

Caught in the middle - Inaction and overlap in governance and decision-making for Canada's imperiled wild steelhead

Amanda L. Jeanson^a, Andrew N. Kadykalo^{a,b}, Steven J. Cooke^{a,*}, Nathan Young^c

^a Department of Biology and Institute of Environmental and Interdisciplinary Science, Carleton University, 1125 Colonel By Dr., Ottawa, ON K1S 5B6, Canada

^b Department of Natural Resource Sciences, McGill University, Faculty of Agricultural and Environmental Sciences, 2111 Lakeshore, Ste-Anne-de-Bellevue, QC H9X 3V9, Canada

^c School of Sociological and Anthropological Studies, University of Ottawa, 120 University Private, Ottawa, ON K1N 6N5, Canada

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ABSTRACT

Biodiversity loss is one of the most serious challenges facing humanity and planetary well-being. Even for iconic species of great cultural and symbolic value, we are largely failing to preserve them and the habitats upon which they depend. This article analyzes one such troubling case, the precipitous decline of wild steelhead (*Oncorhynchus mykiss*) populations in British Columbia's Thompson River. These populations are declining despite high levels of public attention and interventions from both provincial and federal governments. This raises important questions about how such losses could happen despite intense scrutiny and high motivation for action. Our analysis of this case study is based on a review of policy documents and interviews with steelhead anglers (42) and fisheries managers (5) in the Thompson River region. Our analysis revealed that Thompson steelhead are 'caught in the middle' of competing government priorities, jurisdictional uncertainties and overlap, and recalcitrant rightsholder and stakeholder conflicts. The result is policy and decision-making paralysis that has entrenched the decline. We submit that there are lessons to be learned from this case for biodiversity management in Canada and elsewhere that involve deep and urgent reforms to environmental governance.

1. Introduction

Accelerating biodiversity loss is a major challenge facing humanity in the early Anthropocene, threatening human and planetary well-being [1]. The extent of this loss, with up to one million species at risk of extinction due to human activities, have led some to call this a crisis [2–4]. Migratory fish are particularly threatened over other fishes and are demonstrating worrying declines worldwide [5,6]. The causes of these declines are complex and social-ecological in nature with issues spanning marine and freshwater systems [7–9], meaning there is no 'silver bullet' or easy solution to conservation of migratory fish [10,11]. The range of impacts and the number of actors involved in protecting migratory organisms and habitats are characteristic of wicked problems that are notoriously difficult to resolve [12,13]. Nevertheless, the management of at-risk species and freshwater ecosystems is becoming increasingly important for the conservation of biodiversity at a global scale [14–16].

Much of the literature on conservation challenges is focused on 'gaps' as a major obstacle to conservation success. Such gaps include

incomplete knowledge, the absence of appropriate regulation, or poor enforcement [17–19]. In this article we argue that the opposite can also be true. In some cases, conservation challenges and wicked problems are characterized not by gaps but rather by overlaps – that populations or species are not "falling through the cracks" as much as being "caught in the middle" of an abundance of management efforts and multi-actor concerns that can lead to political paralysis and governance failures.

We submit that Canadian Thompson River steelhead represent one such case. To that end, we analysed this case study through reviews of policy documents and interviews with steelhead anglers (42) and fisheries managers (5) in British Columbia (BC) Canada to further define overlap in this context and to share lessons learned to reduce paralysis resulting from similar overlaps within biodiversity conservation management in Canada and elsewhere. We use quotes from interviewed respondents to provide additional context to the case at hand below and to narrate our arguments. This work brings forward issues to be addressed to improve inland fisheries management in Canada, yet concepts can be applied more broadly to biodiversity management both in Canada and beyond its borders.

* Corresponding author.

E-mail address: Steven.Cooke@carleton.ca (S.J. Cooke).

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1.1. The challenges of multi-jurisdictional environmental governance

There are many reasons why conservation initiatives fail, including insufficient knowledge, gaps or mismatches in funding and resources, sluggish bureaucracy, and poor compliance or enforcement [17–19]. One of the enduring challenges of environmental governance is how to coordinate and harmonize actions taken across multiple jurisdictions [20,21]. The natural environment and natural resources occupy physical, political, and cultural spaces. These spaces are transected by a range of different authorities, including formal authorities such as governments as well as informal ones such as associations, groups, and activists. Canadian researchers have been particularly attentive to these inter-jurisdictional challenges, as Canadian federalism divides authority over the natural environment between the federal and provincial governments [22]. In addition, there continues to be uncertainty over the legal and geographic scope of Indigenous authority in environmental governance. Several Canadian researchers have adopted the metaphor of a “jurisdictional tangle” to describe environmental governance in this country, as jurisdictional lines of authority are difficult to trace and overlap both vertically (across government scales) and horizontally (within given territories and systems) [23,24].

The jurisdictional tangle can lead to a paradoxical situation where certain territories, activities, and species are simultaneously under-regulated and over-regulated [25]. Specifically, under-regulation can occur because there is no single authority capable of setting overarching rules or, perhaps most importantly, making quick or adaptive decisions in response to changing environmental conditions. In such a circumstance, the buck stops nowhere, thus weakening authority overall and opening gaps within the governance system [26]. Over-regulation can result from the jurisdictional tangle because regulations frequently overlap and permissions or input must be sought from multiple sources prior to making decisions [27]. It is notable that in either case (and in both) a common result is paralysis and sluggishness in making governance decisions.

Our analysis of the Thompson River steelhead case relies heavily on these notions of jurisdictional tangle and overlap. The puzzle we attempt to solve is how this population continues to decline despite an abundance of management efforts and deep concern among local and regional actors. Our argument is that the jurisdictional tangle in this case has allowed for political paralysis and the avoidance of difficult decisions by any government authority. In effect, we posit that the steelhead are ‘caught in the middle’ of multiple authorities, none of whom have the desire to take responsibility for taking effective action to protect the species.

1.2. Thompson River steelhead

Steelhead *Oncorhynchus mykiss* are a socially and ecologically valuable fish species native to the north Pacific with native populations in Canada, the United States, Russia and Japan. While taxonomically classified as a rainbow trout, steelhead exhibit many characteristics of salmonids, including an anadromous life cycle (migrating between fresh and salt water) and larger average body mass [28]. Many Pacific Salmon populations have experienced declines in recent decades, prompting government inquiries and interventions [29]. Steelhead populations have been amongst the hardest hit and are of “significant conservation concern” according to the Pacific Salmon Foundation, an NGO [30]. Steelhead native to the Thompson River system in British Columbia are considered to be a genetically distinct population at high risk of extirpation [31].

Thompson River steelhead fall under three governmental jurisdictions, which are the Provincial government of BC, the Canadian Federal government, and First Nations governments (Indigenous communities and associations in the region). At the provincial level, the Thompson River inland recreational fishery is managed by the Ministry of Forests, Lands, Natural Resource Operations and Rural Development (MFLNRO),

which is also responsible for freshwater management, licensing and storage. At the federal level, steelhead fall under the jurisdiction of Fisheries and Oceans Canada (colloquially known as the Department of Fisheries and Oceans or DFO) during their oceanic life-stage due to their anadromous salmonid status. Ocean migration from and to freshwater spawning grounds also brings steelhead under international and national salmonid conservation initiatives such as the USA-Canada Pacific Salmon Commission and Canada’s Wild Salmon Policy [31]. Furthermore, although not a commercially harvested species, Thompson River steelhead migrate up the Fraser River at the same time as commercially targeted Pacific salmon species. As such, steelhead risk being caught as bycatch in commercial fisheries that are managed by DFO at the federal level. The range of Thompson River steelhead also overlaps with First Nations reserve lands and traditional territories [32] thus they also fall under First Nations jurisdiction and rights and may be the focus of First Nations governments and assemblies such as the Nlaka’pamux Nation Tribal Council and the Fraser Salmon Management Council (FSMC). In addition, Thompson River steelhead are beloved by anglers and communities that depend on the direct and indirect economic and wellbeing impacts of the fishery. This has led to the creation of organisations that engage in conservation actions and initiatives such as the Steelhead Society of BC, and the Spence’s Bridge Steelhead Advocacy Association [33]. Coordination among these groups, however, remains a challenge. According to a report by the Pacific Salmon Foundation, an influential NGO, “currently, the province of BC, DFO, and First Nation governments each have a unique approach to steelhead monitoring and management within their distinct jurisdictions, often with limited coordination” (28: 43).

Despite these challenges, some action has occurred at every level in response to population declines. Outcry from communities and individuals connected with Thompson River steelhead resulted in a rare emergency COSEWIC (Committee on the Status of Endangered Wildlife in Canada) assessment concluding in February 2018, which found a decrease of 79 % in population over the past three generations, leaving only 177 observed mature steelhead (the lowest number on record, 9.5 % of pre-2000 mean). COSEWIC is an independent advisory body to the Minister of Environment and Climate Change Canada that meets twice a year to assess the extinction risk of select Canadian wildlife species, providing advice and recommendations on which species should be listed under the federal Species at Risk Act (SARA) [34]. Environment and Climate Change Canada is the federal agency responsible for administering SARA and deciding which species are placed on the official list of wildlife species at risk (called the Schedule 1 list). COSEWIC ultimately designated Thompson River steelhead as Endangered (facing imminent extirpation or extinction) and recommended an emergency listing for this population under SARA [31]. This designation was later denied by the federal government in 2019 for reasons of social and economic impact. Specifically, the federal government cited the impact of closing commercial and recreational fisheries for co-migrating Pacific salmon species as prohibitive [35]. Importantly, a SARA designation would have established the federal DFO as the lead authority for decision-making and drafting and implementing a recovery plan [36]. Instead, the decision to deny SARA designation was quickly followed by the release of a joint federal-provincial Steelhead Action Plan [37]. The plan promised close coordination between the two governments, with complete closures of the recreational Thompson steelhead fishery by the provincial government, and habitat restoration and rolling closures for commercial salmon fisheries by DFO. Following the release of the plan, recreational fisheries for steelhead have indeed been closed, yet commercial fishery bycatch impacts on Thompson River steelhead continue [38]. Selective commercial and recreational fisheries closures have occurred since the work reported here (in 2018) was completed but have not ameliorated concerns about the steelhead population [28]. In addition, campaign promises made by the ruling New Democratic Party (NDP) in BC in 2017 to create a provincial species at risk act have been shelved and were not

part of the NDP's successful re-election platform in 2024 [39].

2. Methods

The research reported in this article is part of a PhD dissertation completed by the first author [40]. Research for the dissertation began in 2018 and was completed in 2021 following interruptions from the COVID-19 pandemic. This article reports findings from several sources. The primary sources are interviews with anglers and with fisheries managers involved in decision-making about Thompson River steelhead. The study also involved analysis of major policy documents released by the provincial or federal governments.

In the summer of 2018, the first author conducted semi-structured interviews with 42 steelhead anglers with experience fishing for steelhead on the Thompson River. Of these interviews, 33 were conducted in-person, and 9 were conducted over the telephone. Interviews were between 20 and 90 minutes in length, with phone interviews being on average shorter in length. A combination of opportunistic and snowball sampling was used to recruit participants. Opportunistic sampling occurred at campsites and fishing locations along the Thompson River between Vancouver and Prince George. Snowball sampling followed, as initial participants were asked to share the names and contact information for other steelhead anglers who might be interested in participating. Response rate was high (98 %), with only one potential participant declining the invitation. All but three participants identified as male. Anglers ranged in age from 23 to 82, with an average age of 56. Of the 42 anglers interviewed, 20 were part of angling groups, suggesting higher angler avidity. None of the interviewees were still actively fishing for steelhead at the time of the interview due to conservation concerns that we will describe below. All participants were given a short survey at the conclusion of the interview in which they were asked to rate the level of threat posed to Thompson River steelhead by 20 different stressors.

Five semi-structured interviews were also conducted with provincial fisheries managers in British Columbia responsible for the Thompson River. Purposive sampling was used so as to interview knowledgeable respondents with decision-making capabilities. Managers were initially contacted via e-mail; response rate was 50 %. These interviews were conducted between April and November 2018 over the telephone. The angler and manager interviews ranged in topics covering various aspects of the recreational BC rainbow trout fishery yet allowed the opportunity for respondents to share their perceptions on the status of steelhead in the Thompson River. All interviews were conducted in accordance with the University of Ottawa Research Ethics Board (File Number: 02-18-08).

To complete our analysis, we reviewed key policy documents released by the federal and provincial governments on steelhead conservation, namely: Steelhead Trout (*Oncorhynchus mykiss*): COSEWIC Technical summaries for emergency assessments 2018 [31], the Thompson Steelhead Recovery and Management Plan [33], and The Steelhead Action Plan [37]. These were accessed online from government websites. Policy documents were reviewed to gain understanding of official government mission and priorities for steelhead conservation.

Interview responses were coded using NVIVO software and using the codebook approach developed by Claxton et al. [41]. The first step involved reading the interview transcripts to identify key themes. All themes were entered into the codebook. The second step involved re-reading the transcripts to cross-reference with the master list of themes. Each theme was categorized for each respondent as validated (agreement), invalidated (disagreement), or not included (absent), producing frequency counts for both the presence of a theme and the degree of agreement and disagreement among respondents.

As noted, the interviews were conducted in 2018 prior to the COVID-19 pandemic. Socio-political contexts, management actions, perspectives of individual actors, media coverage, population trajectories of wild organisms, and other factors can change over time. Given that these

data were collected in 2018, it is possible if not likely that responses from interviewees as well as the policy scan could yield different results if conducted today. Nonetheless, the reality is that Thompson River steelhead remain at high risk of extirpation and this issue remains high profile. The portrait painted by these data remains timely with the general findings about the conservation challenges presented by overlapping jurisdictions and concerns being timeless.

3. Results

Our analysis of interview data revealed three major themes: 1) jurisdictional overlap across governments, 2) competing priorities, and 3) mistrust in government. All three themes are identified in our analysis as contributors to paralyzing overlap leading to conservation inaction in this case.

3.1. Jurisdictional overlap across governments

Jurisdictional overlap across governments was repeatedly mentioned in steelhead angler interviews, management interviews, and secondary sources such as media coverage as a major cause of inaction regarding Thompson steelhead conservation efforts. These sources cited two main reasons that are believed to be the causes of such jurisdictional overlap, one being social/political and the other biological/ecological. The first is the “cacophony of complexity” (as fisheries manager #1 describes it) that makes up the decision-making framework around this species, and the second is their status as an anadromous fish that places this species deep in the jurisdictional tangle of Canadian federalism.

Thompson River steelhead hold great value to a range of stakeholders and Indigenous rightsholders, resulting in a web of interested parties invested in conservation decision-making of Thompson River steelhead (see Fig. 1). The sheer number of devoted stakeholders and Indigenous rightsholders involved in decision-making makes it difficult to establish clear jurisdictional responsibilities for steelhead conservation and management. Respondents spoke to the fact that without clear areas of jurisdiction, management and enforcement become difficult and fuzzy, leading to inaction. As BC steelhead angler #8 put it: “I don't think anyone even knows [who's responsible] and I think it's just fallen under the radar. And the fish are paying the price”. This was also reflected in angler interview findings, as 63 % of interviewed anglers mentioned that jurisdictions for steelhead in BC were not well defined between the federal and provincial government.

The anadromous nature of the species means that federal and provincial agencies are responsible for different parts of the animals' life cycles. As manager #2 said: “Yeah, salmon and steelhead in the inland waters, even if they are freshwater, they are anadromous, they [...] are managed by the province but the impacts on them are managed by DFO which is why it's a challenge”. The responsibility to protect this population therefore falls on the Provincial and Federal governments collectively, yet the exact responsibilities they each hold are unclear. Most (98 %) anglers suggested that more collaboration between government is needed for successful management of Thompson steelhead, reinforcing the perception of joint provincial-federal government responsibility. However, most respondents held a dime view of the capacities of each government to fulfill their existing mandates. Of the anglers interviewed, 93 % said that the provincial government did not have sufficient resources to properly manage Thompson River steelhead, and 82 % stated the federal government needed to be more involved.

3.2. Competing priorities

Overlaps and tensions from competing priorities across governments may further entangle Thompson River steelhead conservation in political complexities. Both the provincial and federal governments have competing economic and conservation priorities when it comes to Thompson River steelhead (see Fig. 1). This makes conservation

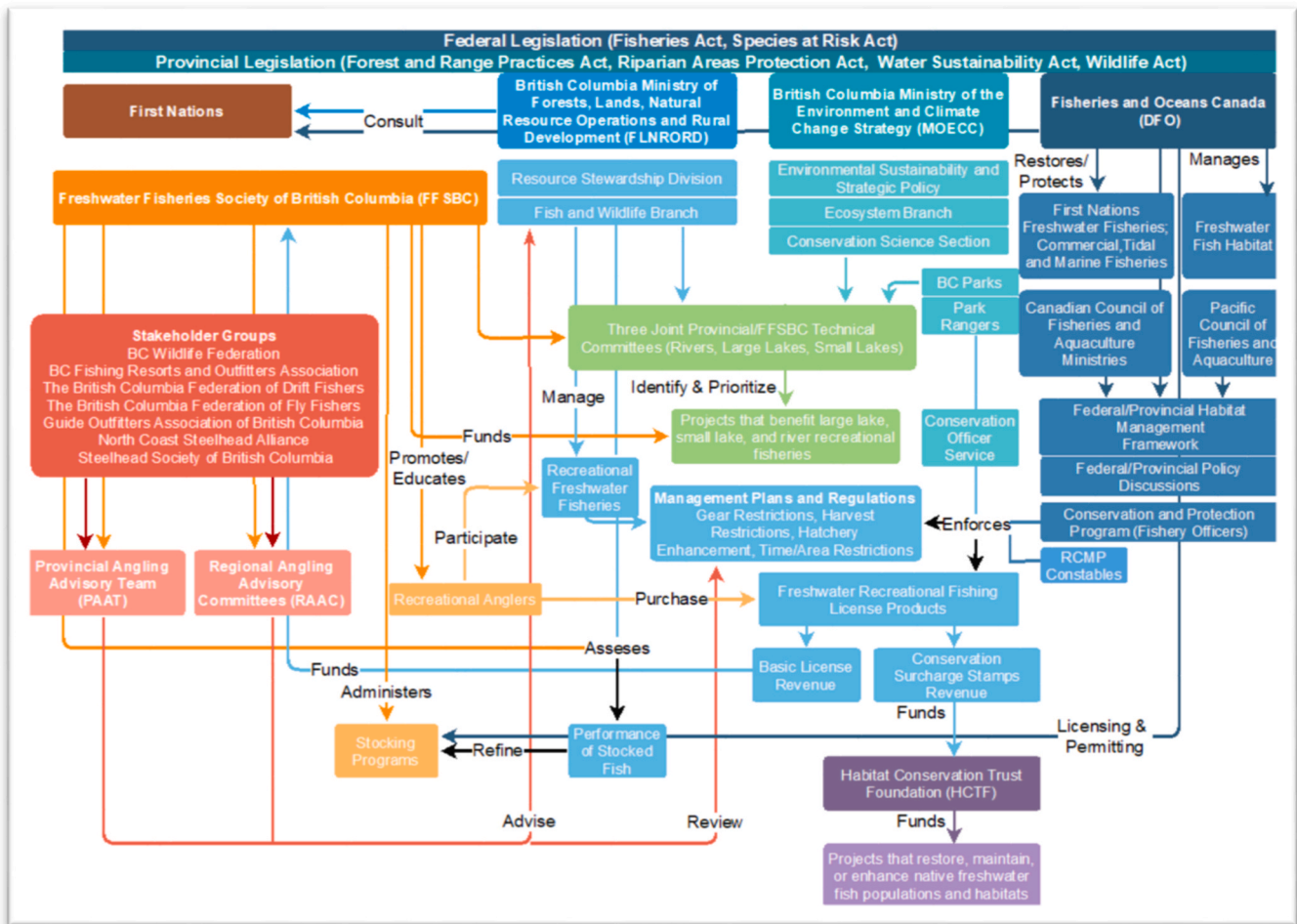


Fig. 1. Overview of steelhead governance, regulation, management, and conservation in BC Canada, including the placement and roles of governments, stakeholders and Indigenous rightsholders. Colour hues denote processes and structures related to parliamentary governments (blue); Indigenous governments (brown); Freshwater Fisheries Society of BC (FFSBC) and resource user stakeholders (red); joint parliamentary/FFSBC bodies (green); and the Habitat Conservation Trust Foundation (purple). (source: the authors).

decision-making difficult, as governments are left weighing the costs and benefits of perusing conservation initiatives.

Our interviews and the media scan suggest DFO are allowing continued commercial fishing at the cost of steelhead populations. Of anglers interviewed, 95 % believe commercial fisheries in the Pacific Ocean to be a leading cause of declines, and 93 % believe commercial nets are a continued major problem for steelhead. As steelhead angler #10 put it: “Oh, it’s the only hope remaining. Closures of fisheries where these fish are being intercepted. And bycatch interception as I mentioned earlier in the net fisheries is the most critical factor”. Freshwater angling pressure is also a concern, as a member of the provincial legislature for Fraser-Nicola Region, Jackie Tegart, stated to the newspaper the Vancouver Sun in Sept. 2019: “Bycatch is the biggest issue for steelhead. Steelhead have to be released if they are caught in nets, but if you are a steelhead and you get caught and released four times in the river, you won’t have much left to get to your spawning grounds”.

At the provincial level, the government of BC has motive to keep recreational steelhead fisheries open, as resulting tourism and primary/secondary economic impacts are of great value to the province. This is evident in comments from anglers that the decision to close the recreational fishery for the 2018–2019 season ought to have been made earlier (98 % of respondents agreed that the recreational fishery ought to have been closed prior to 2018). Angler #13 shared the statement: “They kept the steelhead [recreational fishing] open at Spence’s Bridge

way, way, way too long.”.

3.3. Mistrust in government

Our findings also indicated substantial mistrust towards government. Of the anglers interviewed, 90 % stated that they were not satisfied by the efforts from the provincial government to protect Thompson River steelhead, and 100 % stated that they were not satisfied by efforts from DFO. As BC steelhead angler #1 said: “Well I don’t see the federal government or the provincial government doing much, no. You would hope so, but we don’t see it happening”. A further 75 % stated that they have little to no trust in current management authorities. Statements demonstrating this mistrust include: “But that funding better not get into the hands of our Provincial government, because I don’t trust them as far as I could throw a tank.” (angler #11), and: “You can’t trust people [in government]’s word. People don’t have ethics nowadays. Ethics and morals have gone out the door and that’s probably another reason why fishing has gone down” (angler #17).

Managers and anglers alike agree that Thompson River steelhead declines are the result of, as several interviewed anglers put it (#25, #28, #31): a “death by 1000 cuts” scenario (see Fig. 2), yet poor management is believed to be a leading cause for current population trends. This sentiment was captured by an interviewed angler (angler #31) who stated: “I’m devastated by what has gone on which could have been averted. I mean I know the atmospheric and ocean conditions aren’t

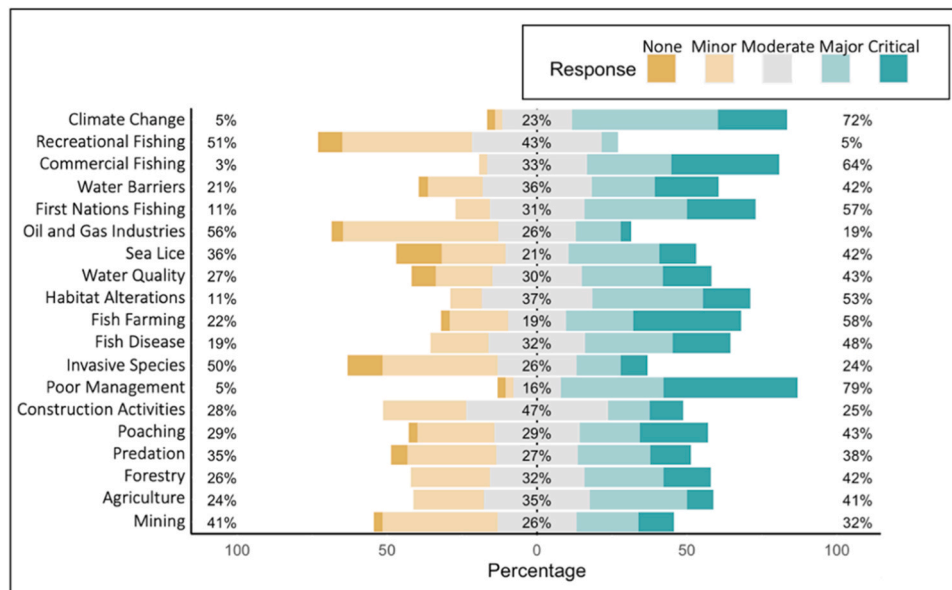


Fig. 2. Threats to Thompson River Steelhead as rated by angler interview respondents.

ideal but really what has led to this situation is willful I'd say mismanagement by DFO (Department of Fisheries and Oceans, Canada)".

4. Discussion

These findings lead us to argue that the paralysis surrounding Thompson River steelhead is strongly influenced by the overlapping jurisdictions and competing governmental priorities amongst authorities involved in decision-making. Moving forward, effort must be made to work collaboratively to repair trust between management, stakeholders, and Indigenous rightsholders, as well as work to overcome conflicting priorities and obtain clarity in cases where there is overlapping jurisdiction.

Overlap in jurisdiction is a permanent feature of Canadian federalism that will not be resolved in the short term. The problem of overlap must therefore be addressed in other ways. As it stands, the overlap in jurisdiction removes responsibility and fosters conservation inaction and indecision, deflecting blame onto other stakeholders and levels of government [42]. Having clear roles and goals for each level of government can highlight responsibilities and motivate governments to act in the best interest of steelhead, as failures to do so would directly reflect failed action by associated levels of government [43].

Conflicting priorities are common in resource management. Governments often need to decide between short term economic gains, or some economic loss in favour of the sustainable use of resources [44]. Both commercial and recreational fisheries can generate large socio-economic benefits [45] thus providing incentive for governments to allow status quo fishing operations over the long-term wellbeing of the fish populations. There are clear economic incentives for both the BC government and Federal government to allow fisheries to remain open. In British Columbia, recreational anglers spent \$498 million CAD in 2019 on the activity, employing 3500 workers in the province [46]. Almost 8 % of anglers in BC are international non-residents, travelling to BC to experience world class fisheries such as that of the Thompson River steelhead [46]. An analysis on the economic impacts of Pacific salmon fisheries (recreational and commercial) in the Pacific Northwest region of Oregon, Washington, BC, and SE Alaska from 2012 to 2015 found the economic output of the fisheries to be \$1364 million USD in Canada, supporting 12,400 fulltime equivalent jobs [47]. Furthermore, BC's commercial capture fishery brought in \$236.1 million CAD towards Canada's gross domestic product (GDP) in 2016 [48]. Addressing

competing priorities should therefore be a priority within inland fisheries management bodies as well as within the broader context of resource management. Short-term socio-economic gains need to be traded off for the long-term persistence of wild steelhead populations, which if populations are rebuilt and managed sustainably, could generate substantially more socio-economic benefit.

Mistrust in government emerged as a secondary effect of jurisdictional overlap and conflicting government priorities, further contributing to the paralysis of conservation actions directed at Thompson River steelhead. Trust between resource stakeholders and management plays a central role in resource management [49] as a lack of trust in management can hinder management progress and success as mistrust can lead to increased lack in compliance and conflict [50]. The active mistrust in government and other rightsholders and stakeholders that we found in our research implies a vicious circle: mistrust is caused by paralysis, and mistrust furthers paralysis. Building trust in government and mutual respect across stakeholders and rightsholders is essential for mitigating overlaps in biodiversity management. This element of trust highlights the social-ecological nature of declines, as social systems are affected by the decreased number of fish observed.

4.1. Lessons learned

Overcoming jurisdictional tangle and overlaps will require sustained effort. Close collaboration among participants in governance is imperative as it has been found to reduce conflict, promote trust, and result in proactive, long-term successful management strategies [50,51]. The BC government is already aiming to improve collaborative efforts towards steelhead management with their multi-party management plan fostering collaboration amongst the province, First Nations Fisheries Council, and DFO [52]. To be successful however, overlap described above must be addressed, as similar collaborative efforts have been made in the last with limited success (i.e., the Steelhead Action Plan). As the provincial government are not believed to hold enough resources to successfully manage conservation efforts on their own (as identified by anglers above), it imperative to foster a working relationship with DFO.

Clearly defined responsibilities may also aid in decisions for which governments hold competing priorities. Moving forward, the federal and provincial governments should consider acknowledging the existence of competing interests and look towards solutions that minimize their impacts on Thompson River steelhead. One solution may be to create

independent committees devoted to decision-making for this fishery to better engage diverse voices in the management process and to ensure government accountability.

4.2. Conservation implications

In this work we presented the concept of jurisdictional overlap and demonstrated how this concept contributes to ineffective management and conservation inaction. Although here we define and discuss the concept of overlap using the Thompson River steelhead population in BC, lessons learned here are applicable to other Pacific salmonids or other species that are ‘caught in the middle’ of conservation, stakeholder, and rightsholder priorities and efforts. Conservation of social-ecologically relevant species therefor needs to account not only for ‘gaps in knowledge’ but also for overlap and lack of clarity in governance.

CRediT authorship contribution statement

Steven Cooke: Writing – review & editing, Supervision, Project administration, Investigation, Funding acquisition, Conceptualization. **Nathan Young:** Writing – review & editing, Supervision, Project administration, Investigation, Funding acquisition, Conceptualization. **Andrew Kadykalo:** Writing – review & editing, Methodology, Investigation, Conceptualization. **Amanda Jeanson:** Writing – review & editing, Writing – original draft, Visualization, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

Declaration of Generative AI and AI-assisted technologies in the writing process

We declare that during the preparation of this work that no generative AI or AI-assisted technologies were used. We take full responsibility for the content of the publication as authors of the text.

Declaration of Competing Interest

The authors declare no competing interests. The perspectives shared by the authors in this paper may not reflect the perspectives of their current employers.

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Data availability

The data that has been used is confidential.

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