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REPORT

# Getting past the blame game: Convergence and divergence in perceived threats to salmon resources among anglers and indigenous fishers in Canada's lower Fraser River

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**Abstract** This article examines threat perception as a potential dimension of inter-group conflict over salmon fisheries in Canada's Fraser River watershed. Environmental changes and the entry of new user groups are putting pressure on both the resource and regulators, as well as threatening to exacerbate conflicts, notably between First Nation (indigenous) fishers and non-indigenous recreational anglers. While resource conflicts are often superficially conceptualized as cases of competing interests, we build on recent studies suggesting that conflicts are associated with deeper cognitive and perceptual differences among user groups. We report findings from 422 riverbank interviews with First Nation fishers and recreational anglers focusing on perceptions of threat to the fisheries. Responses reveal both substantial agreement and disagreement in threat perceptions between the two groups. These patterns provide a potential roadmap for consensus building, and suggest possible avenues for policy-makers to defuse the "blame game" that often dominates this type of conflict.

**Keywords** Pacific Salmon · Conflict management · Co-management · Threat perception · Consensus building · Mental models

## INTRODUCTION

Environmental change and intensive exploitation are putting pressure on natural resources worldwide (Allan et al. 2005). These pressures are exacerbating tensions among user groups, and presenting governments with difficult challenges regarding how to sustainably manage natural resources while maintaining community resilience (Jentoft and Chuenpagdee 2009). In response to this double challenge, governments are increasingly using collaborative strategies such as alternative dispute resolution, consensus building, and stakeholder engagement instead of conventional top-down "command and control" policy and management approaches. Experimentation with co-management, adaptive co-management, and voluntary programs is increasingly evident in many jurisdictions (e.g., Armitage and Plummer 2010). However, engagement and consensus building remains challenging when conflicts, disagreement, and distrust among stakeholder groups exist.

Conflicts are "situations that occur when two or more parties with strongly held opinions clash over objectives, and when one party is perceived to assert its interests at the expense of another" (Redpath et al. 2013, p. 100). Adams et al. (2003), however, argue that resource conflicts go beyond differences in material interests. Instead, they arise at a deeper cognitive level where stakeholders draw on their current knowledge and understanding to mentally frame a specific resource management problem. This perspective, which is sometimes called a "mental models" approach, stresses that individual perceptions are patterned by group membership. Members of a group frequently have similar experiences, cultural backgrounds, ideologies, and social networks, thus patterning interpretation of events and situations (Denzau and North 1994; Shepardson et al. 2007). These differences in knowledge and interpretations can be profound and provide deeper explanation of inter-group conflicts. Similarly, the Advocacy Coalition Framework (ACF) perspective views conflict as shaped by networks of shared beliefs and values (Jenkins-Smith et al. 2014). The ACF suggests that individuals and groups aggregate into "advocacy coalitions" based on shared political beliefs in an attempt to influence policy processes and outcomes (Sabatier 1998; Weible 2007; Matti and Sandstrom 2011). Therefore, enabling participants to

recognize shared beliefs and cognitive common ground is an essential first step in conflict management and/or resolution (Weible 2007; Harrison and Loring 2014). ACF research also suggests that the deep-seated nature of these conflicts means that they risk becoming more polarized with time, as groups compete to influence authorities and promote their own interpretation of different policy outcomes (Henry 2011). Unless countered, this polarization reinforces the "blame game," in which advocacy coalitions see one another as obstacles to key conservation issues, and encouraging conflict that reduces community resilience (Weible 2007; Harrison and Loring 2014).

We take from this literature the notion that resource conflicts are not simply reflections of competing interests, but are rooted in key differences in collective understanding of the resource and its broader ecological context (Henry and Dietz 2012). An investigation into the cognitive and perceptual dimensions of resource conflicts is thus potentially fruitful for (1) identifying points of agreement across user groups as possible starting points for consensus building, and (2) identifying points of divergence or disagreement in understandings of the resource and threats to its existence, so as to better understand the sources of conflicts and the challenges facing policy-makers and regulators in satisfying different user groups (Johnson and Griffith 2010).

Fisheries conflicts are notorious for their longevity and intransigence, which make them an important case for research into the cognitive dimensions of resource controversies (Acheson 1981). This article focuses on a particularly contentious Canadian case, the Pacific salmon fishery in the lower Fraser River.

## Perceived threats to salmon in the Fraser River system

The Fraser River is one of Canada's longest, traveling 1375 km through British Columbia before meeting the Pacific Ocean near the City of Vancouver (Fig. 1). The Fraser River Basin has been home to First Nations (indigenous) communities for at least 9000 years (Schaepe 2007). Prior to European settlement, bounty from the annual salmon harvest played a central role in local First Nations' economic, social, and cultural activities (Hewes 1973; Chisholm et al. 1983). According to Miller (2007, p. 56), "salmon are central to everything it means to be indigenous" for the First Nations of the Lower Fraser, including the Sto:lo Nation (on whose traditional territories we conducted this research), Musqueam, Tsawwassen, and Tsleil-Waututh. However, with the expansion of large-scale commercial fisheries in the mid-twentieth century, Pacific salmon populations came under increasing pressure, and greater restrictions were placed on First Nation people's fishing traditions. During the same period, careless environmental practices in agriculture, forestry, mining, and construction impacted water quality and salmon habitat in parts of the Fraser River watershed (Evenden 2004). While the Fraser River remains one of the most productive salmon rivers in the world, old problems are being exacerbated by new threats from climate change, as warming river waters place increased physiological stress on migrating salmon and enhance vulnerability to infection and disease (Farrell et al. 2008; Martins et al. 2011).

Pacific salmon fisheries in Canada are among the most intensively managed in the world. The management system is complex and includes (but is not limited to) imperatives for predictive modeling of fish movements and returns, real time in-season management, co-management efforts between government and stakeholders, joint management between the US and Canada, and First Nation treaty rights (see Cohen 2012 for a comprehensive description). Three fishing sectors targeting adult migrating Pacific salmon occur in or near the Fraser River: commercial, recreational, and First Nation (FN), all using different gear types, and with different catch allocations and restrictions. All three fishing sectors are managed by the Canadian Department of Fisheries and Oceans (DFO), while commercial fisheries that occur on the US/Canadian waters are subject to the international Pacific Salmon Treaty, a joint treaty between Canada and the US (Cohen 2012). The commercial fishery in the region occurs primarily at the mouth of the river and thus is not directly involved in conflicts on the Fraser River itself. The in-river fisheries are mostly concentrated in the heavily- populated Lower Fraser River, with upper reaches accessible only to FN communities. As such, we focus our case study on the Lower Fraser River and its multi-sector salmon fishery (Fig. 1).

## First Nation fishing

The FNs of the lower Fraser River are traditional religio-political-economic societies with long-held cultural connections to salmon and the environment (Schaepe 2007). Following European settlement, FNs were granted restricted licenses for subsistence only. The 1990 Sparrow Case, in which a Musqueam member was charged with violating terms of his fishing license, led to an important decision by the Supreme Court of Canada recognizing FN fisheries as a constitutional right (Allain and Fréchette 1993). Today, FNs people have priority access to salmon harvest allocations over other user groups. Presently, over 70 FN bands have the legal right to fish for food, social, and ceremonial purposes on the Fraser River (English et al. 2011, Cohen 2012). The FN fisheries are generally small-scale and community-organized, using gill nets, beach seine, and dip nets to target various salmon species. A 2004 agreement to

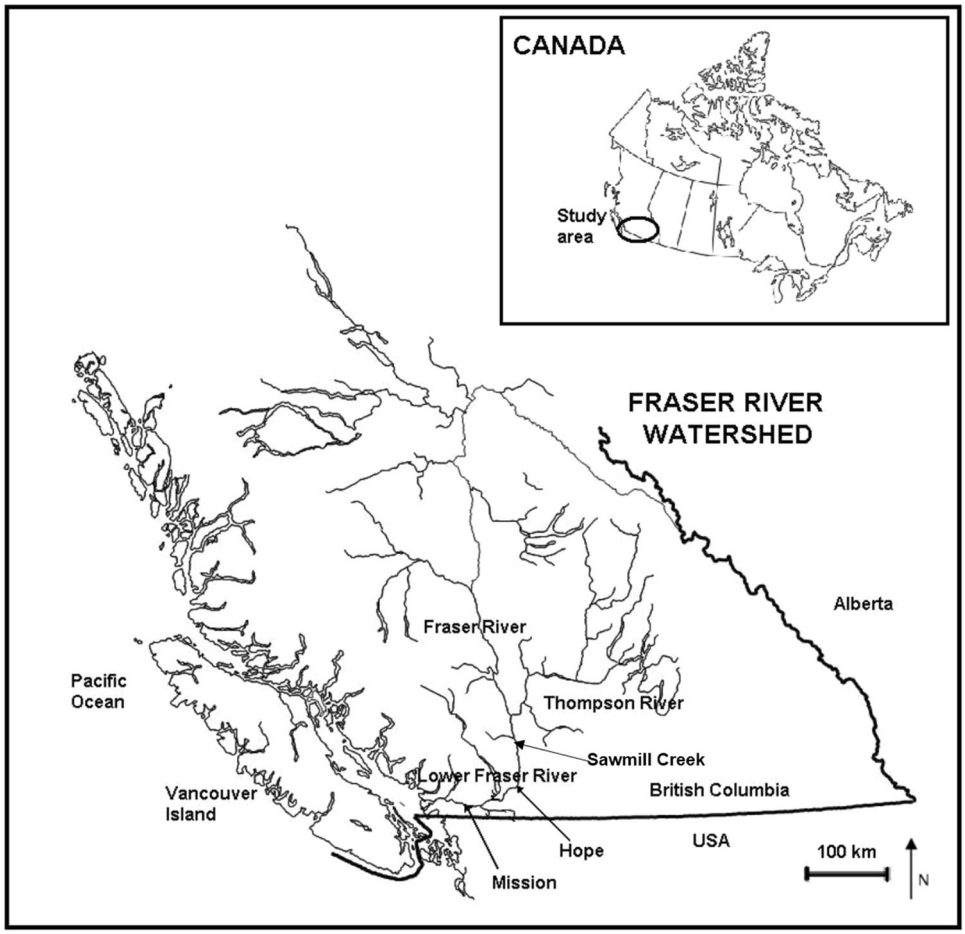


**Fig. 1** Map of the Fraser River watershed study area. Interviews took place on the river bank between the towns of Mission and Hope

establish "Economic Opportunity (EO) Fisheries" allows FN bands to sell their catch commercially for economic development opportunities (DFO 2012). FN fishers can also participate in coastal commercial sockeye salmon fisheries (Cohen 2012).

### Recreational fishing

The recreational fishery for sockeye salmon in the Lower Fraser is relatively recent, established in 1991 (Roscoe and Pollen 2010). Recreational fishers (or anglers) are typically hobbyists who fish for leisure rather than subsistence. In recent years, DFO has sought to grow the recreational fishery, arguing that it generates proportionately more economic benefit than the traditional commercial fishery (DFO 2010). It is now typical for over 1000 anglers to fish the Lower Fraser on a given day during the designated sockeye harvest season (roughly late June–mid-November). Anglers are legally obliged to both purchase a fishing license and pay a conservation fee, and to limit their harvest to two salmon per day.

Conflict between FN and recreational fishers on the lower Fraser has been reported for years, occasionally boiling over in acts of intimidation, fighting, and sabotage. A particularly egregious incident occurred in 2009, in which an FN chief was shot in the face with a pellet gun during a confrontation with a group of anglers. Conflict was also witnessed firsthand by one of the authors during fieldwork. During one such instance, a group of FN fishers drifted a gillnet along the river, forcing anglers to quickly pull in their lines to avoid entanglement. Name calling and yelling ensued, and some anglers casted their weighted lines at the FN fishers in retaliation. Claims of FN fishers throwing discarded bed frames into the river to disrupt recreational fishing have also been made. Such instances are indicative of tensions between the two groups who fish under different rules but often in close proximity to one another.

## MATERIALS AND METHODS

The main data source for this study is semi-structured, face-to-face interviews conducted with recreational and FN

fishers. The interviews touched on several behavioral, attitudinal, and cognitive dimensions related to the fisheries. Of particular relevance to this article is a quantitative question that asked respondents to rank the top three threats to Fraser River salmon populations, out of 12 possible options ("*Considering the list below, please identify and rank the top three factors that you believe have the greatest impact on upriver migrating salmon?*"). The list of options was determined based on a review of the scientific literature, as well as the authors' collective familiarity with common stakeholder concerns. The 12 options were climate change, commercial fishing, First Nation fishing, recreational fishing, water quality, habitat alterations, fish farming, fish health, poaching, mismanagement, urban development, and predation. The options of 'I don't know' and 'other' were also provided. Interviews also asked respondents to explain or elaborate on their choices. This yielded important qualitative data that are analyzed alongside the quantitative findings. The interviews also collected standard socio-demographic information, including age, gender, ethnicity, highest level of education, occupation, and household income. The interview guide was pre-tested with the first three anglers and FN fishers interviewed on the river, and was approved by the Carleton University Research Ethics Board (10102 11-1643).

### Population and data collection

Recreational anglers over the age of 18 were interviewed between August 9 and September 19, 2010, during a recreational sockeye harvest fishery. This population was sampled opportunistically on the riverbank at commonly used fishing sites and boat launches to access large numbers of respondents (Griffiths et al. 2010). Due to the safety of interviewers, we did not include remote sites that are accessible only by boat, nor did we include anglers fishing before dawn or at/after dusk. Anglers were sampled at 17 different fishing sites between the towns of Mission and Hope (see Fig. 1). This stretch of the river is the focus of the majority of recreational and FN fishing efforts. At the study sites, we attempted to interview every second angler along the riverbank to eliminate potential selection bias. It is important to note that following a dismal year of low sockeye salmon returns in 2009, the 2010 return was unusually strong with approximately 30 million sockeye returning (Cohen 2012). Thus, responses from our data collection may be colored by this unusual context.

FN fishers and members involved in the fishing process (including crew monitors, fish buyers, and laborers) were interviewed on the riverbank during two Economic Opportunity Fisheries, one for sockeye using gillnets (24–26 August, 2011) and the other for pink salmon using beach seines (14, 17–19, 24 September, 2011). Unlike anglers, FN fishers are typically organized into crews. We aimed to interview a minimum of 50 % of the members of each crew encountered at a site, including the crew chief in all cases. It is important to note that our population may be skewed toward FN fishers who choose to participate in economic/commercial fishing activities, which may not be representative of the entire FN population.

Seventy-nine percent of anglers (311 of 395) consented to an interview, yielding 302 useable cases (i.e., complete answers) for this particular study. Ninety-seven percent of the FN fishers approached agreed to be interviewed (111 of 115), of which 93 cases were useable.

In 2014, follow-up interviews were performed with leaders of key FN organizations, as well as groups representing anglers ($N = 13$). Participants for this study were identified using public records and supplemented using snowball recruitment via interview participants. These interviews were used to gather the qualitative reflections of key figures on findings from the original round of research.

### Data Analysis

The relationships among group membership (angler or FN fisher), demographics, and the quantitative threat assessment data were assessed using a series of ordinal logistic regressions (OLR). The dependent variables were constructed by recoding the threat assessments provided by each respondent (3 = most serious to 0 = not mentioned). The independent variables included user group (angler or FN fisher), gender, age, and highest level of education attained (dummied). Preliminary tests showed that gender and education were not statistically significant and removed from the model. Age squared was also included in preliminary tests, but removed once it was shown that the effect of age is predominantly linear. Categorical age ranges (dummied) were also tested but ultimately excluded.

We also conducted intercorrelation tests of each group's threat rankings, to see if different types of threat co-vary (positively or negatively). This provided us with information about whether or not certain types of threat tend to be identified together by anglers or FN fishers. For instance, it would be important to know if environmental threats tend to be identified together (habitat degradation and climate change, for example), if user group threats tend to be identified together (commercial fishery and recreational fishery, for example), or if governance themes are identified together (such as mismanagement and urban development, for example). At this step in the analysis, the data on threat perception were recoded as 0 (not mentioned) and 1 (mentioned), because we are interested in knowing which threats go together (and which are averse) rather than in their ordinal ranking per se.

Qualitative data from the riverbank interviews and from the 2014 follow-up interviews were transcribed and thematically coded by the original interviewer. Codes were determined inductively after a first reading of all responses, and applied on a second reading (Thomas 2006). Key quotations were selected for illustrative purposes.

## RESULTS

Basic demographic data from the riverbank interviews are provided in Table 1, and several differences between the groups stand out. The anglers surveyed are older than the FN fishers by an average of almost 10 years, although both populations are significantly older than the average resident of the Greater Vancouver region (32.6 years in 2011). While both populations are dominated by men, the First Nation group has a higher proportion of women (14 % of those surveyed) versus anglers (6 %). The anglers surveyed possess higher levels of formal education, on average, than the FN fishers.

Information on the threats mentioned by the two groups is provided in Table 2. There are similarities along with differences. For instance, the two groups identified habitat degradation, mismanagement, fish farming, and urban development in notably similar proportions. Among the differences, the most frequently identified threat among anglers is climate change (identified by 48 % of respondents), while the modal category for FN fishers is poaching (at 53 %). FN respondents were more likely to identify lesser known environmental threats such as water quality, predation, and fish health. This may be related to more extensive personal experiences of FN fishers with the river, which leads to knowledge of threats that may be hidden to more transient users. One FN fisher (age 58) said that "[We] used to be able to go to the streams. Now the streams are all dead, even the frogs and salamanders are gone," while another FN respondent (age 68) said that "We used to be able to drink out of the river, now you can't. There's too much sewage and pollution."

Overall, anglers appear to be more critical of other user groups than FN fishers. For instance, 42 % of anglers identified the commercial fishery as a threat to sustainability of the resource, while 26 % of FN respondents did the same. Similarly, 37 % of anglers identified the First Nation fishery as a threat, while only 11 % of FN respondents said the same about the recreational fishery. This suggests that the "blame game" in this case may not be as symmetrical as the ACF literature implicitly assumes (more on this later).

The qualitative data provide information on the substance of the complaints that the groups have against one another. Among the anglers, one of the most frequently articulated complaints is that their group is being treated unfairly and that this unfairness is linked to the "special rights" held by FN fishers and communities. For example:

> *First Nations have too many rights. We pay taxes and should have a fair share [of the catch]. Recreational anglers put tax money into the economy. (Angler, age 50–59)*

**Table 1** Demographic characteristics of respondents and prominence of threats identified

| Demographics | FN | Non-FN | Total |
|---|---|---|---|
| Gender | | | |
| Male | 80 | 284 | 364 |
| Female | 13 | 18 | 31 |
| Age | | | |
| 18–20 | 5 | 9 | 14 |
| 21–30 | 27 | 38 | 65 |
| 31–40 | 23 | 50 | 73 |
| 41–50 | 18 | 64 | 82 |
| 51–60 | 13 | 72 | 85 |
| 61–70 | 7 | 43 | 50 |
| 70+ | 0 | 26 | 26 |
| Mean | 38.2 | 47.9 | 45.6 |
| Education | | | |
| <High school | 5 | 12 | 17 |
| High school | 25 | 30 | 55 |
| Some post-sec | 36 | 121 | 157 |
| Bachelor's | 18 | 122 | 140 |
| Graduate degree | 0 | 10 | 10 |
| Total | 93 | 302 | 395 |

**Table 2** Threats identified

| Threat | Number of times identified (with %) | | |
|---|---|---|---|
| | FN | Non-FN | Total |
| Climate change | 33 (36 %) | 146 (48 %) | 179 |
| Commercial fishery | 24 (26 %) | 126 (42 %) | 150 |
| Habitat degradation | 32 (34 %) | 98 (32 %) | 130 |
| First Nation fishery | 7 (8 %) | 112 (37 %) | 119 |
| Poaching | 49 (53 %) | 69 (23 %) | 118 |
| Fish farming | 22 (24 %) | 92 (30 %) | 114 |
| Mismanagement | 23 (25 %) | 83 (27 %) | 106 |
| Water quality | 30 (32 %) | 57 (19 %) | 87 |
| Urban development | 16 (17 %) | 50 (17 %) | 66 |
| Predation | 18 (19 %) | 9 (3 %) | 27 |
| Fish health | 10 (11 %) | 14 (5 %) | 24 |
| Recreational fishery | 10 (11 %) | 7 (2 %) | 17 |
| Don't know | 3 (3 %) | 8 (2 %) | 11 |
| Other | 2 (2 %) | 6 (2 %) | 8 |

*The natives [sic] are taking too many fish. There should be only one fishing regulation for all. [Why] persecute sport fishers while they pay the tax and support the economy? …. The Indian affairs branch needs to be abolished and [we need to] have one law to serve everyone. (Angler, age 60–69)*

A related complaint from anglers has to do with fishing gear, particularly FN fishers' use of nets in the River, which recreational fishers do not use:

*I think the biggest threats to salmon are the nets. Sports fishing [i.e., angling] like this, I don't see it having a huge impact. The most devastating impacts to salmon are the commercial and aboriginal nets. (Angler, age 60–69)*

*Natives [sic] are allowed to use drift nets, which is the most non-selective fishing method and kills too much fish, including sturgeon. I don't mind them catching fish for family, but give them a rod and reel and they can catch as many as they want on rods, just no nets. (Angler, age 60–69).*

FN fishers also have complaints about fairness, although the emphasis here is on perceived injustice through the violation of rights. Some respondents argued that FN rights are restricted in the name of conservation so that other groups have higher harvests:

*We get the brunt of it [i.e., catch restrictions]. It is unfair and frustrating that Coho [salmon] are kept for recreational fishing in the ocean. (FN fisher, age 40)*

A second major complaint is that angling is directly interfering with the FN food fishery. Several respondents reported that community elders see angling, and particularly the practice of catch-and-release, as "playing with food" that violates FN values. There is also a broader argument that anglers are disrespectful of nature and directly cause environmental damage through their presence and habits:

*Recreational anglers dump millions of lead [weights] into the water, they leave tonnes of garbage on the trails and fishing sites, and poop all over the bushes. (FN fisher, age 60).*

*Recreational anglers catch and release every species. They [fish] are beat up because of [the] recaptures, and the natives are blamed for it. (FN fisher, age 67)*

## Ordinal logistic regression tests

Thirteen OLR tests were run with each threat as a dependent variable. As mentioned, gender and educational attainment were not significant in any of these tests and were dropped, while age as a continuous variable was maintained. Table 3 shows the results of these tests, including coefficients and odds ratios.

**Table 3** Results of ordinal logistic regression tests, coefficients, and odds ratios

| | User group (angler = 1, FN = 0) | | | Age (continuous) | | |
|---|---|---|---|---|---|---|
| | Coef | Odds | Sign | Coef | Odds | Sign |
| Climate change | 0.609 | 1.84 | * | −0.01 | 0.99 | |
| Commercial fishery | 0.873 | 2.40 | ** | −0.02 | 0.98 | ** |
| Habitat degradation | 0.066 | 1.07 | | −0.00 | 0.99 | |
| First Nation fishery | 1.994 | 7.35 | *** | 0.01 | 1.01 | |
| Poaching | −1.284 | 0.28 | *** | −0.01 | 0.99 | |
| Fish farming | 0.285 | 1.33 | | 0.02 | 1.01 | * |
| Mismanagement | −0.049 | 0.95 | | 0.02 | 1.03 | ** |
| Water quality | −0.735 | 0.48 | ** | 0.00 | 1.00 | |
| Urban development | 0.098 | 1.10 | | −0.02 | 0.98 | |
| Predation | −2.077 | 0.13 | *** | 0.01 | 1.01 | |
| Fish health | −0.756 | 0.47 | | −0.02 | 0.98 | |
| Recreational fishery | −1.503 | 0.22 | ** | −0.01 | 0.99 | |
| Other | −0.452 | 0.64 | | 0.04 | 1.04 | |

Number of observations = 386 for each DV

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

The OLR tests confirm many of the findings in Table 2, with some important additions. First, it shows the strength of the observed differences in threat perception. FN fishers tend to see poaching, predation, water quality, and the recreational fishing sector as far more serious threats than do anglers. Conversely, anglers see climate change, the commercial fishery, and the First Nation fishery as more serious threats than do FN fishers.

Table 3 also shows the independent effect of age on threat perception. Younger respondents tended to identify the commercial fishery as a major threat to sustainability more than older respondents, even when controlling for user group. In the other direction, older respondents were significantly more likely to identify fish farming and mismanagement as serious threats. Mismanagement is a particularly sensitive issue for older respondents in both groups. The qualitative data show that criticisms of government are harsh and are occasionally intertwined with complaints about other user groups:

*DFO is doing a crappy job. They have no clue how many fish are out there. They need to regulate the natives [sic]. [First Nations] are taking more fish than they are telling us about. They don't need that many fish, and [they are] abusing the resources. They don't have to pay taxes or fees and it pisses me off….*

*I think 80 % of decline in fisheries is due to mismanagement of federal government. (Angler, age 60).*

*DFO doesn't know what they are doing. They just learn out of a book. I'm told by a kid that I don't know nothing. Management from Hope to Mission a couple of years ago was only 3 people for 3000 anglers. There are 30 something people to manage us [who have fewer fishers than recreational fishing sector]. (FN fisher, age 67)*

## Intercorrelation matrices

Intercorrelation matrices can give us a sense of which threats were identified together (and conversely, which were mutually averse) in the two populations. This sheds light on connections among the items that may point to broader themes in how anglers and FN fishers think about threats to the salmon. Table 4 provides the intercorrelations for recreational anglers only. The first thing to note is that all of the statistically significant correlations are negative, indicating aversion. This suggests that there are no consistent patterns among the "three most serious" threats identified by anglers, only in what is not mentioned together. These aversions are still theoretically important, however. For instance, anglers who identified FN fishing as a serious threat to salmon were far less likely to also identify an environmental threat. A similar pattern holds with those who identified the commercial fishery as a threat. These findings suggest that anglers who blame other groups are less inclined to see environmental threats as very serious contributors to the problem. This may indicate that a "blame the other" narrative is conceptually distinct from other possible explanations of threat, particularly environment-themed threats that are unconnected to the actions of either group, such as climate change, habitat degradation, and urban development.

Table 5 presents the same data for FN fishers only. Here, we see less evidence of aversion. Identification of the recreational fishery as a threat to the salmon is not significantly correlated with any other threat. Naming the commercial fishery does, however, correlate negatively with two environmental variables (water quality and habitat). There are also some positive correlations among threats. For instance, the identification of fish farming as a threat is correlated with identification of water quality. Fish farming has a known impact on adjacent ocean waters and the immediate benthic environment (Brown et al. 1987), and it is likely that respondents are referring to marine rather than Fraser River waters in this case. A second and theoretically interesting positive correlation is between identification of the commercial fishery and the FN fishery as a threat to the salmon. Overall, 8 % of FN respondents

**Table 4** Intercorrelations of ranked threats, recoded (0 not mentioned, 1 mentioned), recreational anglers only

| | Climate | Water quality | Rec. fishery | Mismanagement | Habitat | Fish health | Fish farm | First Nation | Predation | Commercial fishery | Poaching | Urban development | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Climate | 1.00 | | | | | | | | | | | | |
| Water quality | −0.04 | 1.00 | | | | | | | | | | | |
| Rec. fishery | −0.16** | −0.02 | 1.00 | | | | | | | | | | |
| Mismanagement | −0.16** | −0.16** | −0.05 | 1.00 | | | | | | | | | |
| Habitat | 0.02 | −0.02 | −0.06 | −0.08 | 1.00 | | | | | | | | |
| Fish health | −0.03 | 0.09 | 0.07 | −0.03 | −0.02 | 1.00 | | | | | | | |
| Fish farm | −0.13* | −0.18** | 0.04 | −0.07 | −0.20** | 0.02 | 1.00 | | | | | | |
| First Nation | −0.25** | −0.19** | −0.03 | −0.12* | −0.23** | −0.14* | −0.05 | 1.00 | | | | | |
| Predation | 0.06 | −0.04 | −0.03 | −0.02 | −0.04 | −0.04 | −0.12* | −0.02 | 1.00 | | | | |
| Commercial fishery | −0.09 | −0.22** | 0.00 | −0.12* | −0.26** | −0.13* | −0.01 | 0.05 | −0.03 | 1.00 | | | |
| Poaching | −0.20** | −0.09 | −0.09 | −0.06 | −0.19** | −0.09 | −0.13* | 0.01 | −0.05 | −0.08 | 1.00 | | |
| Urban development | −0.11 | 0.01 | 0.05 | −0.10 | 0.10 | −0.10 | −0.11 | −0.11 | −0.08 | −0.19** | 0.01 | 1.00 | |
| Other | −0.10 | −0.01 | −0.02 | −0.04 | 0.00 | −0.03 | 0.06 | −0.06 | −0.03 | −0.08 | −0.16 | 0.00 | 1.00 |

* $p < 0.05$; ** $p < 0.01$

**Table 5** Intercorrelations of ranked threats, recoded (0 not mentioned, 1 mentioned), FN fishers only

| | Climate | Water quality | Rec. fishery | Mismanagement | Habitat | Fish Health | Fish farm | First Nation | Predation | Commercial fishery | Poaching | Urban development | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Climate | 1.00 | | | | | | | | | | | | |
| Water quality | −0.03 | 1.00 | | | | | | | | | | | |
| Rec. fishery | −0.04 | −0.17 | 1.00 | | | | | | | | | | |
| Mismgmt | −0.16 | −0.18 | 0.04 | 1.00 | | | | | | | | | |
| Habitat | −0.21* | −0.06 | −0.18 | 0.11 | 1.00 | | | | | | | | |
| Fish health | −0.11 | −0.09 | −0.12 | −0.04 | −0.18 | 1.00 | | | | | | | |
| Fish farm | −0.20 | 0.21* | 0.05 | −0.14 | −0.14 | −0.03 | 1.00 | | | | | | |
| First Nation | −0.13 | −0.20 | 0.03 | −0.16 | −0.12 | 0.16 | −0.06 | 1.00 | | | | | |
| Predation | −0.19 | 0.01 | −0.08 | −0.15 | −0.07 | 0.01 | −0.02 | −0.14 | 1.00 | | | | |
| Commercial fishery | −0.03 | −0.25* | −0.05 | −0.17 | −0.32** | −0.05 | −0.21* | 0.30** | −0.10 | 1.00 | | | |
| Poaching | 0.03 | −0.22* | −0.16 | −0.11 | −0.04 | 0.05 | −0.23* | −0.06 | −0.14 | −0.08 | 1.00 | | |
| Urban development | −0.10 | −0.07 | 0.03 | −0.06 | −0.03 | −0.16 | −0.19 | −0.13 | −0.08 | 0.06 | −0.14 | 1.00 | |
| Other | 0.05 | 0.06 | −0.05 | −0.09 | 0.05 | −0.05 | −0.08 | −0.04 | −0.07 | 0.08 | −0.16 | −0.07 | 1.00 |

* $p < 0.05$; ** $p < 0.01$

identified the FN fishery as a threat, compared to 2 % of anglers who self-identified the recreational fishery. This level of criticism of one's own user group is notable in its own right. However, the close connection to criticism of the commercial fishery may reflect the fact that FN people have long participated in the traditional commercial fishery, and that the two fisheries are more similar in gear and practice than the recreational fishery.

## DISCUSSION

The mental models approach to resource conflicts assumes that inter-group animosity is rooted, in part, in different perceptions and understandings of the issues at play (Denzau and North 1994; Adams et al. 2003). In a more optimistic light, it also suggests that areas of cognitive agreement or convergence can serve as a foundation for conflict resolution (Johnson and Griffith 2010). Our research indicates that there is a great deal of both agreement and disagreement between recreational anglers and FN fishers regarding threats to the Fraser River salmon fishery, which suggests possible avenues for defusing the conflict.

The challenges are significant. The threat perception data confirmed the existence of a "blame game" predicted by the ACF approach, which argues that conflicts are often exacerbated by polarization and stereotyping as groups square off in the public arena. Interestingly, however, we found that this particular blame game is asymmetrical. While members of each group are critical of the other, the tendency is far stronger among anglers, who are highly critical of both the FN and commercial fishery. The qualitative data shed some light on this. Both groups have complaints about fairness, which are potentially a serious obstacle for defusing the blame game. Perceptions of distributive and procedural fairness are critical for stakeholder cooperation and support for social and political institutions, and a perceived lack of fairness can worsen the current situation by further polarizing the camps (Tyler 1990; Lubell 2000). However, our interviews showed that the groups have different types of complaints against one another. Anglers' main complaint against the FN fishery appears to be based on special rights of access and gear. Because these rights are group based, they can be projected against an entire population, which some anglers appear to do. In contrast, FN complaints about rights violations are directed more toward government than anglers per se. FN critiques of anglers are based on particular behaviors, such as "playing with food" and disrespect toward nature in the form of river and trail pollution. These complaints can be interpreted as objections to individuals and their choices (proverbial "bad apples") rather than against the

recreational fishery as a whole. In our view, this is an important difference which may explain the asymmetry in this particular "blame game." First Nations people are criticized as a group, while anglers are criticized (less frequently) for the specific behavior of individuals.

To overcome animosity, we must look to cognitive similarities. First, the intercorrelation tests suggest that, within both groups, respondents who cited environmental threats were less likely to blame other user groups. Environmental threats are therefore a potential area of common ground that deflects attention from the blame game. In our view, this suggests a possible entry point for policy-makers and other parties looking to bring the two groups closer together on areas of shared concern. There are several ways that this could happen. First, DFO could sponsor forums for stakeholders to advise government on potential solutions to environmental problems, thus placing emphasis on areas of agreement and common concern. DFO has engaged in similar practices before, such as the "Integrated Salmon Dialogue Forum" meetings that bring stakeholders together and have been held intermittently since 2007. These forums have been criticized, however, for lacking direction and having no official power to issue recommendations or compel responses from DFO, and would need to be significantly reformed to satisfy the different groups (Cohen 2012, p. 102).

Second, stakeholder meetings could happen independent of government. The follow-up interviews conducted in 2014 found enthusiasm among leaders of both groups for an initiative called the "Fraser River Peacemakers." The Peacemakers was established as a cooperative FN-angler organization in 2009 as a means of gathering information on riverbank conflicts, promoting etiquette among fishers, and de-escalating confrontations (http://fraserriverpeacemakers.ca/). While tension was high within the Peacemakers in early years, the organization has since evolved into a key point of contact and coordination between the two groups that members credit for building relationships and presenting a united front to government regulators. The following quotations are from the 2014 round of follow-up interviews:

> *[DFO's] biggest fear is that [anglers] and First Nations get together, and when we do they can't play us against each other. They have to listen at that point. [The] history has been that when First Nations want some form of fishery, DFO says 'the sports guys can't live with that,' and if [anglers] want something, 'the First Nations won't agree with that.' If we walk in together it forces their hand…. That's the benefit of the Peacemakers. (Peacemakers co-founder)*

> *Many of us now realize that there are bigger fish to fry here. The River is still under threat from big [industrial] projects that governments aren't paying enough attention to and are approving without thinking about the long term. … [The] cooperation [we show through the] Peacemakers goes a long way to reducing conflict even among regular anglers, because they know we're all pushing for the same improvements. (Angler, age ~65)*

Independence from government may have another advantage. The threat perception data showed that anglers and FN fishers have similar levels of concern about habitat degradation, mismanagement, and urban development (in descending order of severity). Fish farming may also be included in this list, as the observed differences are more readily explained by age of respondent than by group membership. Together, these common perceived threats can be considered as a general concern with governance of the resource that involves a critique of both government and the non-fishing private sector. As evident in the quotations above, this criticism can be a rallying point for the groups, encouraging cooperation in pursuit of shared goals. This is consistent with the ACF literature, with the twist that coalitions are not mobilizing against one another in this case, but instead coming together, at least in a limited way, to address perceived shortcomings in governance.

In light of our findings, we advance the following recommendations to policy-makers looking to defuse conflict on the Lower Fraser and promote better understanding and collaboration between recreational anglers and FN fishers. We note that although these recommendations are based on the Fraser River experience, the general lessons are relevant to other cases of longstanding user group conflict.

1. Policy-makers should recognize that recreational anglers and FN fishers have different perceptions of one another, rooted in different mental models. Given that anglers are more likely to complain about group characteristics (particularly FN rights), efforts should be made to enhance awareness among anglers of the origins of FN rights and their applicability to fisheries management.
2. Efforts should be made to contain and counter the "blame the other" narrative within each group (while recognizing that it is more prominent among anglers than FN fishers). A heightened awareness of environmental threats appears to discourage the assignment of blame to other groups. More public and stakeholder education on current environmental challenges facing the river may help discourage these views.
3. Existing forums for bringing individual members of the groups together should be restructured to grant them authority to produce official recommendations. These forums should focus predominantly on areas of

relative consensus, particularly on environmental and governance issues of common concern.

4. The existence of informal third party groups such as the Peacemakers should be widely publicized. DFO should encourage and support the group to build its profile and legitimacy by inviting it to participate directly in consultative and planning processes. However, given that much of the group's legitimacy appears to be based on its autonomy, DFO should not interfere with or attempt to formalize the group.

## CONCLUSIONS

While resource conflicts are often conceptualized as cases of competing interests or contests among advocacy coalitions, we build on recent studies suggesting that they are often exacerbated by deeper cognitive and perceptual differences across user groups. In our view, the first step in managing and diffusing resource conflicts is to better understand similarities and differences in how the groups understand threats to the resource. Our riverbank surveys with recreational anglers and FN fishers uncovered both agreement and disagreement across the groups. One major area of disagreement was over responsibility for threats to the resource (a classic but asymmetrical "blame game"). At the same time, however, substantial agreement on key environmental and governance issues was uncovered. This suggests a potential way forward for leaders seeking to defuse the conflict by enhancing collaboration on key points of convergence in perception. We recommend that the user groups and the regulator explore options for enhanced cooperation on areas of relative consensus, such as environmental stewardship and governance reforms, both within and independent of official processes.

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