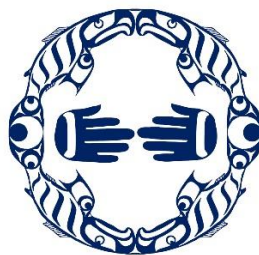


Improving socio-economic valuation in the aquatic species at risk process for First Nations in BC

Discussion Paper

Dorothee Schreiber, Tamarack Research

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FIRST NATIONS
FISHERIES COUNCIL

Introduction

First Nations Fisheries Council (FNFC) is working with DFO to engage First Nations on the aquatic species at risk conservation cycle, with an overarching objective to improve First Nations engagement at each step of the process. The purpose of this discussion paper is to provide analysis for First Nations, and recommendations to DFO and First Nations, on the shortcomings of current approaches to socio-economic analysis (SEA) in the *Species At Risk Act* (SARA) process for aquatic species, and how SEA in SARA may be adapted to protect, reconcile, and advance First Nations interests.

A workshop, as part of a 5-part series, was held in February 2021 to engage First Nations delegates and environment staff on SEA in the aquatic SAR. Additional information on the workshop series can be found in FNFC's *Aquatic Species At Risk In The Pacific Region Virtual Workshop Series Summary Report 2021*. In advance of this workshop, a briefing note was circulated to participants. The briefing note provided background and preliminary analysis for First Nations on the existing mechanisms for First Nations engagement and the challenges that arise when DFO applies SEA to aquatic species at risk.

This discussion paper grew out of the research and development for the preliminary briefing note and was informed by both the Tier 2 (DFO and First Nations) and Tier 1 (First Nations only) discussions held at the February 11, 2021 workshop. The key documents consulted in preparing this discussion paper include DFO's 2016 *Guidelines for Inclusion of Benefits in Cost-Benefit Analysis* and DFO's 2016 *Framework for Integrating Socio-Economic Analysis in Species at Risk Act Listing Decisions*. A sample cost-benefit analysis for a listing decision was also consulted: DFO's 2019 *A Cost-Benefit Analysis on the Potential Impacts of Adding Thompson River Steelhead and Chilcotin River Steelhead (*Oncorhynchus mykiss*) to Schedule 1 of the Species at Risk Act as Endangered*.

How does socio-economic analysis (SEA) enter into the Species at Risk Conservation cycle?

The main application of SEA for species at risk is when Canada is deciding whether or not to list a species on Schedule 1 of SARA. A cost-benefit analysis is at the core of Canada's approach to SEA.

SEA is used at several points during the Species at Risk conservation cycle, in particular, to guide decision-making around legal protection and the actions that will be taken to aid in the recovery of the species and its habitat.

A summary of the steps taken under SARA for species assessment, listing, recovery planning, and protection can be seen in Figure 1. Species are assessed at regular intervals by an independent scientific committee, COSEWIC (Committee on the Status of Endangered Wildlife in Canada), that determines whether a species is special concern, threatened, endangered and/or extirpated. If the species is found to be in one of the latter three categories (threatened, endangered, and/or extirpated), a listing process is initiated. The next step is the drafting of a Recovery Potential Assessment (RPA), which provides scientific information on the current status of the species, threats to its survival and recovery, and the species' potential for recovery.

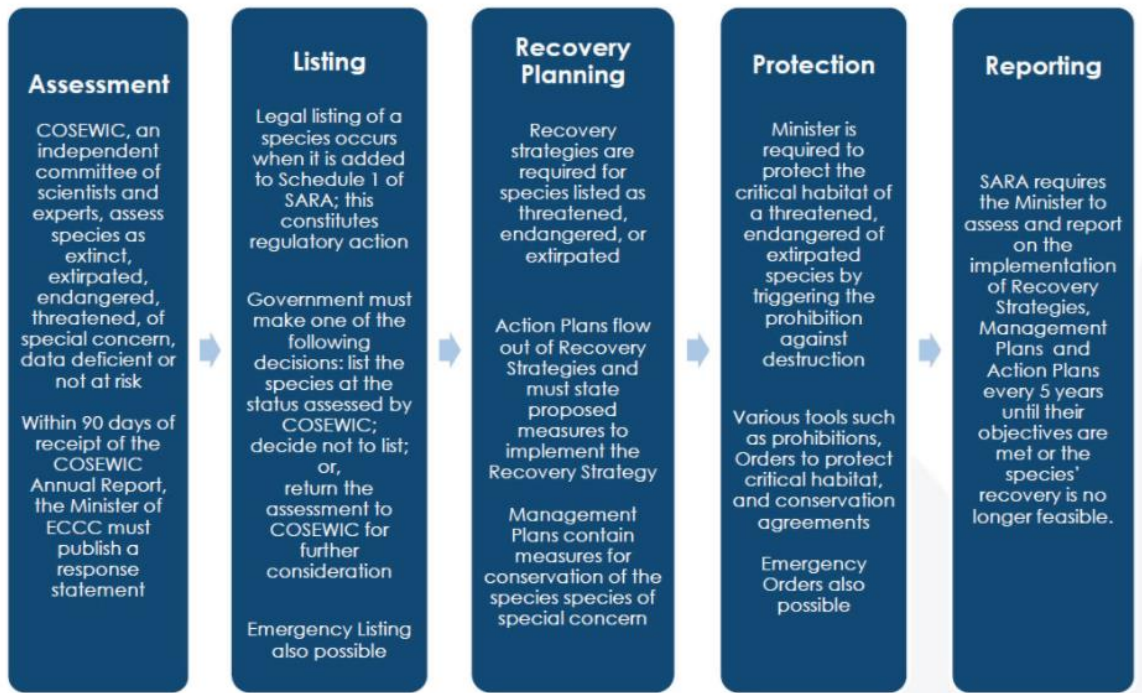


Figure 1. A detailed summary of the assessment and normal listing process. Source: DFO. <https://www.dfo-mpo.gc.ca/transparency-transparence/mtb-ctm/2019/binder-cahier-1/1F4-sara-lep-eng.htm>

Because SARA listing on Schedule 1 triggers automatic prohibitions (such as prohibitions on harming or destroying individuals of the species or its habitat), as well as recovery measures, the consequences of listing a species – affording it legal protection – may have significant socio-economic impacts. It is these positive and negative socio-economic impacts that Canada attempts to capture through its socio-economic valuation procedures.

The Minister of Environment, on the recommendation of the Minister of Fisheries and Oceans, posts a response to the COSEWIC assessment for a given aquatic species at risk, within 90 days of the COSEWIC assessment. This response statement is informed by the Minister of Fisheries and Oceans, who recommends proceeding with either a “normal” or “extended” listing process.

When a species undergoes a “normal” listing process, the SEA is considered to be a low impact analysis and can therefore be limited to a qualitative assessment. In the case of an “extended” listing process – used in cases where the listing has medium/high biological and socio-economic impacts – a Recovery Potential Assessment is completed, which launches a detailed SEA. The precise scope of the SEA is determined by the lead DFO region. The DFO undertakes a triage process to distinguish low-impact listing decisions from those with medium- to high-impact. However, it is safe to say that the vast majority of listing decisions that have impacted First Nations are medium to high impact and have followed the “extended” listing process. There is limited to no public information available on how the department undertakes this triage process.

The Treasury Board of Canada Secretariat’s (TBS) Canadian Cost-Benefit Analysis Guide is the regulatory framework used by Canada to guide SEA across departments. DFO is therefore required through this policy to use it when considering listing a species on Schedule 1.

The detailed cost-benefit analysis forms the basis of the listing recommendation package for the Minister’s consideration and is used for medium/high impact decisions. Once a listing decision has been made, there may be several regulatory and non-regulatory recovery actions that could help recover the species at risk. The different socio-economic impacts of these actions are assessed. Aside from a critical habitat protection order, which is a rare occurrence, these non-listing related parts of the SARA conservation cycle do not require the detailed cost-benefit analysis as mandated by the TBS guide.

Therefore, the main application of SEA in SARA remains the cost-benefit analysis used in medium/high impact listing decisions. The chart in Figure 2 provides an overview of the points at which SEA is used in SARA decision-making.

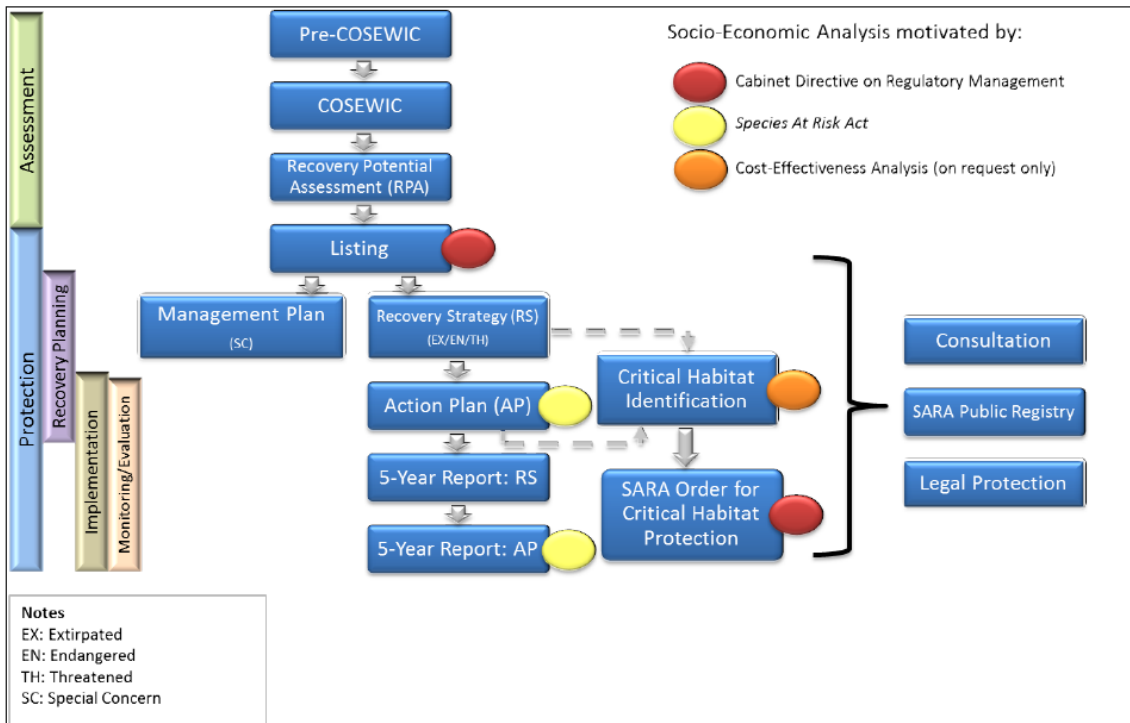


Figure 2. Overview of the points at which SEA is used in SARA decision-making. Source: DFO. 2016. Framework for Integrating Socio-Economic Analysis in Species at Risk Act Listing Decisions. P. 7.

In Figure 2, red signifies the points at which socio-economic analysis is motivated by the Cabinet Directive on Regulatory Management (CDRM), which calls for a cost-benefit analysis. The cost-benefit analysis provides decision makers with information about the net benefits to society of a regulatory decision, in this case listing a species on Schedule 1. A cost-benefit analysis mandated by the CDRM comes into play at the listing decision stage, and also when a critical habitat protection order is being considered; however a critical habitat protection order is relatively rare. Yellow signifies socio-economic analysis that are driven by SARA itself but they do not include a cost-benefit analysis of the type required by the CDRM. Orange signifies yet another type of socio-economic analysis that is undertaken on request, and then only to decide on socio-economic impacts if there is an abundance of habitat and DFO is looking to designate a cost-effective configuration of critical habitat.

How does a cost-benefit analysis work when applied to a species at risk listing decision?

The cost-benefit analysis asks whether there is a net (dollar value) benefit to listing a species, based on the most likely scenarios for population recovery identified in the Recovery Potential Assessment.

Quantitative information that can be added and subtracted to arrive at a “net benefit” figure appears to be prioritized over qualitative information. A typical cost-benefit analysis for a listing decision contains almost no information on First Nations socio-economic values, aside from FSC food replacement values.

As DFO explains it, cost-benefit analysis “provides decision-makers with information about the net benefits to society of various approaches to achieving policy objectives.”¹ The purpose of the analysis is to break down the incremental costs (compliance and administrative costs) and the benefits that will be borne by those who may be affected by the decision.

A cost-benefit analysis for a listing decision compares the net economic benefit of a “List” decision to the net benefit of a “Do not List” decision. DFO completes detailed analyses of impacts to commercial and recreational fisheries. Recreational fisheries are discussed in terms of license sales and direct spending, businesses that serve the recreational fishing industry directly, and spin-off impacts that support regional economies more broadly. The analysis for commercial fisheries uses data on landings, prices and costs, and also considers regional economic impacts of listing to the commercial harvesting and processing sectors. Economic indicators include GDP, employment, and household income.

Distributional analysis is supposed to assess the “incremental costs to vulnerable segments of social and economic groups,” which are identified by DFO as businesses, communities, and regions.²

Impacts to First Nations are discussed almost entirely in terms of the replacement cost of fish caught in FSC fisheries. Cost-benefit analyses conducted by DFO for listing decisions acknowledge that the food replacement cost “does not capture the full values associated with First Nations food, social and ceremonial fishing.”³ And while the analysis may refer to the immense cultural value of a species to First Nations, these values are not described in any detail in the cost-benefit document. An example of this is given in **Appendix A, which reproduces the cost-benefit summary chart for the listing decision for the Thompson River and Chilcotin River Steelhead.**

¹ DFO. 2016. Framework for Integrating Socio-Economic Analysis in Species at Risk Act Listing Decisions. P. 7.

² DFO. 2016. Framework for Integrating Socio-Economic Analysis in Species at Risk Act Listing Decisions. P. 20.

³ Fisheries and Oceans Canada, 2019. A Cost Benefit Analysis on the Potential Impacts of Adding Thompson River Steelhead and Chilcotin River Steelhead (*Oncorhynchus mykiss*) to Schedule 1 of the Species at Risk Act as Endangered. p. 33.

First Nations concerns with DFO's cost-benefit analyses under SARA

- **DFO's description of First Nations' socio-economic values lacks detail and depth.** DFO tends to consider only the economic costs of foregone FSC fishing for First Nations under a "List" scenario. The cost-benefit analysis does not incorporate information on the impacts of a "List" decision on Indigenous governance and stewardship rights, cultural practices, cultural continuity, language, food sovereignty, and many other values of importance to First Nations. It is also not clear how DFO weights quantifiable information (on food replacement costs, for example) relative to qualitative information in the cost-benefit analysis.
- **First Nations are not engaged in the drafting of the cost-benefit analysis sent to the Governor-in-Council.** The cost-benefit analysis that is developed when a species is being considered for listing is done based on management scenarios on which First Nations are not consulted, and contain only short sections on First Nations values. These sections focus on easily quantifiable information that mirrors the economic information collected on non-Indigenous fishers. First Nations must have the opportunity to draft their own socio-economic analyses.
- **First Nations are treated as Canadian stakeholders in DFO's cost-benefit analysis for listing decisions.** DFO lumps costs/benefits to First Nations, with costs/benefits to Canadians without constitutionally-protected rights, to come up with a 'net benefit to Canadians' figure. An example of this can be seen in Appendix A, wherein the cost-benefit summary statement for steelhead, First Nations are identified as "Canadians," right underneath "tidal anglers" and "freshwater anglers." Asking First Nations to attach economic values to fish centred in the colonial lens of property and profit, is in itself an act of assimilation and goes against reconciliation principles.
- **The interests of commercial or recreational fisheries are often prioritized over the constitutionally-protected rights and interests of Indigenous people.** Thus, Indigenous people feel that they are treated as just another stakeholder. This is especially the case where a listing decision would result in closing recreational or commercial fisheries, costing these sectors in the short term, but benefiting the ecosystem and First Nations' cultural survival in the long term. The costs and benefits of non-Indigenous economic sectors tend to be well described within the cost-benefit analyses, with detailed figures on employment, economic spin-offs, and impacts on the regional economy. The costs and benefits used in the First Nations portion of the analysis are highly data deficient.

- **The cost-benefit framework used by DFO for listing decisions deals only with incremental costs and benefits.** This means that cumulative impacts of lost access to fisheries are not considered in the valuation. Only the difference in impact between continuing with current measures and implementing the management measure can be considered. For example, when a fishery has already been severely depleted, the costs already borne by First Nations to conserve the species for other users cannot be included. Similarly, the benefit of bringing a species back from the brink of extinction will be measured in terms of the incremental and immediate benefit of marginally greater fish abundance, not in terms of a devastating cost (extirpation or extinction) that was avoided.
- The possible cost of loss of species (extirpation/extinction) under a “Do not List” scenario is also not directly considered. Where costs to First Nations fisheries are considered, the **analysis appears to be limited to the cost of replacement fish under a scenario** where First Nations are unable to access food fish. As such, the importance of fish and the act of fishing is not reflected in the cost-benefit framework. First Nations often express that **losing the connection and ability to fish equates to a loss of identity and culture.** In most cases, First Nations have already borne the brunt of conservation by being limited to a food fishery only, and in some cases, First Nations have also voluntarily closed their FSC fisheries. These sacrifices are not included in the “cost” side of the ledger.
- **DFO has embraced the concept of Willingness to Pay (WTP), as a tool for assessing the non-market value of species at risk.** There have been extensive critiques in the literature suggesting that WTP is not a reliable or useful estimate for non-market values. For example, willingness to pay studies ask respondents how much they would pay to help maintain a species, a wetland, etc., but they do not ask respondents for the compensation value (how much they would require as compensation for loss of the species, wetland, etc.), which has been shown to be substantially more than the maintenance value. From a First Nations perspective, WTP valuation will likely be considered problematic, not only because it is inconsistent with Indigenous approaches, but also because WTP data for fish or aquatic habitats is usually gathered from recreational anglers or other recreational users of the resource.

Recommendations for First Nations

- **Cost-benefit analyses are not limited to quantitative data.** The guidance document on cost-benefit analyses for listing decisions clearly states that “The focus of the analysis should not be simply on developing socio-economic information that lends itself to

monetization of the incremental costs and benefits, but on presenting the quantitative and qualitative information that best demonstrates the expected biological and socio-economic outcomes.”⁴ This is an important opportunity to fully describe the costs and benefits of the various management scenarios being proposed. **First Nations can contribute critical information on the socio-economic impact of the listing decision, in terms of impacts to: physical, mental, spiritual, and economic health, language, cultural continuity, language, and food sovereignty (as well as other factors, as determined by the First Nation).**

- **First Nations need to determine how different tables** (for example, technical, management, governance) **will be engaged internally** (within First Nations) **and externally** (with DFO/federal government) with the process and/or the results of such analyses.
- First Nations feel that they are constantly being asked to conform to DFO’s existing processes, including the cost-benefit process used to evaluate whether a species at risk should be listed. **First Nations may want to consider creating their own socio-economic analysis for listing decisions, which can be broader in scope than the cost-benefit analysis mandated by the TBS.** The analysis could consider the full range of socio-economic factors, as determined by the First Nation, including historical factors, cumulative effects, and the extent to which thresholds are being approached or have already been surpassed. This analysis could be submitted as a stand-alone document by the Minister to the Governor-in-Council, much as in the federal impact assessment process, Impacts to Rights documents are prepared by First Nations, and submitted alongside the Impact Assessment Agency’s report for consideration by the Governor-in-Council. The Indigenous Cultural Significance (ICS) Framework, as contemplated by DFO, may be a step in the right direction, if it allows First Nations to develop their own analyses that include cultural components in a holistic way. Additionally, **First Nations should consider leading the development and implementation of a framework that outlines how First Nations-led SEA should, and should not be, engaged in existing SARA processes and decision-making.**

Recommendations for DFO

- **DFO should commit funding to First Nations to prepare socio-economic analyses of species at risk, well in advance of the listing process.** Asking First Nations for socio-economic input to inform listing decisions by way of workbooks or engagement forums

⁴ DFO. 2016. Framework for Integrating Socio-Economic Analysis in Species at Risk Act Listing Decisions. P. 10.

does not do justice to the careful research required to do a socio-economic analysis. First Nations need to be assured of sufficient time, funding, and staff capacity to develop their own meaningful socio-economic analyses for species valued by the community. There should also be opportunities for First Nations to workshop their socio-economic analyses in Tier 1 discussions, and for communities within larger nations to decide whether or not to collaborate on their socio-economic analyses. DFO should also be flexible to how First Nations describe and evaluate species, which may include a more holistic view (e.g. may not be singular species focus, nor only focus on the species being considered for listing).

- **The Indigenous Cultural Significance (ICS) Framework can be a starting point for First Nations to develop their own socio-economic analyses.** However, the framework should be co-developed with First Nations. The ICS Framework should not become a mechanism for DFO to collect information to input into yet another DFO-led SEA analysis. Instead, **the Framework should be co-developed and put into practice by First Nations themselves.** Supporting a few communities to pilot the use of the ICS Framework will help to develop the possibilities of the Framework and make it Indigenous-led. Other First Nations can then use these pilots as a framework for structuring their own socio-economic analyses.

- **Before First Nations commit to sharing detailed socio-economic descriptions for use in SARA cost-benefit analyses, DFO should explain how the data will be used.** For example, how will First Nations non-market values for the species be valued in the cost-benefit analysis? How will DFO use this information to meet its obligations under Section 35 of the Constitution Act? Will the available quantitative data be lumped together with the costs/benefits of non-Indigenous Canadians, to come up with a “net benefit to Canadians” value?

- **DFO should explain how Indigenous rights to fish for sale are included in SARA cost-benefit analyses.** It is unclear to First Nations why only FSC is considered when economic costs and benefits are calculated, when First Nations assert, and in some cases even have court decisions supporting an inherent right to fish for sale. The fact that First Nations have been restricted to an invented “food fishery” for more than 100 years, thereby conserving the fisheries for non-Indigenous fishers, must be taken into account when costs and benefits of a “List” scenario are being discussed. First Nations expect to resume fishing for sale for certain species, when it is sustainable to do so. This requires that the distribution of net benefits be considered over a longer time frame than what is currently possible under the TBS cost-benefit approach.

- **DFO should explain how a given cost-benefit analysis incorporates the priority rights of Indigenous peoples to fish, after conservation needs have been met.** In other words, how does the “List” scenario apportion the economic costs between First Nations rights-holders and non-Indigenous stakeholders?
- **Cost-benefit analyses submitted as part of the recommendation package to the Governor-in-Council should include an explanation of how constitutional obligations towards First Nations are addressed in the cost-benefit analyses.** In other words, how are net benefits to First Nations considered, relative to net benefits to Canadians? In line with the respect for and implementation of UNDRIP, reconciliation, Indigenous Title and Rights, **DFO should engage with First Nations in co-developing the recommendation package sent to the Governor-in-Council.**
- **DFO should engage First Nations in the development of management scenarios for listing decisions.** Management scenarios are foundational to the SEA because they include details on the prohibitions, exemptions, and other regulatory requirements that would come into effect if the species is listed. First Nations have expressed frustration over the fact that First Nations' input and views are not fully incorporated into this critical stage of decision-making.
- **DFO should invest in work to clarify and increase transparency on the triage process to distinguish low impact listing decisions from those with medium to high impact.** This includes creating transparency on the knowledge and contextual factors considered for determining impact levels, and how it will impact First Nations and First Nations engagement.
- **Willingness to Pay (WTP) should not be used as a proxy for biodiversity/ecosystem values, and other “non-consumptive” values to be gained by a “List” decision.** As explained above, the WTP metric is derived from non-Indigenous stakeholders, and does not capture First Nations values, nor does it recognize the inherent stewardship, governance and constitutionally-protected rights of First Nations.
- **Cost-benefit analyses for listing decisions should not limit “First Nations non-consumptive values” for a species to the First Nation’s lost opportunities to practice culture while restrictions are in place.**

The cost-benefit analysis for Thompson River and Chilcotin River Steelhead is a case in point. The “non-consumptive” value to non-Indigenous Canadians is estimated based on published Willingness-to-Pay studies in which Canadians (or non-Indigenous people in the United States) were asked to estimate how much their household would be willing to contribute towards the conservation of the species in question. DFO interpreted the “non-consumptive value” of steelhead in terms of the dollar value non-Indigenous Canadians would, hypothetically, be willing to contribute towards recovering this endangered fish species.

In the cost-benefit analysis for Thompson River and Chilcotin River Steelhead, DFO used a Willingness-to-Pay estimate of CAD \$69.44 to CAD\$79.57 per household for listing the species, yet concluded that “it is not possible to assess whether these high non-market benefits exceed the total costs of Listing including the likely significant non-monetized costs related to First Nations food, social and ceremonial values that will be impacted by a Listing decision.”⁵

DFO assumed that First Nations would only be concerned with the negative cultural impacts of not being able to fish while restrictions were in place, rather than with the long-term recovery of the species. In other words, DFO did not recognize that First Nations want to restore productive fisheries and look forward to thriving Indigenous economies and communities. In the Thompson River and Chilcotin River Steelhead analysis, there was no discussion of who should bear the brunt of fisheries closures, and whether First Nations fisheries could be kept open, under the priority scheme laid out in the Sparrow decision. First Nations “non-consumptive values” were estimated in a manner that failed to capture First Nations conservation values for the future. This pits First Nations’ lost “non-consumptive” values associated with lost FSC fishing in the short term, against the Willingness-to-Pay of Canadian consumers for recovery of the species in the long term.

- **DFO should improve SEA policies to reflect and respect Indigenous Rights and Title, including UNDRIP implementation.** This could include, but is not limited to, supporting First Nations-led co-development and implementation processes mentioned in the previous recommendations. Article 29 of UNDRIP states that “Indigenous peoples have the right to the conservation and protection of the environment and the productive capacity of their lands or territories and resources.” Applied to the SARA recovery cycle,

⁵ Fisheries and Oceans Canada, 2019. A Cost Benefit Analysis on the Potential Impacts of Adding Thompson River Steelhead and Chilcotin River Steelhead (*Oncorhynchus mykiss*) to Schedule 1 of the Species at Risk Act as Endangered. p. xiii

Article 29 means that Indigenous peoples have a right to the recovery of culturally and economically important species at risk. This right is not contingent on “net benefit to Canadians.”

Conclusion

Treaty and aboriginal rights have a higher significance in Canadian law than the economic interests of Canadian stakeholders. Yet, First Nations have the sense that when it comes to cost-benefit analyses under SARA, they are engaged as an interest group, not as a rights holder. DFO recognizes that the focus should not be simply on developing socio-economic information that lends itself to the monetization of the incremental costs and benefits. However, there are significant challenges that remain in engaging with DFO on socio-economic analyses. The challenge is not to represent First Nations' rights and interests in quantitative terms. Rather, there is a relationship challenge to have DFO recognize the stewardship, jurisdictional, and harvesting rights of First Nations. In fulfilling its constitutional obligations, DFO must not be limited by the bureaucratic procedures mandated by SARA or the government guidelines such as the TBS cost-benefit guide.

Appendix A: The cost-benefit summary chart for the listing decision for the Thompson River and Chilcotin River Steelhead

Cost Benefit Analysis of Listing Thompson River and Chilcotin River Steelhead DUs (June 2019)

Table A: Cost-Benefit Statement – Listing Scenario 2 with Scientific Permits for Both TR and CR Steelhead DUs (unless otherwise specified) (in Million 2016 C\$)

Incremental Costs and Benefits	1st Year Impacts	5 th Year Impacts	10 th Year Impacts	Last Year Impacts	Present Value over 20 years	Annualized over 20 years
A. Quantified Impacts \$						
Incremental Costs \$:						
<i>Business/Industry</i>						
• Commercial Salmon Fishery (discounted at 7% over 20 years)	7.2	5.5	3.9	2.0	82.0	7.7
• First Nation EO, Demo Fishery (discounted at 7% over 20 years)	0.3	0.3	0.2	0.1	3.9	0.4
• Seafood Processing Sector (linearly discounted at 7% over 10 years)	1.5	0.3	0	0	4.8	0.4
• Lodge/Charter Businesses (linearly discounted at 7% over 5 years)	6.9	0.2	0	0	16.2	1.5
Sub-Total	15.9	6.3	4.1	2.1	106.9	10.0
<i>Canadians</i>						
• Tidal Angler Surplus (linearly discounted at 7% over 3 years)	36.2 to 65.7	0	0	0	65.4 to 118.7	6.17 to 11.2
• Freshwater Angler Surplus (linearly discounted at 7% over 3 years)	0.5 to 2.5	0	0	0	0.9 to 4.5	0.08 to 0.4
• First Nations Food Replacement (discounted at 7% over 20 years)	1.5 to 2.1	1.2 to 1.6	0.8 to 1.1	0.4 to 0.6	17.1 to 23.9	1.6 to 2.3
Sub-Total	38.2 to 70.3	1.2 to 1.6	0.8 to 1.1	0.4 to 0.6	83.4 to 147.1	7.85 to 13.9
Total	54.1 to 86.2	7.5 to 7.9	4.9 to 5.2	2.5 to 2.7	190.3 to 254.0	17.9 to 24.0
B. Quantified Impacts in Non-\$						
Negative Impacts:						
<i>Business/Industry</i>						
• Commercial Fish Harvester (including First Nations)	<ul style="list-style-type: none"> • Almost 1150 commercial marine vessel crew members will be impacted directly. Estimates of jobs impacted in EO/Demo fisheries are not available. • This translates to a 1 year direct household income impact of \$4.2M for commercial harvesters (including First Nations EO/Demo fisheries). 					
• Recreational Sector	<ul style="list-style-type: none"> • About 1171 direct jobs related to the recreational sector are expected to be lost with a 1 year income impact of \$25.5M. 					
• Seafood Processing Sector	<ul style="list-style-type: none"> • Approximately 120 direct jobs are anticipated to be lost with an associated 1 year income impact of approximately \$4.2M for processing sector. 					

Canadians	
<ul style="list-style-type: none"> • First Nation Groups 	<ul style="list-style-type: none"> • About 51 and 93 First Nations groups harvest for Food Social, Ceremonial purposes in the South Coast and Fraser areas, respectively, that would be closed under Listing. • Further, additional impacts anticipated to other Nations. Nations may trade with those that directly harvest in affected areas or they may be gifted harvest from the affected closure areas.
Positive Impacts:	
Quantified Benefits of Steelhead Recovery	
<p>Productivity Model 2b: 1 Year Productivity Model (Most Likely)</p> <p>Under zero exploitation mortality from fishing is expected to be 0%</p> <ul style="list-style-type: none"> • TR DU: growth abundance is not likely at 4% probability in 6 generations and recovery not likely at 1% probability • CR DU: growth abundance is not likely at 0% probability in 6 generations years and recovery not likely at 0% probability 	<ul style="list-style-type: none"> • The probability of Recovery of TR or CR DU is not anticipated under the 1 year mean productivity model. See "other qualitative impacts" for discussion of Listing benefits below in section "C. Qualitative Impacts".
<p>Productivity Model 2a: 5 Year Mean Productivity Model (Best Case)</p> <p>Under zero exploitation mortality from fishing is expected to be 0%</p> <ul style="list-style-type: none"> • TR DU: 41% probability of growth abundance in 6 generations and recovery not likely at 2% probability • CR DU: 100% probability of growth abundance in 6 generations and recovery is highly likely at 97% probability 	<p>Applies to Only CR DU or Both TR and CR DU Listing Decision:</p> <ul style="list-style-type: none"> • For the benefits to equal the monetized costs, WTP for recovery would need to be \$1.80 to \$2.41 for listing CR or both TR and CR DUs. • Based on values from Wallmo and Lew (2010), benefits of recovery far exceed this value (estimated to range from about CAD \$69.44 to CAD\$79.57 per household). This demonstrates that the monetized benefits of recovery under a listing decision are anticipated to be significantly higher than the monetized costs under this productivity model.
<p>Productivity Model 2c: 10 Year Mean Productivity Model (Positive Growth)</p> <p>Under zero exploitation mortality from fishing is expected to be 0%</p> <ul style="list-style-type: none"> • TR DU: growth abundance is likely at 81% probability in 6 generations and recovery not likely at 17% probability • CR DU: growth abundance is likely at 88% probability in 6 generations and recovery not likely at 33% probability 	<ul style="list-style-type: none"> • Recovery of TR or CR DU is not anticipated under the 10 year mean productivity model. See "other qualitative impacts" for discussion of Listing benefits below in section "C. Qualitative Impacts".
C. Qualitative Impacts	
Positive Impacts:	
Productivity Scenarios – Steelhead Recovery and/or Growth Outcomes	
<p>Productivity Model 2b: 1 Year Productivity Model (Most Likely)</p> <p>Under zero exploitation mortality from fishing is expected to be 0%</p> <ul style="list-style-type: none"> • TR DU: growth abundance is not likely at 4% probability in 6 generations and recovery not likely at 1% probability 	<ul style="list-style-type: none"> • Some positive but unknown economic benefits are anticipated as a result of additional recovery actions expected under listing (i.e. increased monitoring, reporting and prohibitions on activities in freshwater and raising species profile). Should these recovery measures lead to reduced mortality or increased productivity beyond what can be achieved through zero fishing exploitation, positive benefits would accrue. While benefits of these types of activities may be positive, they would likely to be negligible.

<ul style="list-style-type: none"> CR DU: growth abundance is not likely at 0% probability in 6 generations years and recovery not likely at 0% probability 	
<p>Productivity Model 2a: 5 Year Mean Productivity Model (Best Case)</p> <p>Under zero exploitation mortality from fishing is expected to be 0%</p> <ul style="list-style-type: none"> TR DU: 41% probability of growth abundance in 6 generations and recovery not likely at 2% probability CR DU: 100% probability of growth abundance in 6 generations and recovery is highly likely at 97% probability 	<p>Applies to only TR DU Listing Decision:</p> <ul style="list-style-type: none"> Recovery of TR DU is not likely (2% probability). Hence, benefits of “recovery” cannot be ascribed. However, there is an increased probability of growth for TR DU compared to the baseline (going from 1% to 41%). However, probability of growth remains low. <p>Applies to only CR DU Listing Decision:</p> <ul style="list-style-type: none"> There is a 97% probability of species recovery. The monetized benefits will be significant (see section B: Quantified Impacts in Non-\$). Canadians value not only a wildlife species itself, but also the ecosystem to which it contributes. However, benefits attributable to the role of Steelhead in ecosystem health are not known but are anticipated to be positive. <p>Applies to Both TR and CR DU Listing Decision:</p> <ul style="list-style-type: none"> In addition to recovery benefits of CR DU and ecosystem service benefits of higher growth of CR DU (see section B: Quantified Impacts in Non-\$), there is an increased probability of growth for TR DU. However, as the probability of growth is low (< 50%), hence, the probability of increased benefits related to higher abundance are also low for TR DU and may not be realized.
<p>Productivity Model 2c: 10 Year Mean Productivity Model (Positive Growth)</p> <p>Under zero exploitation mortality from fishing is expected to be 0%</p> <ul style="list-style-type: none"> TR DU: growth abundance is likely at 81% probability in 6 generations and recovery not likely at 17% probability CR DU: growth abundance is likely at 88% probability in 6 generations and recovery not likely at 33% probability 	<p>Applies to only TR DU Listing Decision:</p> <ul style="list-style-type: none"> Recovery of TR DU is not likely (17% probability). Hence, benefits of “recovery” cannot be ascribed. However, there is an increased probability of growth for TR DU compared to the baseline (going from 8% to 81%). Canadians value not only a wildlife species itself, but also the ecosystem to which it contributes. However, benefits attributable to the role of Steelhead in ecosystem health are not known but are anticipated to be positive. Therefore, the listing scenario may have some unquantified, positive impact on the abundance and distribution of steelhead. <p>Applies to only CR DU Listing Decision:</p> <ul style="list-style-type: none"> There is an increased probability of growth (going from 6% to 88%), as a consequence there may be some unquantified, positive impact on the abundance and distribution of CR steelhead under the listing scenario. However, recovery would take longer than the 6 generation timeframe explored by the RPA. Hence benefits of “recovery” cannot be ascribed. <p>Applies to Both TR and CR DU Listing Decision:</p> <ul style="list-style-type: none"> RPA suggests a low recovery potential of both DUs under this productivity model. However, the increase in probability of growth for Chilcotin and for Thompson shows there may be some unknown positive benefits associated with higher abundance and distribution of TR and CR DUs.
<p>Negative Impacts</p>	
<p>Business/Industry</p>	<ul style="list-style-type: none"> Impacts to proponents with projects near water may be expected as s. 74 permits would not be made available for any projects that may incidentally capture, handle or harm CR or TR DU’s. However, there was no information made available for this analysis on the types of projects that are occurring where steelhead can be found.
<p>First Nations</p>	<ul style="list-style-type: none"> Based on the significance of salmon and steelhead, it is likely that any level of forgone FSC harvest will have significant (non-use) impacts on First Nations. As heard through consultations, the value of the steelhead is beyond measure to some Nations and their culture. Because of its prominence, prevention of salmon and steelhead harvest for those dependent on the resource, either for sustenance, ceremony, or economic well-being, would have major implications.