 20, 2011).
- Babbie, E., and L. Benaquisto. 2002. *The Fundamentals of Social Research 1st ed.* Nelson Thomson Learning: Scarborough, ON.
- Beddington, J.R., Agnew, D.J., and C.W. Clark. 2007. Current Problems in the Management of Marine Fisheries. *Science* 316: 1713-1716.
- Berg, B. 2004. *Qualitative Research Methods for the Social Sciences 5th ed.* Pearson: Boston. MA.
- Blaikie, N. 2010. *Designing Social Research 2nd ed.* Polity Press: Cambridge, UK.
- Bourdages, J.L and C. Labelle. 2000. *Protecting Wild Species at Risk in Canada.* Ottawa, Ontario: Library of Parliament, Parliamentary Research Branch.
- Boyd, D. 2003. *Unnatural Law: Rethinking Canadian Environmental Law and Policy.* Vancouver and Toronto: UBC Press.
- Canada (Fisheries and Oceans) v. David Suzuki Foundation*, 2012 FCA 40. Available from: <http://www.canlii.org/en/ca/fca/doc/2012/2012fca40/2012fca40.pdf> (accessed March 2, 2012).
- Clark, C.W., Munro, G.R., and U.R. Sumaila. 2010. Limits to the Privatization of Fishery Resources. *Land Economics* 86(2): 209-218.
- Comeau's Sea Foods Ltd. v. Canada (Minister of Fisheries and Oceans)*, 1997 399 (SCC), [1997] 1 SCR 12. Available from:  
<http://www.canlii.org/en/ca/scc/doc/1997/1997canlii399/1997canlii399.pdf> (accessed March 2, 2012).

- Committee on the Status of Endangered Wildlife in Canada [COSEWIC]. 2012a. *Candidate Wildlife Species*. Available from: [http://www.cosewic.gc.ca/eng/sct3/index\\_e.cfm#p1](http://www.cosewic.gc.ca/eng/sct3/index_e.cfm#p1) (accessed March 9, 2012).
- Committee on the Status of Endangered Wildlife in Canada [COSEWIC]. 2012b. *COSEWIC Status Reports in Preparation*. Available from: [http://www.cosewic.gc.ca/eng/sct2/sct2\\_4\\_e.cfm](http://www.cosewic.gc.ca/eng/sct2/sct2_4_e.cfm) (accessed Jan 5, 2012).
- Committee on the Status of Endangered Wildlife in Canada [COSEWIC]. 2011a. *About COSEWIC*. Available from: [http://www.cosewic.gc.ca/eng/sct6/sct6\\_3\\_e.cfm#hist](http://www.cosewic.gc.ca/eng/sct6/sct6_3_e.cfm#hist) (accessed July 20, 2011).
- Committee on the Status of Endangered Wildlife in Canada [COSEWIC]. 2010a. *COSEWIC's Assessment Process and Criteria*. Available from: [http://www.cosewic.gc.ca/eng/sct0/assessment\\_process\\_e.cfm](http://www.cosewic.gc.ca/eng/sct0/assessment_process_e.cfm) (accessed July 20, 2011).
- Committee on the Status of Endangered Wildlife in Canada [COSEWIC]. 2010b. *COSEWIC assessment and status report on the Atlantic Cod Gadus morhua in Canada*. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xiii + 105 pp.
- Committee on the Status of Endangered Wildlife in Canada [COSEWIC]. 2007. *COSEWIC assessment and status report on the canary rockfish Sebastes pinniger in Canada*. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 71 pp.
- Committee on the Status of Endangered Wildlife in Canada [COSEWIC]. 2006a. *COSEWIC's response to wildlife species referrals by the Governor in Council*. Available from: [http://www.cosewic.gc.ca/rpts/2006\\_12\\_ref\\_e.pdf](http://www.cosewic.gc.ca/rpts/2006_12_ref_e.pdf) (accessed July 28, 2011).
- Committee on the Status of Endangered Wildlife in Canada [COSEWIC]. 2006b. *COSEWIC assessment and status report on the chinook salmon Oncorhynchus tshawytscha (Okanagan population) in Canada*. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 41 pp.
- Committee on the Status of Endangered Wildlife in Canada [COSEWIC]. 2005. *COSEWIC assessment and status report on the winter skate Leucoraja ocellata in Canada*. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 41 pp.
- Committee on the Status of Endangered Wildlife in Canada [COSEWIC]. 2004. *COSEWIC assessment and status report on the porbeagle shark Lamna nasus in Canada*. Committee on the Status of Endangered Wildlife in Canada. Ottawa. viii + 43 pp.

- Committee on the Status of Endangered Wildlife in Canada [COSEWIC]. 2003a. *COSEWIC assessment and update status report on the Atlantic cod Gadus morhua in Canada*. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xi + 76 pp.
- Committee on the Status of Endangered Wildlife in Canada [COSEWIC]. 2003b. *COSEWIC assessment and status report on the sockeye salmon Oncorhynchus nerka (Cultus population) in Canada*. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 57 pp.
- Committee on the Status of Endangered Wildlife in Canada [COSEWIC]. 2003c. *COSEWIC assessment and status report on the Sockeye Salmon Oncorhynchus nerka (Sakinaw population) in Canada*. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 35 pp.
- Committee on the Status of Endangered Wildlife in Canada [COSEWIC]. 2002a. *COSEWIC assessment and status report on the Bocaccio Sebastes paucispinis in Canada*. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 43 pp.
- Committee on the Status of Endangered Wildlife in Canada [COSEWIC]. 2002b. *COSEWIC assessment and status report on the coho salmon Oncorhynchus kisutch (Interior Fraser population) in Canada*. Committee on the Status of Endangered Wildlife in Canada. Ottawa. viii + 34 pp.
- Constitution Act, 1867 (UK), 30 & 31 Victoria, c 3*. Available from: <http://www.canlii.org/en/ca/const/const1867.html> (accessed July 20, 2011).
- Convention on International Trade in Endangered Species of Wild Fauna and Flora [CITES] Secretariat. 2006. *Identification of Acipenseriformes species in trade*. Available from: [http://www.cites.org/common/prog/sturgeon/id\\_sturgeon\\_iucn.pdf](http://www.cites.org/common/prog/sturgeon/id_sturgeon_iucn.pdf) (accessed August 25, 2011).
- Convention on International Trade in Endangered Species of Wild Fauna and Flora [CITES] Secretariat. No Date (a). *What is CITES?* Available from: <http://www.cites.org/eng/disc/what.php> (accessed August 25, 2011).
- Convention on International Trade in Endangered Species of Wild Fauna and Flora [CITES] Secretariat. No Date (b). *How CITES Works*. Available from: <http://www.cites.org/eng/disc/how.php> (accessed August 25, 2011).
- Convention on International Trade in Endangered Species of Wild Fauna and Flora [CITES] Secretariat. No Date (c). *Identification of Acipenseriformes species in trade*. Available from: <http://www.cites.org/eng/prog/Sturgeon/identification.shtml> (accessed August 25, 2011).
- Costello, C., Gaines, S.D, and J. Lynham. 2008. Can Catch Shares Prevent Fisheries Collapse? *Science* 321: 1678-1681.

- Costello, C., Lynham, J., Lester, S.E., and S.D. Gaines. 2010. Economic Incentives and Global Fisheries Sustainability. *Annual Review of Resource Economics* 2: 299-318.
- David Suzuki Foundation, Ecojustice, Environmental Defence and Nature Canada. 2009. *Canada's Species at Risk Act: Implementation at a Snail's Pace*. Available from: [http://www.naturecanada.ca/pdf/SpeciesAtRisk\\_reportApril2009.pdf](http://www.naturecanada.ca/pdf/SpeciesAtRisk_reportApril2009.pdf) (accessed Feb 25, 2012).
- David Suzuki Foundation. 2007. *Left off the List: A profile of marine and northern species denied listing under Canada's Species At Risk Act*. Available from: <http://www.davidsuzuki.org/files/WOL/DSF-LOTL-final2.pdf> (accessed July 20, 2011).
- Elgie, S. 2009. The Politics of Extinction: The Birth of Canada's Species at Risk Act. In Van Nijnatten, D.L. and R. Boardman (eds.) (2009) *Canadian Environmental Policy and Politics: Prospects for Leadership and Innovation (Third Edition)*. Don Mills, Ontario: Oxford University Press.
- Elgie, S. 2008. Statutory structure and species survival: how constraints on cabinet discretion affect endangered species listing outcomes. *Journal of Environmental Law and Practice* 19, 1-31.
- ESA (*Endangered Species Act of 1973*). 2003. *U.S. Code 16, chap. 35*. Available from: <http://www.fws.gov/endangered/pdfs/esaall.pdf> (accessed Jul 20, 2011).
- Environment Canada. 2010. *CITES Control List*. Available from: <http://ec.gc.ca/cites/default.asp?lang=En&n=957AF676-1> (accessed August 25, 2011).
- Environment Canada. 2009. *Species at Risk Act Policies: Overarching Policy Framework [DRAFT]*. Available from: [http://www.registrelep-sararegistry.gc.ca/document/dspDocument\\_e.cfm?documentID=1916](http://www.registrelep-sararegistry.gc.ca/document/dspDocument_e.cfm?documentID=1916) (accessed July 20, 2011).
- Environment Canada. 2004. *Minister of the Environment Makes Recommendations on Adding New Species to the Species at Risk Act*. Available from: [http://www.ec.gc.ca/media\\_archive/press/2004/041022\\_n\\_e.htm](http://www.ec.gc.ca/media_archive/press/2004/041022_n_e.htm) (accessed August 15, 2011).
- Environment Canada. No Date (a). *Habitat Stewardship Program for Species at Risk*. Available from: <http://www.ec.gc.ca/hsp-pih/> (accessed February 25, 2012).
- Environment Canada. No Date (b). *CITES Roles and Responsibilities in Canada*. Available from: <http://ec.gc.ca/cites/default.asp?lang=En&n=0BB0663F-1> (accessed August 25, 2011).
- Environmental Defence Canada v. Canada (Fisheries and Oceans)*, 2009 FC 878. Available from: <http://www.canlii.org/en/ca/fct/doc/2009/2009fc878/2009fc878.pdf> (accessed July 20, 2011).

- Farrier, D., Whelan, R., and C. Mooney. 2007. Threatened species listing as a trigger for conservation action. *Environmental Science & Policy* 10(3), 219-229.
- Festa, D., R., Diane, and J. Boomhower. 2008. Sharing the Catch, Conserving the Fish. *Issues in Science and Technology Winter*: 75-84.
- Findlay, C.S., Elgie, S., Giles, B., and L. Burr (2009). Species Listing under Canada's *Species at Risk Act*. *Conservation Biology* 23(6): 1609-1617.
- Fishery (General) Regulations. SOR/93-53. *Regulations Respecting Fishing and Fish Habitat In General and the Payment of Penalty and Forfeiture Proceeds under the Fisheries Act*. Available from: <http://www.canlii.org/en/ca/laws/regu/sor-93-53/87118/sor-93-53.html> (accessed Aug 2, 2011).
- Fisheries Act*. RSC 1985, c F-14. Available from: <http://canlii.ca/en/ca/laws/stat/rsc-1985-c-f-14/latest/rsc-1985-c-f-14.html> (accessed, July 20, 2011).
- Fisheries Act (BC)*. RSBC 1996, c 149. Available from: [http://www.bclaws.ca/EPLibraries/bclaws\\_new/document/ID/freeside/00\\_96149\\_01](http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/00_96149_01) (accessed Aug 2, 2011).
- Fisheries and Oceans Canada [DFO]. 2012a. *Modernizing Canada's Fisheries: Input From Canadians*. Available from: <http://www.dfo-mpo.gc.ca/media/npress-communique/2012/hq-ac08-eng.htm> (accessed March 15, 2012).
- Fisheries and Oceans Canada [DFO]. 2012b. *Fisheries Ministers Focus on Economic Prosperity in Atlantic Canada*. Available from: <http://www.dfo-mpo.gc.ca/media/npress-communique/2012/ACFAM-eng.htm> (accessed March 15, 2012).
- Fisheries and Oceans Canada [DFO]. 2011a. *Pacific Region Integrated Fisheries Management Plan – Groundfish February 21, 2011 To February 20, 2013*. Available from DFO Pacific Region Extranet <http://www-ops2.pac.dfo-mpo.gc.ca/xnet/xIndex.cfm?pg=welcome&lang=en> (accessed Nov 10, 2011).
- Fisheries and Oceans Canada [DFO]. 2011b. *Pacific Region Integrated Fisheries Management Plan Salmon Southern B.C. June 1, 2011 To May 31, 2012*. Available from <http://www.dfo-mpo.gc.ca/Library/343942.pdf> (accessed October 28, 2011).
- Fisheries and Oceans Canada [DFO]. 2011c. *Fisheries Ministers Renew Commitment to Sustainability and Prosperity of Canadian Fishing and Aquaculture Industry*. Available from: <http://www.dfo-mpo.gc.ca/media/npress-communique/2011/CCFAM-CCMPA-eng.htm> (assessed January 7, 2012).
- Fisheries and Oceans Canada [DFO]. 2011d. *Minister Ashfield Boosts Market Access and Advances International Cooperation in Asia*. Available from: <http://www.dfo-mpo.gc.ca/media/statement-declarations/2011/20111104-eng.htm> (accessed January 7, 2012).

- Fisheries and Oceans Canada [DFO]. 2010a. *Strategic Framework for Fishery Monitoring and Catch Reporting in the Pacific Fisheries (draft)*. Available from: <http://www.pac.dfo-mpo.gc.ca/consultation/picfi-ipcip/docs/monrep-survdecl/stratfwk-cadre-strat-eng.pdf> (accessed August 26, 2011).
- Fisheries and Oceans Canada [DFO]. 2010b. *National Workshop on Developing Guidelines for Terms and Concepts Used in the Species at Risk Program*. June 10-11, 2008. DFO Can. Sci. Advis. Sec. Proceed. Ser. 2009.043.
- Fisheries and Oceans Canada [DFO]. 2009a. *Sustainable Fisheries Framework*. Available from: <http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/fish-ren-peche/sff-cpd/overview-cadre-eng.htm> (accessed August 8, 2011).
- Fisheries and Oceans Canada [DFO]. 2009b. *Backgrounder - Canada's response to new EU traceability requirements*. Available from: <http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/fish-ren-peche/sff-cpd/traceability-back-tracabilite-eng.htm> (accessed August 25, 2011).
- Fisheries and Oceans Canada [DFO]. 2009c. *3Ps Cod (Gadus morhua) Integrated Fisheries Management Plan*. Available from: <http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/ifmp-gmp/cod-morue/cod-morue2009-eng.htm> (accessed October 28, 2011).
- Fisheries and Oceans Canada [DFO]. 2008a. *PICFI Elements*. Available from: <http://www.pac.dfo-mpo.gc.ca/fm-gp/picfi-ipcip/accountability-responsabilisation-eng.htm> (accessed August 25, 2011).
- Fisheries and Oceans Canada [DFO]. 2008b. *Vision, Mission, Mandate*. Available from: <http://www.dfo-mpo.gc.ca/us-nous/vision-eng.htm> (accessed October 28, 2011).
- Fisheries and Oceans Canada [DFO]. 2007a. *2005 Survey of Recreational Fishing in Canada*. Economics Analysis and Statistics, Policy Sector. Ottawa, ON, pp. 1-50.
- Fisheries and Oceans Canada [DFO]. 2007b. *Recovery Strategy for the Dwarf Wedgemussel (Alasmidonta heterodon) in Canada*. Species at Risk Act Recovery Strategy Series. Department of Fisheries and Oceans, Ottawa. vi + 9 pp.
- Fisheries and Oceans Canada [DFO]. 2007c. *Recovery potential assessment for white sturgeon*. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2007/014.
- Fisheries and Oceans Canada [DFO]. 2007d. *Pacific Region Integrated Fisheries Management Plan – Groundfish March 10, 2007 To March 31, 2008*. Available from DFO Pacific Region Extranet: <http://www.dfo-mpo.gc.ca/Library/329390.pdf> (accessed, October 28, 2011).
- Fisheries and Oceans Canada [DFO]. 2007e. *Notice of Permit*. Available from: [http://www.registrelep-sararegistry.gc.ca/sar/permit/viewPermit\\_e.cfm?id=356&type=1](http://www.registrelep-sararegistry.gc.ca/sar/permit/viewPermit_e.cfm?id=356&type=1) (accessed March 9, 2012).

- Fisheries and Oceans Canada [DFO]. 2006a. *Conservation Strategy for Coho Salmon (Oncorhynchus kisutch), Interior Fraser River Populations*. Available from: <http://www.pac.dfo-mpo.gc.ca/fm-gp/species-especies/salmon-saumon/InteriorFraserCohoCS/index-eng.htm> (accessed July 28, 2011).
- Fisheries and Oceans Canada [DFO]. 2006b. *New Government Program to test the health of Cod Stocks: Minister – I'm confident this is the right path forward*. Available from <http://www.dfo-mpo.gc.ca/media/npres-communique/2006/hq-ac14-eng.htm> (accessed Nov 12, 2011).
- Fisheries and Oceans Canada [DFO]. 2006c. *Northern Bottlenose Whale (Scotian Shelf) and Channel Darter protected under the Species at Risk Act*. Available from: <http://www.dfo-mpo.gc.ca/media/npres-communique/2006/hq-ac10-eng.htm> (accessed March 9, 2012).
- Fisheries and Oceans Canada [DFO]. 2005a. *Conservation Strategy for Sockeye Salmon (Oncorhynchus nerka), Cultus Population, in British Columbia*. Available from: [http://www.pac.dfo-mpo.gc.ca/fm-gp/species-especies/salmon-saumon/cultus\\_conservation/index-eng.htm](http://www.pac.dfo-mpo.gc.ca/fm-gp/species-especies/salmon-saumon/cultus_conservation/index-eng.htm) (accessed July 28, 2011).
- Fisheries and Oceans Canada [DFO]. 2005b. *Conservation Strategy for Sockeye Salmon (Oncorhynchus nerka), Sakinaw Lake Population, in British Columbia*. Available from: [http://www.pac.dfo-mpo.gc.ca/fm-gp/species-especies/salmon-saumon/sakinaw\\_sockeye\\_cs/index-eng.htm](http://www.pac.dfo-mpo.gc.ca/fm-gp/species-especies/salmon-saumon/sakinaw_sockeye_cs/index-eng.htm) (accessed July 28, 2011).
- Fisheries and Oceans Canada [DFO]. 2005c. *Government of Canada Proposes Adding Three Aquatic Species to the Species at Risk Act*. Available from: <http://www.dfo-mpo.gc.ca/media/npres-communique/2005/sara-eng.htm> (accessed March 9, 2012).
- Fisheries and Oceans Canada [DFO]. 2005d. *Conservation Measures for Atlantic Cod and Other Aquatic Species under Consideration for Listing under the Species at Risk Act (SARA)*. Available from: <http://www.dfo-mpo.gc.ca/media/back-fiche/2005/species-eng.htm> (accessed March 9, 2012).
- Fisheries and Oceans Canada [DFO]. 2004. *Salmon – The Present and Beyond*. Available from: <http://www.dfo-mpo.gc.ca/media/back-fiche/2004/pr39-eng.htm> (accessed March 9, 2012).
- Fisheries and Oceans Canada [DFO]. 2002a. *New Access Framework*. Available from: <http://www.dfo-mpo.gc.ca/fm-gp/policies-politiques/access-acces-eng.htm> (accessed August 15, 2011).
- Fisheries and Oceans Canada [DFO]. 2002b. *Canadian Atlantic Pelagic Shark Integrated Fisheries Management Plan - 2002-2007*. Available from: <http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/ifmp-gmp/shark-requin/shark-requin2002-eng.htm#n6> (accessed November 12, 2011).



- Government of Canada. 2011. Order Giving Notice of Decisions Not to Add Certain Species to the List of Endangered Species. *Canada Gazette Part II* 145(14): 1202-1411. Available from: [http://www.sararegistry.gc.ca/document/dspHTML\\_e.cfm?ocid=8641](http://www.sararegistry.gc.ca/document/dspHTML_e.cfm?ocid=8641) (accessed July 27, 2011).
- Government of Canada. 2010. Order Giving Notice of Decision not to add Certain Species to the List of Endangered Species. *Canada Gazette Part II* 144(6): 240-407. Available from: [http://www.registrelep-sararegistry.gc.ca/virtual\\_sara/files/orders/g2%2D14406%5Fdec%5Fe%2Epdf](http://www.registrelep-sararegistry.gc.ca/virtual_sara/files/orders/g2%2D14406%5Fdec%5Fe%2Epdf) (accessed July 27, 2011)
- Government of Canada. 2006a. Order Giving Notice of Decisions not to add Certain Species to the List of Endangered Species. *Canada Gazette Part II* 140(8):252-294. Available from: [http://www.registrelep-sararegistry.gc.ca/virtual\\_sara/files/orders/g2%2D14008%5Fe1%2Epdf](http://www.registrelep-sararegistry.gc.ca/virtual_sara/files/orders/g2%2D14008%5Fe1%2Epdf) (accessed July 27 2011).
- Government of Canada. 2006b. Order Giving Notice of Decisions not to add Certain Species to the List of Endangered Species. *Canada Gazette Part II* 140(18):1078-1131. Available from: [http://www.registrelep-sararegistry.gc.ca/virtual\\_sara/files/orders/g2%2D14018iii%5Fe%2Epdf](http://www.registrelep-sararegistry.gc.ca/virtual_sara/files/orders/g2%2D14018iii%5Fe%2Epdf) (accessed July 27 2011).
- Government of Canada. 2005. Order Giving Notice of Decisions not to add Certain Species to the List of Endangered Species. *Canada Gazette Part II* 139(2):113-117. Available from: [http://www.registrelep-sararegistry.gc.ca/virtual\\_sara/files/orders/g2%2D13902i%5Fe%2Epdf](http://www.registrelep-sararegistry.gc.ca/virtual_sara/files/orders/g2%2D13902i%5Fe%2Epdf) (accessed July 27 2011).
- Government of Canada. No Date (a). *Species at Risk Public Registry*. Environment Canada. Available from: [http://www.registrelep-sararegistry.gc.ca/default\\_e.cfm](http://www.registrelep-sararegistry.gc.ca/default_e.cfm) (accessed July 19 2011).
- Government of Canada. No Date (b). *Species at Risk Public Registry: Regulations*. Environment Canada. Available from: [http://www.sararegistry.gc.ca/approach/act/regulations\\_e.cfm](http://www.sararegistry.gc.ca/approach/act/regulations_e.cfm) (accessed July 28, 2011).
- Government of Canada. No Date (c). *Recovery Strategies*. SARA Public Registry. Available from: [http://www.registrelep-sararegistry.gc.ca/sar/recovery/timelines\\_e.cfm](http://www.registrelep-sararegistry.gc.ca/sar/recovery/timelines_e.cfm) (accessed January 8, 2012).
- Government of Canada. No Date (d). *Action Plans*. SARA Public Registry. Available from: [http://www.registrelep-sararegistry.gc.ca/sar/recovery/actionPlansTimelines\\_e.cfm](http://www.registrelep-sararegistry.gc.ca/sar/recovery/actionPlansTimelines_e.cfm) (accessed March 15, 2012).

- Government of Canada. No Date (e). *Parliamentary Review*. SARA Public Registry. Available from: [http://www.registrelep-sararegistry.gc.ca/approach/act/parl\\_review\\_e.cfm](http://www.registrelep-sararegistry.gc.ca/approach/act/parl_review_e.cfm) (accessed March 9, 2012).
- Goyert, W., Sagarin, R. and J. Annala. 2010. The promise and pitfalls of Marine Stewardship Council certification: Maine lobster as a case study. *Marine Policy* 34(2010): 1103-1109.
- Gutiérrez, N., Hilborn, R. and O. Defeo. 2011. Leadership, social capital and incentives promote successful fisheries. *Nature* (470): 386-389.
- Hannah, R.W., Rankin, P.W., Penny, A.N., and S.J. Parker. 2008. Physical model of the development of external signs of barotrauma in Pacific rockfish. *Aquatic Biology* 3: 291–296.
- Hutchings, J.A. and J. Baum. 2005. Measuring marine fish biodiversity: temporal changes in abundance, life history and demography. *Philosophical Transactions of the Royal Society B* 360: 315-338.
- Hutchings, J.A. and R.W. Rangeley. 2011. Correlates of recovery for Canadian Atlantic cod (*Gadus morhua*). *Canadian Journal of Zoology* 89: 386-400.
- Hutchings, J.A., Côté, I.M., Dodson, J.J., Fleming, I.A., Jennings, S., Mantua, N.J., Peterman, R.M., Riddell, B.E., Weaver, A.J., and D.L. VanderZwaag. 2012. *Sustaining Canadian marine biodiversity: responding to the challenges posed by climate change, fisheries, and aquaculture*. Expert panel report prepared for the Royal Society of Canada, Ottawa.
- Hutchings, J.A. and Festa-Bianchet, M. 2009. Canadian species at risk (2006–2008), with particular emphasis on fishes. *Environmental Reviews* 17(1), 53-65.
- Illical, M. and K. Harrison. 2007. Protecting Endangered Species in the US and Canada: The Role of Negative Lesson Drawing. *Canadian Journal of Political Science* 40(2): 367-394.
- IUCN Standards and Petitions Subcommittee. 2010. *Guidelines for Using the IUCN Red List Categories and Criteria. Version 8.1*. Prepared by the Standards and Petitions Subcommittee in March 2010. Available from: <http://intranet.iucn.org/webfiles/doc/SSC/RedList/RedListGuidelines.pdf> (accessed July 20, 2011).
- Kulka, D., Hood, C. and J. Huntington. 2007. *Recovery Strategy for Northern Wolffish (Anarhichas denticulatus) and Spotted Wolffish (Anarhichas minor), and Management Plan for Atlantic Wolffish (Anarhichas lupus) in Canada*. Fisheries and Oceans Canada: Newfoundland and Labrador Region. St. John's, NL. x + 103 pp.
- Larocque v. Canada (Minister of Fisheries and Oceans)*, 2006 FCA 237. Available from: <http://canlii.ca/t/1p130> (accessed March 2, 2012).

- Magnuson-Stevens Fishery Conservation and Management Reauthorization Act. US Public Law 109-479, 2006.* US Department of Commerce. Available from: [www.nmfs.noaa.gov/msa2005/docs/MSA\\_amended\\_msa%20\\_20070112\\_FINAL.pdf](http://www.nmfs.noaa.gov/msa2005/docs/MSA_amended_msa%20_20070112_FINAL.pdf) (accessed March 3, 2012).
- Marine Stewardship Council [MSC]. 2011a. *Harnessing Market Forces for Positive Environmental Change: The MSC Theory of Change.* Available from: <http://www.msc.org/documents/msc-brochures/msc-theory-of-change> (accessed March 9, 2012).
- Marine Stewardship Council [MSC]. 2011b. *Marine Stewardship Council – Technical Advisory Board Tab Directive Series.* Available from: [http://www.msc.org/documents/scheme-documents/directives/TAB\\_D\\_032\\_FAM\\_Amendments\\_v1.pdf](http://www.msc.org/documents/scheme-documents/directives/TAB_D_032_FAM_Amendments_v1.pdf) (accessed August 25, 2011).
- Marine Stewardship Council [MSC]. 2010. *MSC Fishery Standard Principles and Criteria for Sustainable Fishing.* Available from: [http://www.msc.org/documents/scheme-documents/msc-standards/MSC\\_environmental\\_standard\\_for\\_sustainable\\_fishing.pdf](http://www.msc.org/documents/scheme-documents/msc-standards/MSC_environmental_standard_for_sustainable_fishing.pdf) (accessed August 25, 2011).
- Marine Stewardship Council [MSC]. No Date. *What We Do.* Available from: <http://www.msc.org/about-us/what-we-do> (accessed August 25, 2011).
- Ministry of Agriculture. No Date. *Commercial Fisheries Program.* Available from: [http://www.al.gov.bc.ca/fisheries/compl/ce\\_branch.htm#Overview](http://www.al.gov.bc.ca/fisheries/compl/ce_branch.htm#Overview) (accessed Aug 2, 2011).
- Mooers, A.Ø., Doak, D.F., Findlay, S.C., Green, D.M., Grouios, C., Manne, L.L., Rashvand, A., Rudd, M.A. and J. Whitton. 2010. Science, Policy, and Species at Risk in Canada. *BioScience* 60(10): 843-849.
- Mooers, A.Ø., Prugh, L.R., Festa-Bianchet, M., and J.A Hutchings. 2007. Biases in Legal Listing under Canadian Endangered Species Legislation. *Conservation Biology* 21(3): 572-575.
- Mora, C., Myers, R.A., Coll, M., Libralato, S., Pitcher, T.J., Sumaila, R.U., Zeller, D., Watson, R., Gaston, K.J., and B. Worm. 2009. Management Effectiveness of the World's Marine Fisheries. *PLoS Biology* 7(6): 1-11.
- Office of the Auditor General [OAG]. 2011. *2011 December Report of the Commissioner of the Environment and Sustainable Development – Chapter 4: A Study of Managing Fisheries for Sustainability.* Available from: [http://www.oag-bvg.gc.ca/internet/English/parl\\_cesd\\_201112\\_04\\_e\\_36032.html](http://www.oag-bvg.gc.ca/internet/English/parl_cesd_201112_04_e_36032.html) (accessed March 2, 2012).

- Office of the Auditor General [OAG]. 2009. *2009 Spring Report of the Commissioner of the Environment and Sustainable Development – Chapter 1: Protecting Fish Habitat*. Available from: [http://www.oag-bvg.gc.ca/internet/English/parl\\_cesd\\_200905\\_01\\_e\\_32511.html](http://www.oag-bvg.gc.ca/internet/English/parl_cesd_200905_01_e_32511.html) (accessed Aug 2, 2011).
- Office of the Auditor General of Canada [OAG]. 2008. *2008 March Status Report of the Commissioner of the Environment and Sustainable Development. Chapter 5 – Ecosystems – Protection of Species at Risk*. Available from: [http://www.oag-bvg.gc.ca/internet/English/parl\\_cesd\\_200803\\_05\\_e\\_30131.html](http://www.oag-bvg.gc.ca/internet/English/parl_cesd_200803_05_e_30131.html) (accessed October 28, 2011).
- Ostrom, E. 2009. A General Framework for Analyzing Sustainability of Social-Ecological Systems. *Science* (325): 419- 422.
- Ostrom, E. 2007. A diagnostic approach for going beyond panaceas. *Proceedings of the National Academy of Sciences of the United States of America* 104(39): 15181-15187.
- Parks Canada Agency. No Date. *National Marine Conservation Areas of Canada*. Available from: <http://www.pc.gc.ca/eng/progs/amnc-nmca/pr-sp/index.aspx> (accessed Aug 2, 2011).
- Parliament of Canada. No Date. *Standing Committee on the Environment and Sustainable Development: Studies*. House of Commons 41st Parliament, 1st Session June 2, 2011 – Present. Available from: <http://www.parl.gc.ca/CommitteeBusiness/StudiesActivities.aspx?Language=E&Mode=1&Parl=41&Ses=1&Cmte=ENVI> (accessed March 9, 2012).
- Parslow, J. 2010. Individual transferable quotas and the “tragedy of the commons”. *Canadian Journal of Fisheries and Aquatic Science* 67: 1889-1896.
- Pinkerton, E. 2009. Partnerships in Management. In Cochrane, K.L. and S.M. Garcia (Eds). *A Fishery Manager’s Guidebook, 2nd Edition*. FAO and Wiley-Blackwell. Oxford: 283-300.
- Pinkerton, E. and M. Weinstein. 1995. *Fisheries That Work: Sustainability through Community-Based Management*. The David Suzuki Foundation. Vancouver, B.C., 199p.
- Pinkerton, E. and D. Edwards. 2009. The Elephant in the Room: the hidden costs of leasing Individual Transferable Fishing Quotas. *Marine Policy* 33: 707-713.
- Powles, H. 2011. Assessing Risk of Extinction of Marine Fishes in Canada—The COSEWIC Experience. *Fisheries* 36(5): 231-246.
- R. v. Sparrow*, [1990] 1 S.C.R. 1075. Available from: <http://www.canlii.org/en/ca/scc/doc/1990/1990canlii104/1990canlii104.html> (accessed Aug 2, 2011).

- Ricker, W.E. 1958. Maximum Sustained Yields from Fluctuating Environments and Mixed Stocks. *Journal of the Fisheries Research Board of Canada* 15(5): 991-100.
- Roheim, C.A., Asche, F., and J. Insignares Santos. 2011. The Elusive Price Premium for Ecolabelled Products: Evidence from Seafood in the UK Market. *Journal of Agricultural Economics* 62(3): 655-668.
- Sanchirico, J.N., and J.E. Wilen. 2007. Global marine fisheries resources: status and prospects. *International Journal of Global Environmental Issues* 7: 106-119.
- Schrank, W. E. 2007. Is there any hope for fisheries management? *Marine Policy* 31(3), 299-307.
- Secretariat for the Convention on Biological Diversity. No Date. *History of the Convention*. Available from: <http://www.cbd.int/history/> (accessed July 17, 2011).
- Shelton, P.A., and A.F. Sinclair. 2008. It's time to sharpen our definition of sustainable fisheries management. *Canadian Journal of Fisheries and Aquatic Science* 65: 2305-2314.
- Species at Risk Act [SARA]. SC 2002, c 29. Bill C-5, An Act Respecting the Protection of Wildlife Species at Risk in Canada.* Ottawa, ON.
- Sierra Legal Defense Fund, 2006. *Submission to the Commission for Environmental Cooperation*. Available from: [http://www.cec.org/Storage/83/7899\\_06-5-SUB\\_en.pdf](http://www.cec.org/Storage/83/7899_06-5-SUB_en.pdf) (accessed Aug 18, 2011).
- Species at Risk Advisory Committee [SARAC]. 2009. *Presentation to the Standing Committee on the Environment and Sustainable Development Spring 2009*. Available from: [www.naturecanada.ca/pdf/FINAL\\_SARAC\\_SC\\_BRIEF\\_2April09\\_en.pdf](http://www.naturecanada.ca/pdf/FINAL_SARAC_SC_BRIEF_2April09_en.pdf) (accessed July 28, 2011).
- Standing Committee on the Environment and Sustainable Development. 2009a. *Evidence – March 10, 2009, 40th Parliament, 2nd Session*. Available from: <http://www.parl.gc.ca/HousePublications/Publication.aspx?DocId=3737721&Language=E&Mode=1&Parl=40&Ses=2#Int-2646092> (accessed July 28, 2011).
- Standing Committee on the Environment and Sustainable Development. 2009b. *Evidence – May 28, 2009, 40th Parliament, 2nd Session*. Available from: <http://www.parl.gc.ca/HousePublications/Publication.aspx?DocId=3930308&Language=E&Mode=1&Parl=40&Ses=2#T0905> (accessed July 28, 2011).
- Standing Committee on the Environment and Sustainable Development. 2009c. *Evidence – June 2, 2009, 40th Parliament, 2nd Session*. Available from: <http://www.parl.gc.ca/HousePublications/Publication.aspx?DocId=3947583&Language=E&Mode=1&Parl=40&Ses=2> (accessed March 9, 2012).

- Standing Committee on the Environment and Sustainable Development. 2009c. *Evidence – June 4, 2009. 40th Parliament, 2nd Session*. Available from: <http://www.parl.gc.ca/HousePublications/Publication.aspx?DocId=3960093&Language=E&Mode=1&Parl=40&Ses=2> (accessed March 9, 2012).
- Standing Joint Committee on the Scrutiny of Regulations. 2007. *Third Report, No. 81 – Species at Risk Act*. 39th Parliament, 2nd Session. Available from: <http://www.parl.gc.ca/HousePublications/Publication.aspx?DocId=3502486&Language=E&Mode=1&Parl=39&Ses=2> (accessed on July 28, 2011).
- Treasury Board of Canada Secretariat. 2012. *Minister Clement welcomes recommendations from the Red Tape Cutting Commission*. Available from: <http://www.tbs-sct.gc.ca/media/nr-cp/2012/0118-eng.asp> (accessed March 15, 2012).
- Treasury Board of Canada Secretariat. 2007. *Cabinet Directive on Streamlining Regulation*. Available from: [http://www.tbs-sct.gc.ca/ri-qr/directive/directive01-eng.asp#\\_Toc162687226](http://www.tbs-sct.gc.ca/ri-qr/directive/directive01-eng.asp#_Toc162687226) (accessed July 20, 2011).
- United Nations Environment Programme [UNEP].1993. *United Nations on Convention on Biological Diversity*. Rio de Janeiro. Available from: [http://treaties.un.org/doc/Treaties/1992/06/19920605%2008-44%20PM/Ch\\_XXVII\\_08p.pdf](http://treaties.un.org/doc/Treaties/1992/06/19920605%2008-44%20PM/Ch_XXVII_08p.pdf) (accessed July 19, 2010).
- VanderZwaag, D.L., Engler-Palma, M.C., and J.A. Hutchings. 2011. Canada's *Species at Risk Act* and Atlantic Salmon: Cascade of Promises, Trickle of Protection, Sea of Challenges. *Journal of Environmental Law and Practice* 22: 267-307.
- VanderZwaag, D.L., and J.A Hutchings. 2005. Canada's Marine Species at Risk: Science and Law at the Helm, but a Sea of Uncertainty. *Ocean Development and International Law* 36:219-259.
- Venter, O., Belland, B., Nemiroff, L., Brodeur, N.N., Dolinsek, I.J., and J.W.A. Grant. 2006. Threats to Endangered Species in Canada. *BioScience* 56(11): 903-901.
- Ward, T.J. 2008. Barriers to biodiversity conservation in marine fishery certification. *Fish and Fisheries* 9(2), 169-177.
- Wood, C.C., and M.R. Gross. 2008. Elemental Conservation Units: Communicating Extinction Risk without Dictating Targets for Protection. *Conservation Biology* 22(1): 36-47.
- Wood, C.C. 2001. Managing biodiversity In Pacific salmon: the evolution of the Skeena River sockeye salmon fishery in British Columbia. *Paper presented at the International conference Blue Millennium: Managing fisheries biodiversity*. Victoria. Canada. 25-27. June 2001. World Fisheries Trust.

Worm, B., Hilborn, R., Baum, J.K., Branch, T.A., Collie, J.S., Costello, C., Fogarty, M.J., Fulton, E.A., Hutchings, J.A., Jennings, S., Jensen, O.P., Lotze, H.K., Mace, P.M., McClanahan, T.R, Minto, C., Palumbi, S.R., Parma, A.M., Ricard, D., Rosenberg, A.A., Watson, R., and D. Zeller. 2009. Rebuilding Global Fisheries. *Science* 325: 578-585.

## **Appendices**



## Appendix A. Expert Workshop Agenda and Questions

9:00 – 9:30 Opening Remarks, Consent Forms, Presentation

*Opening remarks*

*Audio recording, speak-up*

*Introductions*

*Overview Presentation*

*Collect consent forms*

9:30 – 10:30 Q1: Should commercial exploitation of at-risk marine fish be allowed?

*Probing Questions:*

What are the circumstances, if any, under which you think commercial exploitation of marine fish that have been *COSEWIC-designated* as endangered or threatened is appropriate?

Would these circumstances change if the species was then SARA-listed?

What are the circumstances, if any, under which you think commercial exploitation of marine fish that have been *SARA-listed* as threatened and endangered is appropriate?

If commercial fishing for at-risk marine fish in Canada is appropriate, should it be managed solely under the Fisheries Act, or SARA and the Fisheries Act together? Why?

10:30 – 10:45 BREAK

10:45-11:15 Continue Q1 discussion (if needed)

11:15 – 12:00 Q2: Please select which species you think is best suited for a SARA regulation exempting buying, selling and trade, and explain why you chose that species (go around the room).

| Species   | COSEWIC Status | SARA Status                          | Commercial Status at the Time   |
|---|----------------|--------------------------------------|---|
| Coho salmon (interior Fraser population)        | EN             | Not listed (April 2006)              | -Canadian exploitation rate limited to 3%; non-retention “generally in effect” (2006/2007) Southern BC Salmon IFMP)   |
| Canary Rockfish                                 | TH             | Proposed to not list (December 2010) | -2011-2013 canary TAC set to 900 tonnes (2011-2013 Groundfish IFMP)   |
| Winter skate (Eastern Scotian Shelf population) | TH             | Not listed (March 2010)              | -bycatch only (NAFO Divisions 4VWX+5 2010 Management Decision)<br>-bycatch in groundfish, scallop, offshore clam, sea cucumber and shrimp fisheries (SE Analysis 2008)  |
| Porbeagle shark                                 | EN             | Not listed (August 2006)             | -200 tonne directed fishery<br>-un-restricted bycatch and retention in large pelagic fisheries (swordfish and non-bluefin tuna)<br>-traditional groundfish fixed gear by-catch fishery permitted to retain a restricted amount per vessel |

|  |  |  |   |
|--|--|--|---|
|  |  |  | per trip of shark.<br>-no recreational fishery (Canadian Atlantic Shark IFMP 2002-2007) |
|--|--|--|---|

If more time, ask:

why other species were not chosen?

whether another species not on the list is a better candidate?

12:00 – 1:00 LUNCH BREAK

1:00 – 2:30 **Q3: What a) *BIOLOGICAL*; b) *SOCIAL*; c) *ECONOMIC*; and d) *POLICY/ADMINISTRATIVE* criteria should be in place for DFO to recommend a species be exempted under SARA from commercial?**

Should any other types of criteria be considered?

2:30 – 2:45 BREAK

2:45 – 3:45 **Continue Q3 discussion**

3:45 – 4:00 **Wrap-up, next steps**

*criteria ranking exercise to be sent by email to all participants*

## Appendix B. Expert Interview Protocol

### Introduction

- am audio recording this conversation*
- no one else will have access to it, other than my supervisor*
- will be securely stored and destroyed after five years*
- going to go through the presentation I emailed to you*
  - context for research*
  - goal of interview*
  - consent form*
- then will have a few questions to guide our discussion*

### Give Presentation

- any questions?*

### Questions

*Q1: Should commercial exploitation of at-risk marine fish be allowed?*

*Probing Questions:*

What are the circumstances, if any, under which you think commercial exploitation of marine fish that have been *COSEWIC-designated* as endangered or threatened is appropriate?

Would these circumstances change if the species was then SARA-listed?

What are the circumstances, if any, under which you think commercial exploitation of marine fish that have been *SARA-listed* as threatened and endangered is appropriate?

If commercial fishing for at-risk marine fish in Canada is appropriate, should it be managed solely under the Fisheries Act, or SARA and the Fisheries Act together? Why?

*Q2: Is there an at-risk marine fish that you think is best suited for a SARA regulation exempting buying, selling and trade? Why or why not?*

*Q3: What a) BIOLOGICAL; b) SOCIAL/ECONOMIC; and d) POLICY/ADMINISTRATIVE criteria should be in place for DFO to recommend that a species be exempted under SARA from commercial activity?*

Should any other types of criteria be considered?

*Q4: In consulting the literature and talking with other DFO experts, some draft criteria have been devised. Do you agree or disagree with these criteria, or have any comments on them?*

*Biological:*

The species can meet a recovery target, determined under current Recovery Potential Assessment and Sustainable Fisheries Framework standards, with relatively high certainty

*Social/Economic:*

The fishery has community benefits, or a community or communities are dependent on the fishery

The species has relatively low market value

Fishers have a long-term stake in the fishery

*Policy/Administrative:*

There is the capacity for adequate monitoring and enforcement to be put in place, incorporating uncertainty

Certification schemes (e.g. MSC) aren't affected

DFO has the ability to address one or more of the threats facing the species

*Thank you*

*-criteria ranking exercise to follow*

## Appendix C. Stakeholder and Expert Questionnaire

### Key Stakeholder and Expert Questionnaire

Assessing the viability of the *Species at Risk Act* in managing commercial exploitation of threatened and endangered marine fish in Canada

Courtney Druce

School of Resource and Environmental Management, Simon Fraser University

Before answering this questionnaire, please read the attached “REM SARA Study Key Stakeholder Backgrounder”.

1. Please identify what sector you are affiliated with. Please select only one.

Commercial fishing industry

Environmental Non-Governmental Organization

Academia

Other (please specify): \_\_\_\_\_

Anonymous

2. Table 1 presents a list of 16 potential criteria describing species characteristics and/or fisheries conditions that may be important to consider in determining if and when SARA exemptions enabling commercial fishing and commercial activity (i.e. buying, selling, and trading) may be appropriate for a threatened or endangered marine fish. An explanation of what each criterion means, and why it might be important to consider, is provided. Please read through Table 1; a rating exercise and a brief series of questions will follow below.

| <b>Table 1. Potential criteria to determine if and when SARA exemptions enabling commercial fishing and commercial activity for a threatened or endangered marine fish may be appropriate</b> |
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| The species can sustain the mortality rate of a viable commercial fishery without jeopardizing species survival or recovery, or the potential for the species to meet population and distribution objectives. |
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| What this criterion means: The species could meet its population and distribution objectives, required in a species' recovery strategy under SARA, while sustaining mortalities sufficient for a viable commercial fishery. Sustainable levels of mortality would be determined using the current DFO Recovery Potential Assessment protocol, the DFO Sustainable Fisheries Framework and any other relevant policy, guidance or standards. |
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| Why this criterion may be important: The Government of Canada's draft SARA Overarching Policy Framework specifies that s.83(4) exemptions from the prohibitions will only be granted for activities that satisfy a series of pre-conditions, including that the activity will not jeopardize species survival or recovery (s. 73(3)). Human-induced mortality must not, therefore, prevent a species from achieving the population and distribution objectives set out in its recovery strategy. |
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| The species is designated as Threatened by COSEWIC. |
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| <p>What this criterion means: Only species with the Threatened designation, as determined by COSEWIC, would be eligible to consider for SARA exemptions on commercial fishing and commercial activity. Species that COSEWIC designates as Endangered would not be considered.</p> <p>Why this criterion may be important: Species that are threatened are likely to have a better population trajectory than species that are endangered, and may therefore be more able to sustain limited commercial harvest.</p>   |
| <p>The species has high substitutability.</p> <p>What this criterion means: High substitutability means that consumers would be willing and able to choose another fish species to purchase if the first species were no longer available.</p> <p>Why this criterion may be important: Highly substitutable species may be less susceptible to poaching or black-market activities.</p>   |
| <p>The species cannot be visually distinguished from other commercial catch.</p> <p>What this criterion means: The species cannot be visually distinguished from other commercial targeted species that may be caught in the fishery (e.g. a threatened population of sockeye salmon being caught with other, healthy populations of sockeye salmon).</p> <p>Why this criterion may be important: If fishers and/or fishery officers cannot distinguish a SARA-listed threatened or endangered marine fish species from other, non-listed marine fish species, then it may force DFO to curtail all fishing for visually indistinguishable species in order to ensure that the SARA-listed species is being protected. However, if commercial activity for the SARA-listed species was exempted from the SARA prohibitions, then fisheries for visually indistinguishable species may continue.</p> |
| <p>The species has relatively low market value on a per-unit basis (e.g., price/kg).</p> <p>What this criterion means: While the species is sold commercially, it is not a highly-valued fish like halibut or bluefin tuna.</p> <p>Why this criterion may be important: Low market value species may be less susceptible to poaching or black-market activities.</p>  |
| <p>The fishery has local benefits, or a local community or communities are dependent on the fishery.</p> <p>What this criterion means: The fishery contributes economically (i.e. through direct or indirect employment) and/or socially (i.e. the fishery holds social or cultural importance to community members) to a particular local community.</p> <p>Why this criterion may be important: Fishers whose local communities benefit from a fishery may have a greater stake in ensuring long-term viability of the species and the fishery.</p>   |
| <p>The species is managed as part of a mixed stock fishery or a larger species aggregate.</p> <p>What this criterion means: The species co-occurs with other species, populations or stocks that are targeted for commercial fishing. The species may be managed in concert with these other species, populations or stocks.</p>  |

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| <p>Why this criterion may be important: Fishers' access to healthy species, populations or stocks may be reduced by co-occurrence with a SARA-listed species, due to the prohibitions against harvest and commercial activity for the SARA-listed species. Enabling commercial activity under SARA for threatened or endangered species may allow continued access to healthy species, populations or stocks that co-occur or are managed in concert with the SARA-listed species.</p>   |
| <p>The social and economic benefits of the fishery are geographically diffuse.</p> <p>What this criterion means: Social and economic benefits are not concentrated in one or a small number of communities, but are spread throughout a region or province.</p> <p>Why this criterion may be important: Fisheries that spread social and economic benefits more widely may combat regional tensions regarding access to fishing opportunities.</p>   |
| <p>Fishers have an economic incentive—because they own defined catch shares (e.g. individual transferable quotas), have made investments in specialized boats/gear, or have participated in species stock assessment or monitoring activities—to comply with fishery catch limits so as not to jeopardize the future value of the fishery.</p> <p>What this criterion means: Fishers have purchased and own defined catch shares, and boats/gear in order to pursue fishing opportunities for the foreseeable future. Fishers may also have invested resources into stock assessment or other monitoring activities aimed at increasing knowledge of the species and resulting fishing opportunities.</p> <p>Why this criterion may be important: Fishers that have already invested significant resources into a fishery may be more inclined to accept short- to medium-term fishery reductions or other management measures in order to increase the chance of long-term fishery viability and profitability.</p> |
| <p>Fishers have a functioning and representative advisory group or industry association that enables face-to-face communication between participants.</p> <p>What this criterion means: Fishers have an advisory group or industry association that acts on behalf of their interests in the fishery.</p> <p>Why this criterion may be important: Fishers who are able to meet face-to-face through an industry association or advisory group may be more likely to co-operate on management actions to increase the chance of long-term fishery viability for an at-risk marine fish.</p>   |
| <p>Other pieces of legislation or agreements, both domestic and international, are not adversely affected by the species' exemption from commercial harvest under SARA.</p> <p>What this criterion means: DFO has mandates under the Fisheries Act, the Oceans Act, and the Species at Risk Act. Additionally, Canada is party to international agreements affecting marine fish (e.g. the Convention on International Trade in Endangered Species).</p> <p>Why this criterion may be important: Exempting a fishery for an at-risk marine fish from SARA's general prohibitions should only be done if fishers, DFO, and Canada would remain in compliance with other relevant agreements and legislation.</p>  |
| <p>Traceability measures are in place, or are readily available in the fishery.</p> <p>What this criterion means: Traceability is the ability to follow the movement of fish and seafood products</p>  |

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| <p>through the seafood supply chain from harvesting to processing and distribution.</p> <p>Why this criterion may be important: Traceability measures may increase consumer confidence that the fishery is being managed sustainably, and may increase the certainty of catch and mortality data.</p>   |
| <p>Fishers' efforts to attain Marine Stewardship Council (MSC) certification are not precluded by exempting the fishery from the SARA prohibitions.</p> <p>What this criterion means: Exempting a fishery from the SARA prohibitions does not result in a MSC certification score that precludes a fishery from receiving certification.</p> <p>Why this criterion may be important: The MSC certification process takes into account fishery effects on at-risk species. It may be important to consider the effects of directly or indirectly catching at-risk marine fish on the certification process for a fishery.</p>  |
| <p>There is the capacity for adequate monitoring and enforcement to be put in place, incorporating uncertainty.</p> <p>What this criterion means: Monitoring and enforcement activities can be put in place or are already in place, so that management decisions are made with a relatively high degree of certainty in catch and mortality data.</p> <p>Why this criterion may be important: Monitoring and enforcement activities can be put into place consistent with DFO's commitment to fisheries sustainability, so that the catch and mortality data being used to support management decisions have as little uncertainty as possible.</p>  |
| <p>DFO has the ability to address one or more of the main threats facing the species, as outlined in the species' COSEWIC Status Report.</p> <p>What this criterion means: The main threat(s) to the species is/are known to DFO, and management actions can be put into place to address the threat(s), such that probability of recovery remains sufficiently high to both allow a commercial fishery and meet SARA population and distribution objectives.</p> <p>Why this criterion may be important: Being able to identify and address the species' main threats may decrease the uncertainty that the species will meet its population and distributions objectives, while also supporting a commercial harvest.</p> |
| <p>The fishery does not cause significant negative effects on other species or fisheries.</p> <p>What this criterion means: Fishing occurring for the species exempted from the SARA prohibitions does not have significant negative effects on non-target species.</p> <p>Why this criterion may be important: Any fishery exempted from the SARA prohibitions should not contribute to population decline of other species, such that they are likely to be assessed by COSEWIC as at-risk, or for species already assessed by COSEWIC as at-risk, found to be in a higher category of risk.</p>  |

3. Please rate each criterion according to how important you think it is that this criterion be considered in determining if and when SARA exemptions enabling commercial fishing and commercial activity may be appropriate for a threatened or endangered marine fish.



You may choose from the following responses:

**I Don't Know** - meaning you are not sure whether the criterion should be used or not, or how much weight it should be given;

**Should Not Consider** - meaning the criterion should not be used at all;

**Not Very Important to Consider** - meaning the criterion should be used, but given a relatively low weight;

**Somewhat Important to Consider** - meaning the criterion should be used, and given a relatively moderate weight; and

**Very Important to Consider** - meaning the criterion should be used, and given a relatively high amount of weight.

In addition to rating the criteria on the next page, please provide any comments you may have on any or all of the criteria and their accompanying explanations, in the space below.

Additional comments on the criteria:

| Table 2. Rating exercise for the potential criteria to determine if and when SARA exemptions enabling commercial fishing and commercial activity for a threatened or endangered marine fish may be appropriate  | Rating (please select one response for each criterion) |                     |                                |                                |                            |
|---|--|---------------------|--------------------------------|--------------------------------|----------------------------|
|   | I Don't Know   | Should Not Consider | Not Very Important to Consider | Somewhat Important to Consider | Very Important to Consider |
| The species can sustain the mortality rate of a viable commercial fishery without jeopardizing species survival or recovery, or the potential for the species to meet population and distribution objectives.   |  |                     |                                |                                |                            |
| The species is designated as Threatened by COSEWIC.   |  |                     |                                |                                |                            |
| The species has high substitutability.  |  |                     |                                |                                |                            |
| The species cannot be visually distinguished from other commercial catch.   |  |                     |                                |                                |                            |
| The species has relatively low market value on a per-unit basis (e.g. price/kg).  |  |                     |                                |                                |                            |
| The fishery has local benefits, or a local community or communities are dependent on the fishery.   |  |                     |                                |                                |                            |
| The species is managed as part of a mixed stock fishery or a larger species aggregate.  |  |                     |                                |                                |                            |
| The social and economic benefits of the fishery are geographically diffuse.   |  |                     |                                |                                |                            |
| Fishers have an economic incentive—because they own defined catch shares (e.g. individual transferable quotas), have made investments in specialized boats/gear, or have participated in species stock assessment or monitoring activities—to comply with fishery catch limits so as not to jeopardize the future value of the fishery. |  |                     |                                |                                |                            |
| Fishers have a functioning and representative advisory group or industry association that enables face-to-face communication between participants.  |  |                     |                                |                                |                            |
| Other pieces of legislation or agreements, both domestic and international, are not adversely affected by the species' exemption from commercial harvest under SARA.  |  |                     |                                |                                |                            |
| Traceability measures are in place, or are readily available in the fishery.  |  |                     |                                |                                |                            |
| Fishers' efforts to attain Marine Stewardship Council (MSC) certification are not precluded by exempting the fishery from the SARA prohibitions.  |  |                     |                                |                                |                            |
| There is the capacity for adequate monitoring and enforcement to be put in place, incorporating uncertainty.  |  |                     |                                |                                |                            |

|   |  |  |  |  |  |
|---|--|--|--|--|--|
| DFO has the ability to address one or more of the main threats facing the species, as outlined in the species' COSEWIC Status Report. |  |  |  |  |  |
| The fishery does not cause significant negative effects on other species or fisheries.  |  |  |  |  |  |

4. Are there additional criteria not listed in Tables 1 and 2 that you think would be important to use to determine if and when SARA exemptions enabling commercial fishing and commercial activity may be appropriate for a threatened or endangered marine fish upon listing? If so, what are they and why are they important?

5. If DFO used the criteria presented in Tables 1 and 2 to determine that it would recommend a threatened or endangered marine fish be listed under SARA and have commercial fishing and commercial activity exempted from the SARA general prohibitions, would you, or would you not, support this listing recommendation? Why?

6. Do you think that commercial fishing of at-risk marine fish should be allowed in Canada? “At-risk” is defined in this study as species that have been designated by COSEWIC as either threatened or endangered. At-risk species may also be listed under SARA, be under consideration for SARA listing, or have been declined for SARA listing. Please explain your answer.