Fraser River Chinook Conservation Measures – Technical Information and Planning Considerations for Possible Fishery Reductions

March 23, 2019

The draft 2018/19 Salmon Integrated Fisheries Management Plans identify additional fishery management measures proposed for 2018 fisheries to address conservation concerns for many BC Chinook Salmon populations (**Annex 1** provides information from the IFMP foreword).

Specifically, to address conservation concerns for the 2018 season, DFO is proposing a precautionary reduction in exploitation rates (in the range of 25% to 35%) for specific chinook stocks of concern to align exploitation rates with current stock productivity, support conservation and promote rebuilding.

These additional reductions are planned to address conservation concerns for Nass River, Skeena River and many small wild chinook populations in Northern BC; and, all Fraser River chinook populations (including Spring 4_2, Spring 5_2, Summer 5_2, Summer 4_1 and Fall 4_1) in Southern BC.

A pre-publication version of a CSAS Science Response is also provided separately that outlines *Science Information to Support Consultations on BC Chinook Fishery Management Measures in 2018*. The final version of this document will be posted on the CSAS web-site (http://www.isdm-gdsi.gc.ca/csas-sccs/applications/Publications/index-eng.asp) when it is completed.

This document provides technical information on total fishery mortalities and approximate fishery mortality reductions proposed for Canadian fisheries in 2018. This information is focused on Fraser River chinook management units (including Spring 4_2, Spring 5_2, Summer 5_2, Summer 4_1 and Fall 4_1). Information has been provided separately for Northern BC chinook stocks of concern.

Technical information includes:

Annex 2 – Distribution of total fishing mortalities for Nicola River chinook (Spring 4_2 indicator)

Annex 3 – Distribution of total fishing mortalities for Lower Shuswap River chinook (Summer 4_1 indicator)

Annex 4 – Distribution of total fishing mortalities for Harrison River chinook (Fall 4_1 indicator)

Annex 5: Summary of 25% and 35% reductions in total fishing mortalities in Canadian fisheries for Fraser River chinook coded-wire tag indicator populations.

Annex 6: Graphical representation of average Canadian total fishing mortalities for Fraser River chinook CWT indicator populations for 2013-2016 period.

A separate EXCEL spreadsheet is also provided that contains information in Annexes 2-6 as well as total fishery mortality distributions for other CWT indicator populations.

Planning Considerations

Further discussion is required to identify appropriate management actions and the Department is seeking input from First Nations and stakeholders on specific measures that could achieve the required reductions.

In considering potential management actions to implement for 2018, proposed measures will need to be consistent with the Salmon Allocation Policy that assigns the highest priority to conservation, followed by First Nation access to Chinook salmon for food, social, ceremonial and Treaty obligations.

Proposed measures will also need to consider:

- Achievement of exploitation rate reductions across identified Chinook stocks of concern to the greatest extent possible. (Where data permits, this will be evaluated by reviewing expected reductions in exploitation rates for Canadian CWT indicator populations that represent wild chinook populations);
- differential fishery impacts on Chinook populations across different fisheries, times, and areas due to variation in stock distribution and migratory patterns;
- Design of fishery measures that foster compliance and support effective implementation.

To develop the specific management measures, the Department is proposing the following steps to support consideration of the technical information provided when developing possible fishery adjustments that could be considered for 2018. These steps are intended to be a generalized guide to planning and further information may be required to support planning. Department staff will provide support for these discussions and assist with providing additional information as required.

Step 1: Identify target total mortality reductions for specified chinook populations

- Annex 5 identifies the range of reductions in Canadian total fishing mortality for 2018 to support conservation of Fraser chinook based on available chinook CWT indicator populations.

- Further considerations for these calculations include:
  - Reductions were determined using information on total mortalities for CWT indicator populations
  - Reductions of 25% and 35% are applied to the Canadian portion of the total mortality only to highlight the range of fishery reductions required for each indicator (US impacts are not included as Canada does not control what happens in these fisheries).
  - Calculations were based on information for the last 4 years (2013-2016) to represent the last cycle for age-4 chinook populations. The average impacts for the prior 4 year period (2009-2012) are also provided for comparison.
  - An example of the information table from Annex 5 is shown below (also see "Reduction Summary" TAB in attached EXCEL spreadsheet)

Table: Summary of 25% and 35% reductions in total fishing mortalities in Canadian fisheries only for specified Fraser River chinook coded-wire tag indicators.
All units shown are total fishing mortalities.

Fishery Management Unit	Indicator Population	Year	Canadian Total Mortality	CDN Total Mortality Reduction		US Total Mortality	CDN Total Mortality after		US + CDN Total Mortality after	
				25% Red'n	35% Red'n		25% Red'n	35% Red'n	25% Red'n	35% Red'n
Spring 4_2	**Nicola**	2009	47.5%	11.9%	16.6%	4.3%	35.6%	30.9%	39.9%	35.2%
		2010	7.7%	1.9%	2.7%	1.4%	5.8%	5.0%	7.2%	6.4%
		2011	11.8%	3.0%	4.1%	3.7%	8.9%	7.7%	12.6%	11.4%
		2012	23.8%	6.0%	8.3%	8.1%	17.9%	15.5%	26.0%	23.6%
		2013	7.8%	2.0%	2.7%	4.5%	5.9%	5.1%	10.3%	9.6%
		2014	14.5%	3.6%	5.1%	1.6%	10.9%	9.4%	12.5%	11.0%
		2015	14.9%	3.7%	5.2%	1.7%	11.2%	9.7%	12.9%	11.4%
		2016	20.9%	5.2%	7.3%	1.6%	15.7%	13.6%	17.3%	15.2%
	Average	2009-2012	22.7%	5.7%	7.9%	4.4%	17.0%	14.8%	21.4%	19.1%
	Average	**2013-2016**	**14.5%**	**3.6%**	**5.1%**	**2.3%**	**10.9%**	**9.4%**	**13.2%**	**11.8%**
Summer 4_1	**Lower Shusw**	2009	38.6%	9.6%	13.5%	10.9%	28.9%	25.1%	39.8%	36.0%
		2010	35.5%	8.9%	12.4%	13.4%	26.6%	23.1%	40.1%	36.5%
		2011	35.7%	8.9%	12.5%	11.3%	26.8%	23.2%	38.1%	34.5%
		2012	34.7%	8.7%	12.1%	12.5%	26.0%	22.6%	38.5%	35.1%
		2013	27.9%	7.0%	9.8%	9.9%	21.0%	18.2%	30.8%	28.0%
		2014	32.7%	8.2%	11.5%	16.4%	24.5%	21.3%	40.9%	37.6%
		2015	23.3%	5.8%	8.2%	11.7%	17.5%	15.1%	29.2%	26.9%
		2016	26.0%	6.5%	9.1%	13.5%	19.5%	16.9%	33.0%	30.4%
	Average	2009-2012	36.1%	9.0%	12.6%	12.0%	27.1%	23.5%	39.1%	35.5%
	Average	**2013-2016**	**27.5%**	**6.9%**	**9.6%**	**12.9%**	**20.6%**	**17.9%**	**33.5%**	**30.7%**
Fall 4_1	**Harrison**	2009	12.3%	3.1%	4.3%	2.9%	9.2%	8.0%	12.1%	10.8%
		2010	15.0%	3.8%	5.3%	8.4%	11.3%	9.8%	19.7%	18.2%
		2011	16.5%	4.1%	5.8%	6.6%	12.4%	10.7%	19.0%	17.4%
		2012	13.0%	3.2%	4.5%	9.6%	9.7%	8.4%	19.3%	18.0%
		2013	13.3%	3.3%	4.6%	11.2%	10.0%	8.6%	21.1%	19.8%
		2014	23.6%	5.9%	8.3%	10.2%	17.7%	15.3%	27.8%	25.5%
		2015	18.4%	4.6%	6.4%	6.9%	13.8%	12.0%	20.7%	18.9%
		2016	12.8%	3.2%	4.5%	5.2%	9.6%	8.3%	14.8%	13.5%
	Average	2009-2012	14.2%	3.5%	5.0%	6.9%	10.6%	9.2%	17.5%	16.1%
	Average	**2013-2016**	**17.0%**	**4.3%**	**6.0%**	**8.4%**	**12.8%**	**11.1%**	**21.1%**	**19.4%**

- Target reductions of 25% and 35% are highlighted in red boxes

Step 2: Explore information on current total mortalities by fishery

- Annexes 2-4 and the attached EXCEL spreadsheet provides detailed CWT total mortality information by fishery for Fraser River chinook indicator populations

Fishery Management Unit	CWT Indicator Population
Spring 4_2	Nicola
Spring 5_2	n/a
Summer 5_2	n/a
Summer 4_1	Lower Shuswap
Fall 4_1	Harrison

- Total fishery mortality reductions for Spring 4_2 and Summer 4_1 will likely benefit Spring 5_2 and Summer 5_2 chinook to some degree; however, design of fishery management actions should consider/address differences in run timing (e.g. Summer 5_2 later timed than Spring 4_2) and fishery distribution (Spring 5_2 and Summer 5_2 populations have offshore life history vs. Summer 4_1 which are far-north migrating).
- Additional information may be required to assist planning. Examples could include distribution of observed or estimated CWT recoveries by month/fishery strata to inform planning in step 3. DFO staff can assist with providing additional information as required.

Step 3: Identify potential candidate fisheries and total mortality reductions to achieve target reductions

- First Nations and stakeholder input is required to identify which fisheries could be reduced further.
- Considerations:
    - The implementation of specific fishery management measures will be consistent with the Salmon Allocation Policy priorities. Consistent with conservation objectives, the expected outcome of fishery reductions is to pass reductions from outside fisheries through to spawning grounds to extent possible; this will likely require the need to retain existing restrictions from recent years and consideration of other reductions to further reduce impacts.
    - differential fishery impacts on Chinook populations across different fisheries, times, and areas due to variation in stock distribution and migratory patterns;
    - Reduction scenarios for Northern chinook stocks of concern that are developed for Northern BC fisheries need to be considered with respect to their benefits to Fraser River chinook.

- For Fraser River Spring 5_2 and Summer 5_2, the Department proposes to maintain precautionary zone 1 management actions for the full season to support achievement of overall fishery reductions for these management units.

Step 4: For fisheries where reductions are contemplated, identify possible fishery management actions to achieve desired reductions

- Departmental staff can assist with tools/analysis to assist First Nations and stakeholders with evaluating how to implement possible incremental fishery reductions that may be considered
- Design of fishery measures that foster compliance and support effective implementation.
- Fishery specific considerations are noted below:
  - First Nations fisheries
    - Fraser River CHIAPET tool and/or run reconstruction has been developed to evaluate specific fishing plans for the Fraser River.
  - Recreational fisheries
    - Additional information from creel survey and / or iREC data can inform development of specific measures.
    - Chinook bio-sampling data including size, genetic stock ID, etc.
    - Potential tools that could be considered include:
      - Daily limits. Information by fishery – month strata to assess potential level of catch reduction and release mortality.
      - Size limits. e.g. XX cm maximum size limit. What would the decrease in catch and release mortality be? Review of creel biodata by fishery stratum.
      - Time/area restrictions
  - Commercial fisheries
    - Additional information available from past management actions to reduce impacts on stocks on conservation concern including genetic stock composition of catch, effort/harvest rate relationships, etc.

Next Steps

The Department will summarize any management measures proposed as part of feedback on the draft IFMP and will review these with First Nations and stakeholders during meetings in April. The intention will be to identify and document areas of agreement and where there are differences of view to inform decision-making. The Department will consider the input received and will make final decisions for 2018.

Final Salmon IFMPs will be updated to reflect specific fishery management measures that will be in place for the 2018 season. These measures are intended to be in place for the 2018 season only and will be re-evaluated in the post-season review.

Measures in future years will also be informed by the outcomes of on-going strategic planning for southern BC chinook, the Fraser River chinook 5 year technical review and Pacific Salmon Treaty re-negotiation of the Chapter 3 (chinook).

Annex 1: Northern and Southern BC IFMP section on Changes for 2018/19

Additional Conservation Measures for BC Chinook Salmon

Additional fishery management measures are proposed for 2018 fisheries to address conservation concerns for many BC Chinook Salmon populations. The requirement for additional actions is based on:

- Evidence of a regional pattern of reduced stock productivity related to reduced marine survival, younger age-at-maturity, reduced size at age and reduced fecundity across many B.C. Chinook salmon stocks. This pattern is affecting many Southeast Alaska, Washington and Oregon Chinook Salmon populations as well.
- Expectations for continued reduced productivity of Chinook Salmon populations given many chinook age-classes returning in 2018 were exposed to affects from the warm Pacific ocean "blob" and El Nino of 2016 and other anomalous ocean conditions which suggest changes in the marine food web impacts on the marine survival of Pacific salmon. The outlook for 2018 does not show signs of improvement for many stocks, based on juvenile salmon and oceanographic surveys conducted in 2017.
- Where information is available, pre-season forecasts are for well-below average abundance of Chinook salmon, in many cases below levels required to achieve minimum spawning escapement targets.
- Management and conservation measures implemented to date have not been sufficient to rebuild many chinook populations.
- Coast-wide declines and below-average escapement among many British Columbia Chinook Salmon populations have been observed in recent years (particularly 2016 and 2017); see Figure 1 and Table 1.

Proposed 2018 Fishery Management Approach:

To address conservation concerns for the 2018 season, DFO is proposing a precautionary reduction in exploitation rates (in the range of 25% to 35%) for specific chinook stocks of concern to align exploitation rates with current stock productivity, support conservation and promote rebuilding.

These additional reductions are planned to address conservation concerns for Nass River, Skeena River and many small wild chinook populations in Northern BC; and, all Fraser River chinook populations (including Spring 4_2, Spring 5_2, Summer 5_2, Summer 4_1 and Fall 4_1) in Southern BC. Vancouver Island chinook populations that are at low abundance but have shown recent signs of rebuilding are also expected to benefit from fishery measures to address stocks of concern.

The implementation of specific fishery management measures will be consistent with the Salmon Allocation Policy that assigns the highest priority to conservation, followed by First Nation access to Chinook salmon for food, social, ceremonial and Treaty obligations.

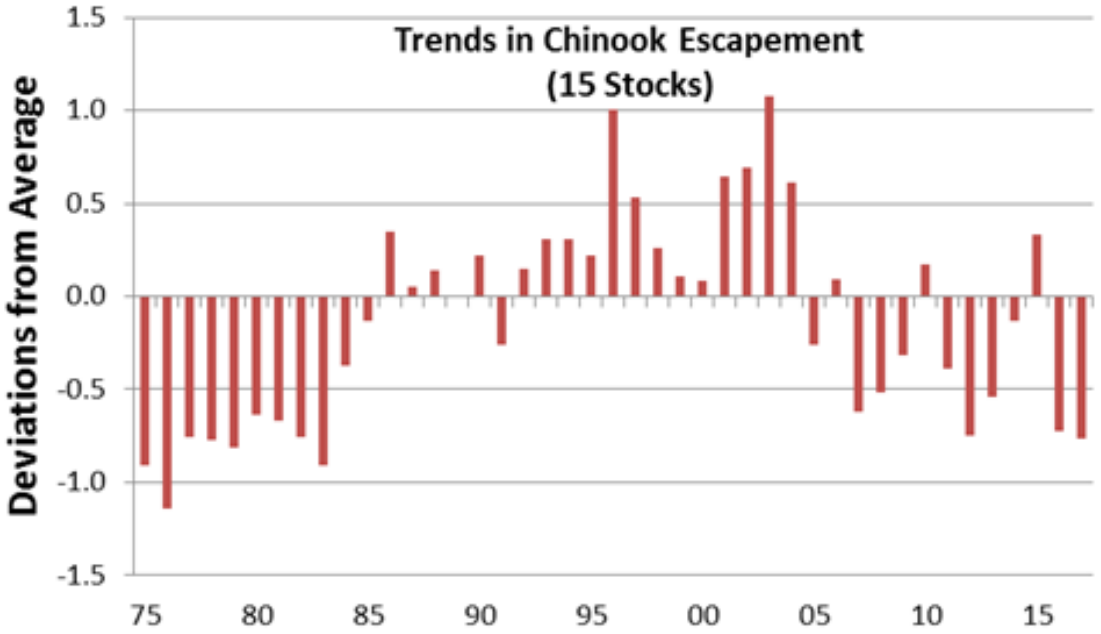


Figure 1. Trends in escapement based on average deviations (Z-scores) for 15 Chinook stocks from Alsek River to the Fraser River, 1975-2017. Stocks include: Alsek, Taku, Stikine, Nass, Skeena, Kitsumkalum, WCVI-aggregate (includes Marble, Tahsis, Artlish, Kaouk, Tahsish), Cowichan, Fraser Spring 1.3, Fraser Spring 1.2, Nicola SP 1.2, Harrison, Fraser Summer 1.3, Fraser Summer 0.3, Lower Shuswap 0.3. Prepared by C. Parken, D. Lewis.

To achieve the required reductions for BC chinook stocks of concern, fishery reductions will likely need to be considered (to varying degrees) in major offshore (i.e. Aggregate Abundance Based Management - AABM chinook fisheries), coastal (i.e. Individual Stock Based Management - ISBM chinook fisheries) and terminal (i.e. in-river) fisheries to best meet conservation objectives.

The expected outcome is a further reduction in overall exploitation rates relative to recent years to support rebuilding of wild chinook spawner abundance. These measures are proposed in addition to stock specific management measures already in place.

Further discussion is required to identify appropriate management actions and the Department is planning to seek input from First Nations and stakeholders on specific measures that could achieve the required reductions. Proposed measures will also need to consider:

- Achievement of exploitation rate reductions across identified Chinook stocks of concern to the greatest extent possible. (Where data permits, this will be evaluated by reviewing expected reductions in exploitation rates for Canadian CWT indicator populations that represent wild chinook populations);
- differential fishery impacts on Chinook populations across different fisheries, times, and areas due to variation in stock distribution and migratory patterns;
- Design of fishery measures that foster compliance and support effective implementation.

These measures are intended to be in place for the 2018 season only and will be re-evaluated in the post-season review. Measures in future years will be informed by the outcomes of on-going strategic planning for southern BC chinook, the Fraser River chinook 5 year technical review and Pacific Salmon Treaty re-negotiation of the Chapter 3 (chinook).

Additional technical information will be provided to support analysis and discussions of potential measures that could achieve the overall reductions.

Final Salmon IFMPs will be updated to reflect specific fishery management measures that will be in place for the 2018 season.

Annex 2

Note: Three tables are provided for this population to represent fishery impacts on hatchery marked fish (Table C.1) and unmarked (wild) fish with 2 tables to address CWT recoveries with incomplete data with assumptions that these fish were 1) caught in a non-selective fishery (Table C.2) or, 2) a mark-selective fishery (Table C.3).

The mark-selective fisheries (MSFs) in marine waters of southern BC and Washington have occurred mainly during the period when Fraser spring and summer stocks are returning to the Fraser River and there have been very few CWT recoveries outside of this timeframe. All Canadian ocean MSFs occurred in the Juan de Fuca (JDF) sport fishery (2008–2016), or in the Nicola River mouth sport MSF in 2002. For the Canadian JDF sport fishery, both MSF and non-selective fishery regulations were used for specific dates, fishery management sub-areas, and fish length categories; which necessitated the review of date, area, and fish length data for all JDF Sport CWT recoveries with respect to the regulations described in the DFO Fishery Notices. Some JDF Sport recoveries had incomplete date, location, or fish length data. As a result, there are 2 additional mortality distribution tables for this population representing: 1) a scenario where all of the incomplete data recoveries were assumed to have been caught in the MSF (Table C.2), and, 2) all these recoveries were assumed to be caught in the NSF (Table C.3). Reporting both sets of data provides a range of the MSF impacts and captures some of the uncertainty due to incomplete data recording. Results from Table C.1 are reported in the 'Reduction Summary' table.

Table C.1. Percent distribution of Nicola River Spring AEQ total fishing mortalities and escapement to represent hatchery marked fish.

		AABM Fisheries						ISBM Fisheries																						
		SEAK		NBC		WCVI		Cdn. Ocean Sport					Cdn. Ocn Net		Terminal Fraser River							US ISBM Fisheries			Escapement		Canadian Marine			0.25	0.35	
Catch Year	Estimated # of CWTs	Troll	Net & Sport	Troll	Sport	Troll	Sport	Juan de Fuca	Johnstone Strait	Strait of Georgia	WCVI	NBC	Cdn. Ocean Net[1]	Cdn. Ocean Troll[2]	Fraser Mainstem Sport	Shuswap Sport	Chiliwack Sport	Nicola/ Thompson Sport	Comm. Net[4]	FN FSC[3,4]	Troll	Net	Sport	Esc.	Can. Stray	Total Mortality	CDN Total	25% CDN Red'n	35% CDN Red'n	US Total
1989	1298	0.0%	0.0%	0.3%	1.3%	0.9%	0.0%	7.5%	0.0%	4.1%	0.0%	0.0%	0.5%	0.0%	1.0%	0.0%	0.0%	1.5%	7.8%	4.1%	0.9%	1.1%	2.3%	66.7%	0.0%	14.6%	29.0%	7%	10%	4.3%
1990	273	0.0%	0.0%	0.0%	0.0%	2.2%	0.0%	2.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.6%	0.0%	0.0%	11.7%	2.0%	12.7%	1.5%	0.0%	3.3%	61.9%	0.0%	4.4%	33.3%	8%	12%	4.8%
1991	1360	0.1%	0.4%	0.0%	0.2%	4.0%	0.0%	4.6%	0.3%	0.3%	0.0%	0.0%	0.7%	0.4%	3.2%	0.0%	0.0%	5.0%	4.1%	9.0%	0.8%	0.1%	1.7%	65.1%	0.0%	10.4%	31.6%	8%	11%	3.2%
1992	542	0.0%	0.0%	5.4%	0.0%	5.2%	0.0%	4.6%	1.7%	1.5%	0.0%	0.0%	0.9%	2.6%	0.7%	0.0%	0.0%	6.9%	0.6%	5.8%	5.7%	0.0%	6.1%	52.4%	0.0%	21.8%	35.8%	9%	13%	11.8%
1993	1206	0.0%	0.0%	3.2%	0.0%	5.6%	1.2%	2.0%	1.2%	2.7%	0.0%	0.0%	1.4%	0.0%	2.8%	0.0%	0.0%	2.6%	1.4%	8.3%	1.9%	0.0%	2.2%	63.6%	0.0%	17.2%	32.3%	8%	11%	4.1%
1994	2050	0.0%	0.0%	0.2%	0.0%	3.6%	0.4%	2.7%	0.0%	0.7%	0.0%	0.0%	0.2%	0.0%	0.7%	0.0%	0.0%	7.4%	0.1%	1.2%	0.3%	0.0%	0.0%	82.6%	0.0%	7.7%	17.1%	4%	6%	0.3%
1995	1867	0.0%	0.0%	0.2%	0.6%	1.3%	0.5%	1.6%	0.2%	1.2%	0.0%	0.0%	1.5%	0.0%	1.7%	0.0%	0.2%	1.8%	0.5%	2.9%	0.1%	0.0%	0.4%	85.5%	0.0%	7.0%	14.0%	4%	5%	0.5%
1996	73	0.0%	0.0%	2.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.7%	0.0%	0.0%	0.0%	0.0%	0.0%	2.0%	15.8%	0.0%	0.0%	0.0%	76.7%	0.0%	5.5%	23.3%	6%	8%	0.0%
1997	257	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.3%	0.0%	0.0%	0.0%	0.0%	12.1%	0.0%	0.0%	0.0%	0.0%	5.4%	0.3%	1.2%	0.0%	0.0%	14.0%	62.6%	0.0%	16.3%	23.3%	6%	8%	14.0%
1998	416	0.0%	0.0%	0.0%	3.8%	0.0%	0.0%	1.2%	0.0%	1.2%	0.0%	0.0%	1.9%	0.0%	2.6%	0.0%	0.0%	14.5%	0.9%	9.2%	0.0%	0.0%	0.0%	64.7%	0.0%	8.2%	35.3%	9%	12%	0.0%
1999	2422	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	2.1%	0.0%	0.1%	0.0%	0.2%	6.6%	0.7%	0.0%	0.0%	89.4%	0.0%	0.7%	9.8%	2%	3%	0.8%
2000	1771	0.0%	0.0%	0.0%	2.0%	0.0%	0.0%	3.6%	0.0%	0.7%	0.0%	0.0%	0.0%	0.0%	1.0%	0.0%	0.0%	4.3%	0.4%	7.8%	0.0%	0.0%	0.0%	80.2%	0.0%	6.3%	19.8%	5%	7%	0.0%
2001	2260	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	3.4%	0.4%	0.2%	0.0%	0.0%	0.0%	0.0%	1.9%	0.0%	0.0%	2.5%	1.0%	5.7%	0.8%	0.0%	0.0%	84.0%	0.0%	4.2%	15.3%	4%	5%	0.8%
2002	2312	0.0%	0.0%	1.4%	0.3%	0.6%	0.0%	0.8%	0.0%	0.2%	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%	0.3%	2.2%	0.4%	3.6%	0.7%	0.0%	0.2%	89.1%	0.0%	3.5%	10.0%	2%	3%	1.0%
2003	1795	0.1%	0.0%	2.4%	0.0%	0.9%	0.6%	1.7%	0.0%	0.8%	0.0%	0.0%	0.0%	0.0%	3.2%	0.0%	0.3%	3.3%	0.1%	0.5%	0.4%	0.0%	0.0%	85.7%	0.0%	6.4%	13.8%	3%	5%	0.6%
2004	439	0.0%	0.0%	2.3%	0.0%	1.8%	0.0%	1.4%	0.0%	2.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.7%	22.0%	0.9%	0.0%	0.0%	67.7%	0.0%	7.7%	31.4%	8%	11%	0.9%
2005	401	0.0%	0.0%	1.0%	0.0%	3.7%	0.0%	3.7%	0.0%	2.7%	0.0%	0.0%	0.0%	0.0%	3.1%	0.0%	0.0%	12.1%	0.3%	12.9%	0.5%	0.0%	0.0%	59.9%	0.0%	11.2%	39.7%	10%	14%	0.5%
2006	425	0.0%	0.0%	1.6%	0.0%	1.9%	0.0%	2.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	0.0%	0.0%	8.9%	0.4%	11.9%	0.5%	0.0%	0.7%	70.6%	0.0%	6.4%	28.2%	7%	10%	1.2%
2007	148	0.0%	0.0%	0.0%	0.0%	6.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.9%	18.1%	0.4%	27.3%	1.4%	0.0%	0.0%	41.9%	0.0%	6.1%	56.8%	14%	20%	1.4%
2008	613	0.0%	0.0%	1.1%	0.8%	0.0%	0.0%	1.5%	0.0%	2.1%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	1.0%	2.4%	0.4%	10.2%	2.1%	0.5%	0.3%	77.3%	0.0%	5.5%	19.7%	5%	7%	2.9%
2009	276	0.0%	0.0%	0.4%	0.0%	0.0%	0.0%	8.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	17.8%	0.0%	0.0%	3.6%	0.6%	16.5%	3.3%	0.0%	1.1%	48.2%	0.0%	9.1%	47.5%	12%	17%	4.3%
2010	2309	0.3%	0.0%	1.3%	0.2%	0.0%	0.1%	0.6%	0.6%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	4.3%	0.6%	0.0%	0.4%	90.9%	0.0%	3.1%	7.7%	2%	3%	1.4%
2011	677	0.0%	0.0%	0.6%	0.0%	0.0%	0.4%	2.5%	0.6%	0.9%	0.0%	0.0%	0.0%	0.0%	2.5%	0.0%	0.0%	0.0%	0.3%	4.0%	2.1%	0.0%	1.6%	84.5%	0.0%	5.0%	11.8%	3%	4%	3.7%
2012	714	0.0%	0.0%	0.6%	0.7%	0.0%	0.0%	1.8%	1.1%	0.8%	0.0%	0.0%	0.0%	0.0%	0.7%	0.0%	0.0%	0.1%	0.6%	17.4%	8.1%	0.0%	0.0%	68.1%	0.0%	5.0%	23.8%	6%	8%	8.1%
2013	1455	0.0%	0.0%	1.0%	0.0%	0.2%	0.0%	3.5%	0.0%	0.9%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	1.8%	3.2%	0.0%	1.3%	87.7%	0.0%	5.8%	7.8%	2%	3%	4.5%
2014	435	0.0%	0.0%	0.0%	0.0%	1.8%	0.0%	0.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.9%	0.0%	1.0%	9.8%	1.6%	0.0%	0.0%	83.9%	0.0%	2.8%	14.5%	4%	5%	1.6%
2015	1544	0.0%	0.0%	0.2%	0.2%	0.3%	0.0%	2.7%	0.3%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.9%	10.1%	0.8%	0.2%	0.7%	83.4%	0.0%	4.0%	14.9%	4%	5%	1.7%
2016	943	0.2%	0.0%	1.6%	0.0%	1.1%	0.0%	7.7%	1.0%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	8.3%	1.0%	0.0%	0.4%	77.5%	0.0%	11.9%	20.9%	5%	7%	1.6%
2009-2012		0.1%	0.0%	0.7%	0.2%	0.0%	0.1%	3.4%	0.6%	0.5%	0.0%	0.0%	0.0%	0.0%	5.3%	0.0%	0.0%	0.9%	0.5%	10.5%	3.5%	0.0%	0.8%	72.9%	0.0%	5.5%	22.7%	5.7%	7.9%	4.4%
2013-2016		0.1%	0.0%	0.7%	0.0%	0.8%	0.0%	3.7%	0.3%	0.4%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.7%	7.5%	1.6%	0.0%	0.6%	83.1%	0.0%	6.1%	14.5%	3.6%	5.1%	2.3%

Footnotes:

1. Canadian Ocean Net includes Juan de Fuca net, Johnstone Strait net, Northern net, Central net and WCVI net.
2. Canadian ocean troll includes Central and any other Canadian troll fisheries not listed.
3. Imputed CWT recoveries from Fraser Run Reconstructed catch, escapement CWT density, and 2017 relationship between recoveries based on CWT sampling and run reconstruction for 2000, 2005-2009.
4. The CWT data for all Fraser net fisheries was combined for the CTC CWT cohort analysis. The estimated CWT recoveries were used to prorate the CTC analysis into FN FSC and commercial categories for 2011-2016.

Table C.2. Percent distribution of Nicola River Spring AEQ total fishing mortalities and escapement to represent unmarked fish, when recoveries with incomplete data were assumed to have been caught in a non-selective fishery.

		AABM Fisheries						ISBM Fisheries																	
		SEAK		NBC		WCVI		Cdn. Ocean Sport					Cdn. Ocn Net		Terminal Fraser River							US ISBM Fisheries			Escapement		Canadian Marine
Catch Year	Estimated # of CWTs	Troll	Net & Sport	Troll	Sport	Troll	Sport	Juan de Fuca	Johnstone Strait	Strait of Georgia	WCVI	NBC	Cdn. Ocean Net[1]	Cdn. Ocean Troll[2]	Fraser Mainstem Sport	Shuswap Sport	Chiliwack Sport	Nicola/ Thompson Sport	Comm. Net[4]	FN FSC[3,4]	Troll	Net	Sport	Esc.	Can. Stray	Total Mortality
1989	1298	0.0%	0.0%	0.3%	1.3%	0.9%	0.0%	7.5%	0.0%	4.1%	0.0%	0.0%	0.5%	0.0%	1.0%	0.0%	0.0%	1.5%	7.8%	4.1%	0.9%	1.1%	2.3%	66.7%	0.0%	14.6%
1990	273	0.0%	0.0%	0.0%	0.0%	2.2%	0.0%	2.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.6%	0.0%	0.0%	11.7%	2.0%	12.7%	1.5%	0.0%	3.3%	61.9%	30.7%	4.4%
1991	1360	0.1%	0.4%	0.0%	0.2%	4.0%	0.0%	4.6%	0.3%	0.3%	0.0%	0.0%	0.7%	0.4%	3.2%	0.0%	0.0%	5.0%	4.1%	9.0%	0.8%	0.1%	1.7%	65.1%	179.9%	10.4%
1992	542	0.0%	0.0%	5.4%	0.0%	5.2%	0.0%	4.6%	1.7%	1.5%	0.0%	0.0%	0.9%	2.6%	0.7%	0.0%	0.0%	6.9%	0.6%	5.8%	5.7%	0.0%	6.1%	52.4%	87.5%	21.8%
1993	1206	0.0%	0.0%	3.2%	0.0%	5.6%	1.2%	2.0%	1.2%	2.7%	0.0%	0.0%	1.4%	0.0%	2.8%	0.0%	0.0%	2.6%	1.4%	8.3%	1.9%	0.0%	2.2%	63.6%	36.8%	17.2%
1994	2050	0.0%	0.0%	0.2%	0.0%	3.6%	0.4%	2.7%	0.0%	0.7%	0.0%	0.0%	0.2%	0.0%	0.7%	0.0%	0.0%	7.4%	0.1%	1.2%	0.3%	0.0%	0.0%	82.6%	0.0%	7.7%
1995	1867	0.0%	0.0%	0.2%	0.6%	1.3%	0.5%	1.6%	0.2%	1.2%	0.0%	0.0%	1.5%	0.0%	1.7%	0.0%	0.2%	1.8%	0.5%	2.9%	0.1%	0.0%	0.4%	85.5%	24.3%	7.0%
1996	73	0.0%	0.0%	2.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.7%	0.0%	0.0%	0.0%	0.0%	0.0%	2.0%	15.8%	0.0%	0.0%	0.0%	76.7%	0.0%	5.5%
1997	257	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.3%	0.0%	0.0%	0.0%	0.0%	12.1%	0.0%	0.0%	0.0%	0.0%	5.4%	0.3%	1.2%	0.0%	0.0%	14.0%	62.6%	0.0%	16.3%
1998	416	0.0%	0.0%	0.0%	3.8%	0.0%	0.0%	1.2%	0.0%	1.2%	0.0%	0.0%	1.9%	0.0%	2.6%	0.0%	0.0%	14.5%	0.9%	9.2%	0.0%	0.0%	0.0%	64.7%	0.0%	8.2%
1999	2422	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	2.1%	0.0%	0.1%	0.0%	0.2%	6.6%	0.7%	0.0%	0.0%	89.4%	0.0%	0.7%
2000	1771	0.0%	0.0%	0.0%	2.0%	0.0%	0.0%	3.6%	0.0%	0.7%	0.0%	0.0%	0.0%	0.0%	1.0%	0.0%	0.0%	4.3%	0.4%	7.8%	0.0%	0.0%	0.0%	80.2%	0.0%	6.3%
2001	2260	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	3.4%	0.4%	0.2%	0.0%	0.0%	0.0%	0.0%	1.9%	0.0%	0.0%	2.5%	1.0%	5.7%	0.8%	0.0%	0.0%	84.0%	0.0%	4.2%
2002	2312	0.0%	0.0%	1.4%	0.3%	0.6%	0.0%	0.8%	0.0%	0.2%	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%	0.3%	0.4%	0.4%	3.6%	0.7%	0.0%	0.2%	90.9%	0.0%	3.5%
2003	1795	0.1%	0.0%	2.4%	0.0%	0.9%	0.6%	1.7%	0.0%	0.8%	0.0%	0.0%	0.0%	0.0%	3.2%	0.0%	0.3%	3.3%	0.1%	0.5%	0.4%	0.0%	0.0%	85.7%	0.0%	6.4%
2004	439	0.0%	0.0%	2.3%	0.0%	1.8%	0.0%	1.4%	0.0%	2.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.7%	22.0%	0.9%	0.0%	0.0%	67.7%	0.0%	7.7%
2005	401	0.0%	0.0%	1.0%	0.0%	3.7%	0.0%	3.7%	0.0%	2.7%	0.0%	0.0%	0.0%	0.0%	3.1%	0.0%	0.0%	12.1%	0.3%	12.9%	0.5%	0.0%	0.0%	59.9%	0.0%	11.2%
2006	425	0.0%	0.0%	1.6%	0.0%	1.9%	0.0%	2.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	0.0%	0.0%	8.9%	0.4%	11.9%	0.5%	0.0%	0.7%	70.6%	0.0%	6.4%
2007	148	0.0%	0.0%	0.0%	0.0%	6.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.9%	18.1%	0.4%	27.3%	1.4%	0.0%	0.0%	41.9%	0.0%	6.1%
2008	613	0.0%	0.0%	1.1%	0.8%	0.0%	0.0%	1.5%	0.0%	2.1%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	1.0%	2.4%	0.4%	10.2%	2.1%	0.5%	0.3%	77.3%	0.0%	5.5%
2009	276	0.0%	0.0%	0.4%	0.0%	0.0%	0.0%	8.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	18.0%	0.0%	0.0%	3.6%	0.6%	16.6%	3.3%	0.0%	0.1%	48.8%	0.0%	9.1%
2010	2309	0.3%	0.0%	1.3%	0.2%	0.0%	0.1%	0.6%	0.6%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	4.3%	0.6%	0.0%	0.1%	91.2%	0.0%	3.1%
2011	677	0.0%	0.0%	0.6%	0.0%	0.0%	0.4%	2.5%	0.6%	0.9%	0.0%	0.0%	0.0%	0.0%	2.5%	0.0%	0.0%	0.0%	0.3%	4.0%	2.1%	0.0%	1.6%	84.5%	0.0%	5.0%
2012	714	0.0%	0.0%	0.6%	0.7%	0.0%	0.0%	1.8%	1.1%	0.8%	0.0%	0.0%	0.0%	0.0%	0.7%	0.0%	0.0%	0.1%	0.6%	17.4%	8.1%	0.0%	0.0%	68.1%	0.0%	5.0%
2013	1455	0.0%	0.0%	1.0%	0.0%	0.2%	0.0%	3.5%	0.0%	0.9%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	1.8%	3.2%	0.0%	1.3%	87.7%	0.0%	5.8%
2014	435	0.0%	0.0%	0.0%	0.0%	1.8%	0.0%	0.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.9%	0.0%	1.0%	9.8%	1.6%	0.0%	0.0%	83.9%	0.0%	2.8%
2015	1544	0.0%	0.0%	0.2%	0.2%	0.3%	0.0%	2.4%	0.3%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.9%	10.1%	0.8%	0.2%	0.7%	83.7%	0.0%	3.6%
2016	943	0.2%	0.0%	1.6%	0.0%	1.1%	0.0%	7.7%	1.0%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	8.3%	1.0%	0.0%	0.4%	77.5%	0.0%	11.9%

Table C.3. Percent distribution of Nicola River Spring AEQ total fishing mortalities and escapement to represent unmarked fish, when recoveries with incomplete data were assumed to have been caught in a mark-selective fishery.

		AABM Fisheries						ISBM Fisheries																	
		SEAK		NBC		WCVI		Cdn. Ocean Sport					Cdn. Ocn Net		Terminal Fraser River							US ISBM Fisheries			Escapement		Canadian Marine
Catch Year	Estimated # of CWTs	Troll	Net & Sport	Troll	Sport	Troll	Sport	Juan de Fuca	Johnstone Strait	Strait of Georgia	WCVI	NBC	Cdn. Ocean Net[1]	Cdn. Ocean Troll[2]	Fraser Mainstem Sport	Shuswap Sport	Chiliwack Sport	Nicola/ Thompson Sport	Comm. Net[4]	FN FSC[3,4]	Troll	Net	Sport	Esc.	Can. Stray	Total Mortality
1989	1298	0.0%	0.0%	0.3%	1.3%	0.9%	0.0%	7.5%	0.0%	4.1%	0.0%	0.0%	0.5%	0.0%	1.0%	0.0%	0.0%	1.5%	7.8%	4.1%	0.9%	1.1%	2.3%	66.7%	0.0%	14.6%
1990	273	0.0%	0.0%	0.0%	0.0%	2.2%	0.0%	2.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.6%	0.0%	0.0%	11.7%	2.0%	12.7%	1.5%	0.0%	3.3%	61.9%	30.7%	4.4%
1991	1360	0.1%	0.4%	0.0%	0.2%	4.0%	0.0%	4.6%	0.3%	0.3%	0.0%	0.0%	0.7%	0.4%	3.2%	0.0%	0.0%	5.0%	4.1%	9.0%	0.8%	0.1%	1.7%	65.1%	179.9%	10.4%
1992	542	0.0%	0.0%	5.4%	0.0%	5.2%	0.0%	4.6%	1.7%	1.5%	0.0%	0.0%	0.9%	2.6%	0.7%	0.0%	0.0%	6.9%	0.6%	5.8%	5.7%	0.0%	6.1%	52.4%	87.5%	21.8%
1993	1206	0.0%	0.0%	3.2%	0.0%	5.6%	1.2%	2.0%	1.2%	2.7%	0.0%	0.0%	1.4%	0.0%	2.8%	0.0%	0.0%	2.6%	1.4%	8.3%	1.9%	0.0%	2.2%	63.6%	36.8%	17.2%
1994	2050	0.0%	0.0%	0.2%	0.0%	3.6%	0.4%	2.7%	0.0%	0.7%	0.0%	0.0%	0.2%	0.0%	0.7%	0.0%	0.0%	7.4%	0.1%	1.2%	0.3%	0.0%	0.0%	82.6%	0.0%	7.7%
1995	1867	0.0%	0.0%	0.2%	0.6%	1.3%	0.5%	1.6%	0.2%	1.2%	0.0%	0.0%	1.5%	0.0%	1.7%	0.0%	0.2%	1.8%	0.5%	2.9%	0.1%	0.0%	0.4%	85.5%	24.3%	7.0%
1996	73	0.0%	0.0%	2.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.7%	0.0%	0.0%	0.0%	0.0%	0.0%	2.0%	15.8%	0.0%	0.0%	0.0%	76.7%	0.0%	5.5%
1997	257	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.3%	0.0%	0.0%	0.0%	0.0%	12.1%	0.0%	0.0%	0.0%	0.0%	5.4%	0.3%	1.2%	0.0%	0.0%	14.0%	62.6%	0.0%	16.3%
1998	416	0.0%	0.0%	0.0%	3.8%	0.0%	0.0%	1.2%	0.0%	1.2%	0.0%	0.0%	1.9%	0.0%	2.6%	0.0%	0.0%	14.5%	0.9%	9.2%	0.0%	0.0%	0.0%	64.7%	0.0%	8.2%
1999	2422	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	2.1%	0.0%	0.1%	0.0%	0.2%	6.6%	0.7%	0.0%	0.0%	89.4%	0.0%	0.7%
2000	1771	0.0%	0.0%	0.0%	2.0%	0.0%	0.0%	3.6%	0.0%	0.7%	0.0%	0.0%	0.0%	0.0%	1.0%	0.0%	0.0%	4.3%	0.4%	7.8%	0.0%	0.0%	0.0%	80.2%	0.0%	6.3%
2001	2260	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	3.4%	0.4%	0.2%	0.0%	0.0%	0.0%	0.0%	1.9%	0.0%	0.0%	2.5%	1.0%	5.7%	0.8%	0.0%	0.0%	84.0%	0.0%	4.2%
2002	2312	0.0%	0.0%	1.4%	0.3%	0.6%	0.0%	0.8%	0.0%	0.2%	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%	0.3%	0.4%	0.4%	3.6%	0.7%	0.0%	0.2%	90.9%	0.0%	3.5%
2003	1795	0.1%	0.0%	2.4%	0.0%	0.9%	0.6%	1.7%	0.0%	0.8%	0.0%	0.0%	0.0%	0.0%	3.2%	0.0%	0.3%	3.3%	0.1%	0.5%	0.4%	0.0%	0.0%	85.7%	0.0%	6.4%
2004	439	0.0%	0.0%	2.3%	0.0%	1.8%	0.0%	1.4%	0.0%	2.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.7%	22.0%	0.9%	0.0%	0.0%	67.7%	0.0%	7.7%
2005	401	0.0%	0.0%	1.0%	0.0%	3.7%	0.0%	3.7%	0.0%	2.7%	0.0%	0.0%	0.0%	0.0%	3.1%	0.0%	0.0%	12.1%	0.3%	12.9%	0.5%	0.0%	0.0%	59.9%	0.0%	11.2%
2006	425	0.0%	0.0%	1.6%	0.0%	1.9%	0.0%	2.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	0.0%	0.0%	8.9%	0.4%	11.9%	0.5%	0.0%	0.7%	70.6%	0.0%	6.4%
2007	148	0.0%	0.0%	0.0%	0.0%	6.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.9%	18.1%	0.4%	27.3%	1.4%	0.0%	0.0%	41.9%	0.0%	6.1%
2008	613	0.0%	0.0%	1.1%	0.8%	0.0%	0.0%	1.5%	0.0%	2.1%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	1.0%	2.4%	0.4%	10.2%	2.1%	0.5%	0.3%	77.3%	0.0%	5.5%
2009	276	0.0%	0.0%	0.4%	0.0%	0.0%	0.0%	8.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	18.0%	0.0%	0.0%	3.6%	0.6%	16.6%	3.3%	0.0%	0.1%	48.8%	0.0%	9.1%
2010	2309	0.3%	0.0%	1.3%	0.2%	0.0%	0.1%	0.3%	0.6%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	4.3%	0.6%	0.0%	0.1%	91.5%	0.0%	2.8%
2011	677	0.0%	0.0%	0.6%	0.0%	0.0%	0.4%	2.5%	0.6%	0.9%	0.0%	0.0%	0.0%	0.0%	2.5%	0.0%	0.0%	0.0%	0.3%	4.0%	2.1%	0.0%	1.6%	84.5%	0.0%	5.0%
2012	714	0.0%	0.0%	0.6%	0.7%	0.0%	0.0%	1.8%	1.1%	0.8%	0.0%	0.0%	0.0%	0.0%	0.7%	0.0%	0.0%	0.1%	0.6%	17.4%	8.1%	0.0%	0.0%	68.1%	0.0%	5.0%
2013	1455	0.0%	0.0%	1.0%	0.0%	0.2%	0.0%	2.8%	0.0%	0.9%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	1.8%	3.2%	0.0%	1.3%	88.4%	0.0%	5.0%
2014	435	0.0%	0.0%	0.0%	0.0%	1.8%	0.0%	0.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.9%	0.0%	1.0%	9.8%	1.6%	0.0%	0.0%	83.9%	0.0%	2.8%
2015	1544	0.0%	0.0%	0.2%	0.2%	0.3%	0.0%	2.4%	0.3%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.9%	10.1%	0.8%	0.2%	0.7%	83.7%	0.0%	3.6%
2016	943	0.2%	0.0%	1.6%	0.0%	1.1%	0.0%	6.6%	1.0%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	8.4%	1.0%	0.0%	0.4%	78.5%	0.0%	10.7%

Annex 3

Note: Three tables are provided for this population to represent fishery impacts on hatchery marked fish (Table C.1) and unmarked (wild) fish with 2 tables to address CWT recoveries with incomplete data with assumptions that these fish were 1) caught in a non-selective fishery (Table C.2) or, 2) a mark-selective fishery (Table C.3).

The mark-selective fisheries (MSFs) in marine waters of southern BC and Washington have occurred mainly during the period when Fraser spring and summer stocks are returning to the Fraser River and there have been very few CWT recoveries outside of this timeframe. All Canadian ocean MSFs occurred in the Juan de Fuca (JDF) sport fishery (2008–2016), or in the Nicola River mouth sport MSF in 2002. For the Canadian JDF sport fishery, both MSF and non-selective fishery regulations were used for specific dates, fishery management sub-areas, and fish length categories; which necessitated the review of date, area, and fish length data for all JDF Sport CWT recoveries with respect to the regulations described in the DFO Fishery Notices. Some JDF Sport recoveries had incomplete date, location, or fish length data. As a result, there are 2 additional mortality distribution tables for this population representing: 1) a scenario where all of the incomplete data recoveries were assumed to have been caught in the MSF (Table C.2), and, 2) all these recoveries were assumed to be caught in the NSF (Table C.3). Reporting both sets of data provides a range of the MSF impacts and

Table C.1. Percent distribution of Lower Shuswap River Summer AEQ total fishing mortalities and escapement to represent hatchery marked fish.

		AABM Fisheries						ISBM Fisheries																					
		SEAK		NBC		WCVI		Cdn. Ocean Sport					Cdn. Ocn Net		Terminal Fraser River						US ISBM Fisheries			Escapement		Canadian Marine		0.25	0.35	
Catch Year	Estimated # of CWTs	Troll	Net & Sport	Troll	Sport	Troll	Sport	Juan de Fuca	Johnstone Strait	Strait of Georgia	WCVI	NBC	Cdn. Ocean Net[1]	Cdn. Ocean Troll[2]	Fraser Mainstem Sport	Shuswap Sport	Chiliwack Sport	Nicola/ Thompson Sport	Comm. Net[4]	FN FSC[3,4]	Troll	Net	Sport	Esc.	Can. Stray	Total Mortality	CDN Total	25% CDN Red'n	35% CDN Red'n	US Total
1988	2032	6.8%	0.0%	9.2%	0.2%	5.5%	0.0%	1.5%	0.8%	0.5%	0.0%	0.0%	3.1%	1.7%	0.4%	0.9%	0.2%	0.0%	3.7%	1.9%	0.0%	1.6%	0.2%	61.7%	0.0%	22.6%	29.7%	7%	10%	8.6%
1989	1682	5.1%	4.0%	7.2%	0.0%	1.1%	0.0%	0.0%	0.0%	0.4%	0.0%	0.0%	7.8%	0.5%	0.0%	0.4%	0.0%	0.0%	5.4%	0.4%	0.0%	1.4%	0.1%	66.0%	0.0%	17.1%	23.4%	6%	8%	10.6%
1990	1236	28.0%	0.8%	19.6%	0.3%	3.8%	3.1%	1.0%	0.0%	0.8%	0.0%	0.9%	3.2%	1.8%	0.0%	1.5%	0.0%	0.0%	5.4%	2.3%	0.0%	0.0%	0.5%	27.0%	0.0%	34.5%	43.7%	11%	15%	29.3%
1991	627	34.0%	0.6%	22.2%	0.5%	3.0%	0.0%	0.5%	0.8%	0.0%	0.0%	0.0%	6.7%	1.3%	0.0%	0.6%	0.0%	0.0%	3.4%	1.8%	0.0%	3.2%	0.0%	21.4%	0.0%	34.9%	40.8%	10%	14%	37.8%
1992	285	12.6%	0.0%	17.2%	0.0%	3.9%	0.0%	2.1%	1.1%	1.8%	0.0%	0.0%	6.3%	6.0%	0.0%	4.6%	0.0%	0.0%	3.6%	1.6%	0.0%	0.0%	2.8%	36.5%	0.0%	38.2%	48.1%	12%	17%	15.4%
1993	464	10.6%	1.7%	12.5%	0.0%	9.5%	0.0%	0.4%	1.1%	0.0%	0.0%	0.0%	8.4%	1.1%	0.0%	3.7%	0.0%	0.0%	6.5%	2.3%	0.4%	0.0%	0.0%	41.8%	0.0%	33.0%	45.5%	11%	16%	12.7%
1994	1040	9.4%	1.1%	17.5%	1.7%	8.2%	0.0%	0.4%	1.1%	0.4%	0.0%	0.0%	5.2%	11.0%	0.0%	0.0%	0.0%	0.0%	7.1%	2.7%	0.0%	3.0%	0.0%	31.3%	0.0%	45.4%	55.2%	14%	19%	13.5%
1995	527	15.9%	3.8%	11.4%	4.2%	3.4%	0.0%	1.3%	1.3%	0.0%	0.0%	1.5%	3.6%	0.8%	0.0%	0.4%	0.0%	0.0%	2.6%	5.4%	0.0%	3.2%	0.0%	41.2%	0.0%	27.5%	35.9%	9%	13%	23.0%
1996	743	16.3%	0.0%	0.5%	0.7%	0.4%	0.9%	1.9%	1.5%	0.7%	0.1%	1.5%	0.5%	0.0%	1.2%	0.0%	0.0%	0.0%	5.7%	2.5%	0.0%	0.0%	0.0%	65.5%	0.0%	8.7%	18.2%	5%	6%	16.3%
1997	608	13.3%	0.7%	8.7%	2.1%	0.5%	0.0%	2.1%	1.2%	2.3%	0.0%	0.7%	3.8%	0.2%	0.0%	0.0%	0.0%	0.0%	14.9%	0.7%	0.0%	2.3%	0.0%	46.5%	0.0%	21.5%	37.2%	9%	13%	16.3%
1998	745	21.7%	9.7%	7.1%	14.2%	0.0%	0.0%	1.5%	1.2%	4.6%	0.7%	1.1%	0.4%	0.0%	0.0%	0.7%	0.0%	0.0%	3.1%	2.4%	0.0%	0.8%	0.0%	30.9%	0.0%	30.7%	36.9%	9%	13%	32.2%
1999	832	15.5%	6.0%	0.7%	4.6%	0.0%	0.0%	0.5%	1.8%	2.3%	0.0%	0.2%	0.0%	0.0%	0.0%	0.4%	0.0%	0.0%	0.8%	4.6%	0.0%	0.0%	0.0%	62.6%	0.0%	10.1%	15.9%	4%	6%	21.5%
2000	711	11.1%	10.0%	0.0%	4.8%	0.0%	0.0%	1.0%	0.3%	2.4%	0.0%	0.0%	0.0%	0.0%	1.4%	0.0%	0.0%	0.0%	3.8%	2.7%	0.0%	0.1%	0.4%	62.0%	0.0%	8.4%	16.3%	4%	6%	21.7%
2001	1159	8.1%	1.6%	0.0%	0.0%	0.0%	0.0%	1.8%	4.1%	3.5%	0.0%	1.0%	0.7%	0.3%	0.2%	1.4%	0.0%	0.0%	0.9%	0.5%	0.1%	0.4%	0.0%	75.2%	0.0%	11.5%	14.5%	4%	5%	10.3%
2002	1577	18.0%	2.5%	13.7%	4.1%	1.3%	0.0%	1.5%	0.9%	1.2%	0.0%	1.6%	0.0%	0.1%	0.0%	0.4%	0.0%	0.0%	3.6%	4.9%	0.0%	0.0%	0.0%	46.3%	0.0%	24.3%	33.2%	8%	12%	20.5%
2003	1872	9.8%	2.5%	7.9%	2.5%	0.0%	0.0%	4.0%	2.1%	0.7%	0.3%	0.4%	0.0%	1.3%	1.3%	1.0%	0.0%	0.1%	2.1%	2.5%	0.3%	0.5%	0.0%	60.9%	0.0%	19.1%	26.0%	7%	9%	13.1%
2004	1156	18.3%	1.6%	9.3%	4.0%	0.8%	0.0%	0.5%	1.0%	3.9%	0.0%	4.8%	0.0%	0.0%	1.5%	1.2%	0.0%	0.0%	8.4%	3.5%	0.3%	1.0%	0.0%	39.7%	0.0%	24.3%	39.0%	10%	14%	21.3%
2005	824	15.0%	1.8%	12.4%	5.3%	0.4%	3.2%	2.2%	9.7%	1.9%	0.0%	1.3%	0.0%	0.0%	2.0%	1.0%	0.0%	0.6%	0.6%	6.4%	0.2%	0.4%	0.0%	35.4%	0.0%	36.4%	47.1%	12%	16%	17.5%
2006	1312	12.0%	2.7%	13.3%	8.2%	0.3%	0.9%	1.2%	3.3%	5.4%	0.0%	1.7%	0.0%	0.0%	2.6%	0.5%	0.0%	0.0%	2.7%	4.5%	0.2%	0.8%	0.0%	39.5%	0.0%	34.4%	44.7%	11%	16%	15.8%
2007	504	7.7%	9.9%	3.6%	10.1%	0.0%	1.0%	2.0%	0.0%	1.4%	0.0%	0.0%	0.0%	0.0%	3.4%	0.0%	0.0%	1.8%	0.3%	4.6%	0.0%	0.0%	0.0%	54.2%	0.0%	18.1%	28.2%	7%	10%	17.7%
2008	1771	8.8%	0.6%	8.1%	7.7%	0.0%	1.6%	2.1%	1.7%	3.4%	0.0%	0.0%	0.0%	0.0%	0.3%	2.2%	0.4%	0.1%	0.4%	2.5%	0.0%	0.0%	0.0%	60.1%	0.0%	24.7%	30.5%	8%	11%	9.4%
2009	1687	9.2%	1.3%	6.5%	3.4%	0.8%	2.3%	4.1%	2.3%	2.5%	0.0%	0.6%	0.0%	0.0%	0.9%	5.2%	0.0%	0.0%	1.2%	8.8%	0.1%	0.0%	0.3%	50.5%	0.0%	22.4%	38.6%	10%	14%	10.9%
2010	2001	9.9%	1.5%	10.6%	3.1%	0.0%	0.5%	2.2%	4.9%	2.3%	0.0%	0.3%	0.0%	0.0%	0.6%	1.3%	0.0%	0.0%	4.3%	5.2%	0.3%	1.5%	0.1%	51.0%	0.0%	24.1%	35.5%	9%	12%	13.4%
2011	1852	8.2%	1.8%	7.6%	4.4%	1.3%	0.7%	3.8%	1.5%	2.7%	0.3%	0.0%	0.0%	0.0%	1.2%	1.6%	0.0%	0.1%	1.9%	8.7%	0.5%	0.3%	0.5%	53.0%	0.0%	22.3%	35.7%	9%	12%	11.3%
2012	1942	6.8%	2.5%	7.6%	4.4%	1.1%	1.2%	4.0%	2.4%	3.3%	0.4%	0.6%	0.0%	0.0%	1.0%	3.9%	0.0%	0.0%	0.4%	4.5%	0.4%	0.1%	2.7%	52.8%	0.0%	25.0%	34.7%	9%	12%	12.5%
2013	8008	7.6%	0.6%	7.7%	2.2%	0.2%	1.0%	5.2%	1.1%	3.7%	0.2%	0.4%	0.0%	0.0%	0.0%	2.0%	0.1%	0.0%	1.0%	3.2%	0.6%	0.3%	0.7%	62.2%	0.0%	21.7%	27.9%	7%	10%	9.9%
2014	4591	11.1%	1.1%	7.2%	1.9%	3.4%	1.7%	2.4%	0.5%	2.2%	0.2%	0.2%	0.9%	0.0%	0.5%	0.9%	0.5%	0.0%	1.4%	8.9%	2.3%	0.5%	1.3%	50.9%	0.0%	20.6%	32.7%	8%	11%	16.4%
2015	4977	6.7%	0.3%	3.7%	1.5%	0.5%	1.3%	3.3%	1.4%	3.7%	0.1%	0.7%	0.0%	0.0%	1.7%	2.0%	0.0%	0.0%	0.6%	2.9%	2.4%	0.9%	1.4%	65.0%	0.0%	16.1%	23.3%	6%	8%	11.7%
2016	2177	9.7%	2.3%	8.9%	2.2%	2.0%	1.1%	0.6%	3.5%	2.4%	0.0%	1.2%	0.0%	0.0%	0.0%	1.1%	0.0%	0.0%	0.4%	2.5%	0.3%	0.4%	0.8%	60.5%	0.0%	22.0%	26.0%	6%	9%	13.5%
2009-2012		8.5%	1.8%	8.1%	3.8%	0.8%	1.2%	3.6%	2.8%	2.7%	0.2%	0.4%	0.0%	0.0%	0.9%	3.0%	0.0%	0.0%	1.9%	6.8%	0.3%	0.5%	0.9%	51.8%	0.0%	23.4%	36.1%	9.0%	12.6%	12.0%
2013-2016		8.8%	1.1%	6.9%	2.0%	1.5%	1.3%	2.9%	1.6%	3.0%	0.1%	0.6%	0.2%	0.0%	0.5%	1.5%	0.1%	0.0%	0.8%	4.4%	1.4%	0.5%	1.1%	59.6%	0.0%	20.1%	27.5%	6.9%	9.6%	12.9%

Footnotes:

1. Canadian Ocean Net includes Juan de Fuca net, Johnstone Strait net, Northern net, Central net and WCVI net.
2. Canadian ocean troll includes Central and any other Canadian troll fisheries not listed.
3. Imputed CWT recoveries from Fraser Run Reconstructed catch, escapement CWT density, and 2017 relationship between recoveries based on CWT sampling and run reconstruction for 2007.
4. The CWT data for all Fraser net fisheries was combined for the CTC CWT cohort analysis. The estimated CWT recoveries were used to prorate the CTC analysis into FN FSC and commercial categories for 2011-2016.

Table C.2 Percent distribution of Lower Shuswap River Summer AEQ total fishing mortalities and escapement to represent unmarked fish, when recoveries with incomplete data were assumed to have been caught in a non-selective fishery.

		AABM Fisheries						ISBM Fisheries																		
		SEAK		NBC		WCVI		Cdn. Ocean Sport					Cdn. Ocn Net		Terminal Fraser River Fraser							US ISBM Fisheries			Escapement		Canadian Marine
Catch Year	Estimated # of CWTs	Troll	Net & Sport	Troll	Sport	Troll	Sport	Juan de Fuca	Johnstone Strait	Strait of Georgia	WCVI	NBC	Cdn. Ocean Net[1]	Cdn. Ocean Troll[2]	Mainstem Sport	Shuswap Sport	Chiliwack Sport	Nicola/ Thompson Sport	Comm. Net[4]	FN FSC[3,4]	Troll	Net	Sport	Esc.	Can. Stray	Total Mortality
1988	2032	6.8%	0.0%	9.2%	0.2%	5.5%	0.0%	1.5%	0.8%	0.5%	0.0%	0.0%	3.1%	1.7%	0.4%	0.9%	0.2%	0.0%	3.7%	1.9%	0.0%	1.6%	0.2%	61.7%	0.0%	22.6%
1989	1682	5.1%	4.0%	7.2%	0.0%	1.1%	0.0%	0.0%	0.0%	0.4%	0.0%	0.0%	7.8%	0.5%	0.0%	0.4%	0.0%	0.0%	5.4%	0.4%	0.0%	1.4%	0.1%	66.0%	0.0%	17.1%
1990	1236	28.0%	0.8%	19.6%	0.3%	3.8%	3.1%	1.0%	0.0%	0.8%	0.0%	0.9%	3.2%	1.8%	0.0%	1.5%	0.0%	0.0%	5.4%	2.3%	0.0%	0.0%	0.5%	27.0%	0.0%	34.5%
1991	627	34.0%	0.6%	22.2%	0.5%	3.0%	0.0%	0.5%	0.8%	0.0%	0.0%	0.0%	6.7%	1.3%	0.0%	0.6%	0.0%	0.0%	3.4%	1.8%	0.0%	3.2%	0.0%	21.4%	0.0%	34.9%
1992	285	12.6%	0.0%	17.2%	0.0%	3.9%	0.0%	2.1%	1.1%	1.8%	0.0%	0.0%	6.3%	6.0%	0.0%	4.6%	0.0%	0.0%	3.6%	1.6%	0.0%	0.0%	2.8%	36.5%	0.0%	38.2%
1993	464	10.6%	1.7%	12.5%	0.0%	9.5%	0.0%	0.4%	1.1%	0.0%	0.0%	0.0%	8.4%	1.1%	0.0%	3.7%	0.0%	0.0%	6.5%	2.3%	0.4%	0.0%	0.0%	41.8%	0.0%	33.0%
1994	1040	9.4%	1.1%	17.5%	1.7%	8.2%	0.0%	0.4%	1.1%	0.4%	0.0%	0.0%	5.2%	11.0%	0.0%	0.0%	0.0%	0.0%	7.1%	2.7%	0.0%	3.0%	0.0%	31.3%	0.0%	45.4%
1995	527	15.9%	3.8%	11.4%	4.2%	3.4%	0.0%	1.3%	1.3%	0.0%	0.0%	1.5%	3.6%	0.8%	0.0%	0.4%	0.0%	0.0%	2.6%	5.4%	0.0%	3.2%	0.0%	41.2%	0.0%	27.5%
1996	743	16.3%	0.0%	0.5%	0.7%	0.4%	0.9%	1.9%	1.5%	0.7%	0.1%	1.5%	0.5%	0.0%	1.2%	0.0%	0.0%	0.0%	5.7%	2.5%	0.0%	0.0%	0.0%	65.5%	0.0%	8.7%
1997	608	13.3%	0.7%	8.7%	2.1%	0.5%	0.0%	2.1%	1.2%	2.3%	0.0%	0.7%	3.8%	0.2%	0.0%	0.0%	0.0%	0.0%	14.9%	0.7%	0.0%	2.3%	0.0%	46.5%	0.0%	21.5%
1998	745	21.7%	9.7%	7.1%	14.2%	0.0%	0.0%	1.5%	1.2%	4.6%	0.7%	1.1%	0.4%	0.0%	0.0%	0.7%	0.0%	0.0%	3.1%	2.4%	0.0%	0.8%	0.0%	30.9%	0.0%	30.7%
1999	832	15.5%	6.0%	0.7%	4.6%	0.0%	0.0%	0.5%	1.8%	2.3%	0.0%	0.2%	0.0%	0.0%	0.0%	0.4%	0.0%	0.0%	0.8%	4.6%	0.0%	0.0%	0.0%	62.6%	0.0%	10.1%
2000	711	11.1%	10.0%	0.0%	4.8%	0.0%	0.0%	1.0%	0.3%	2.4%	0.0%	0.0%	0.0%	0.0%	1.4%	0.0%	0.0%	0.0%	3.8%	2.7%	0.0%	0.1%	0.4%	62.0%	0.0%	8.4%
2001	1159	8.1%	1.6%	0.0%	0.0%	0.0%	0.0%	1.8%	4.1%	3.5%	0.0%	1.0%	0.7%	0.3%	0.2%	1.4%	0.0%	0.0%	0.9%	0.5%	0.1%	0.4%	0.0%	75.2%	0.0%	11.5%
2002	1577	18.0%	2.5%	13.7%	4.1%	1.3%	0.0%	1.5%	0.9%	1.2%	0.0%	1.6%	0.0%	0.1%	0.0%	0.4%	0.0%	0.0%	3.6%	4.9%	0.0%	0.0%	0.0%	46.3%	0.0%	24.3%
2003	1872	9.8%	2.5%	7.9%	2.5%	0.0%	0.0%	4.0%	2.1%	0.7%	0.3%	0.4%	0.0%	1.3%	1.3%	1.0%	0.0%	0.1%	2.1%	2.5%	0.3%	0.5%	0.0%	60.9%	0.0%	19.1%
2004	1156	18.3%	1.6%	9.3%	4.0%	0.8%	0.0%	0.5%	1.0%	3.9%	0.0%	4.8%	0.0%	0.0%	1.5%	1.2%	0.0%	0.0%	8.4%	3.5%	0.3%	1.0%	0.0%	39.7%	0.0%	24.3%
2005	824	15.0%	1.8%	12.4%	5.3%	0.4%	3.2%	2.2%	9.7%	1.9%	0.0%	1.3%	0.0%	0.0%	2.0%	1.0%	0.0%	0.6%	0.6%	6.4%	0.2%	0.4%	0.0%	35.4%	0.0%	36.4%
2006	1312	12.0%	2.7%	13.3%	8.2%	0.3%	0.9%	1.2%	3.3%	5.4%	0.0%	1.7%	0.0%	0.0%	2.6%	0.5%	0.0%	0.0%	2.7%	4.5%	0.2%	0.8%	0.0%	39.5%	0.0%	34.4%
2007	504	7.7%	9.9%	3.6%	10.1%	0.0%	1.0%	2.0%	0.0%	1.4%	0.0%	0.0%	0.0%	0.0%	3.4%	0.0%	0.0%	1.8%	0.3%	4.6%	0.0%	0.0%	0.0%	54.2%	0.0%	18.1%
2008	1771	8.8%	0.6%	8.1%	7.7%	0.0%	1.6%	2.1%	1.7%	3.4%	0.0%	0.0%	0.0%	0.0%	0.3%	2.2%	0.4%	0.1%	0.4%	2.5%	0.0%	0.0%	0.0%	60.1%	0.0%	24.7%
2009	1687	9.2%	1.3%	6.5%	3.4%	0.8%	2.3%	4.1%	2.3%	2.5%	0.0%	0.6%	0.0%	0.0%	0.9%	5.2%	0.0%	0.0%	1.2%	8.8%	0.1%	0.0%	0.1%	50.6%	0.0%	22.4%
2010	2001	9.9%	1.5%	10.6%	3.1%	0.0%	0.5%	1.9%	4.9%	2.3%	0.0%	0.3%	0.0%	0.0%	0.6%	1.3%	0.0%	0.0%	4.3%	5.2%	0.3%	1.5%	0.1%	51.3%	0.0%	23.7%
2011	1852	8.2%	1.8%	7.6%	4.4%	1.3%	0.7%	3.8%	1.5%	2.7%	0.3%	0.0%	0.0%	0.0%	1.2%	1.6%	0.0%	0.1%	1.9%	8.7%	0.5%	0.3%	0.3%	53.2%	0.0%	22.3%
2012	1942	6.8%	2.5%	7.6%	4.4%	1.1%	1.2%	3.8%	2.4%	3.3%	0.4%	0.6%	0.0%	0.0%	1.0%	4.0%	0.0%	0.0%	0.4%	4.5%	0.4%	0.1%	2.0%	53.5%	0.0%	24.8%
2013	8008	7.6%	0.6%	7.7%	2.2%	0.2%	1.0%	5.1%	1.1%	3.7%	0.2%	0.4%	0.0%	0.0%	0.0%	2.0%	0.1%	0.0%	1.0%	3.2%	0.6%	0.3%	0.5%	62.6%	0.0%	21.6%
2014	4591	11.1%	1.1%	7.2%	1.9%	3.4%	1.7%	1.9%	0.5%	2.2%	0.2%	0.2%	0.9%	0.0%	0.5%	0.9%	0.5%	0.0%	1.4%	9.1%	2.3%	0.5%	0.9%	51.6%	0.0%	20.1%
2015	4977	6.7%	0.3%	3.7%	1.5%	0.5%	1.3%	3.3%	1.4%	3.7%	0.1%	0.7%	0.0%	0.0%	1.7%	2.0%	0.0%	0.0%	0.6%	2.9%	2.4%	0.9%	1.1%	65.3%	0.0%	16.1%
2016	2177	9.7%	2.3%	8.9%	2.2%	2.0%	1.1%	0.6%	3.5%	2.4%	0.0%	1.2%	0.0%	0.0%	0.0%	1.1%	0.0%	0.0%	0.4%	2.5%	0.3%	0.4%	0.8%	60.5%	0.0%	22.0%

Table C.3. Percent distribution of Lower Shuswap River Summer AEQ total fishing mortalities and escapement to represent unmarked fish, when recoveries with incomplete data were assumed to have been caught in a mark-selective fishery.

		AABM Fisheries						ISBM Fisheries																		
		SEAK		NBC		WCVI		Cdn. Ocean Sport					Cdn. Ocn Net		Terminal Fraser River						US ISBM Fisheries			Escapement		Canadian Marine
Catch Year	Estimated # of CWTs	Troll	Net & Sport	Troll	Sport	Troll	Sport	Juan de Fuca	Johnstone Strait	Strait of Georgia	WCVI	NBC	Cdn. Ocean Net[1]	Cdn. Ocean Troll[2]	Fraser Mainstem Sport	Shuswap Sport	Chiliwack Sport	Nicola/ Thompson Sport	Comm. Net[4]	FN FSC[3,4]	Troll	Net	Sport	Esc.	Can. Stray	Total Mortality
1988	2032	6.8%	0.0%	9.2%	0.2%	5.5%	0.0%	1.5%	0.8%	0.5%	0.0%	0.0%	3.1%	1.7%	0.4%	0.9%	0.2%	0.0%	3.7%	1.9%	0.0%	1.6%	0.2%	61.7%	0.0%	22.6%
1989	1682	5.1%	4.0%	7.2%	0.0%	1.1%	0.0%	0.0%	0.0%	0.4%	0.0%	0.0%	7.8%	0.5%	0.0%	0.4%	0.0%	0.0%	5.4%	0.4%	0.0%	1.4%	0.1%	66.0%	0.0%	17.1%
1990	1236	28.0%	0.8%	19.6%	0.3%	3.8%	3.1%	1.0%	0.0%	0.8%	0.0%	0.9%	3.2%	1.8%	0.0%	1.5%	0.0%	0.0%	5.4%	2.3%	0.0%	0.0%	0.5%	27.0%	0.0%	34.5%
1991	627	34.0%	0.6%	22.2%	0.5%	3.0%	0.0%	0.5%	0.8%	0.0%	0.0%	0.0%	6.7%	1.3%	0.0%	0.6%	0.0%	0.0%	3.4%	1.8%	0.0%	3.2%	0.0%	21.4%	0.0%	34.9%
1992	285	12.6%	0.0%	17.2%	0.0%	3.9%	0.0%	2.1%	1.1%	1.8%	0.0%	0.0%	6.3%	6.0%	0.0%	4.6%	0.0%	0.0%	3.6%	1.6%	0.0%	0.0%	2.8%	36.5%	0.0%	38.2%
1993	464	10.6%	1.7%	12.5%	0.0%	9.5%	0.0%	0.4%	1.1%	0.0%	0.0%	0.0%	8.4%	1.1%	0.0%	3.7%	0.0%	0.0%	6.5%	2.3%	0.4%	0.0%	0.0%	41.8%	0.0%	33.0%
1994	1040	9.4%	1.1%	17.5%	1.7%	8.2%	0.0%	0.4%	1.1%	0.4%	0.0%	0.0%	5.2%	11.0%	0.0%	0.0%	0.0%	0.0%	7.1%	2.7%	0.0%	3.0%	0.0%	31.3%	0.0%	45.4%
1995	527	15.9%	3.8%	11.4%	4.2%	3.4%	0.0%	1.3%	1.3%	0.0%	0.0%	1.5%	3.6%	0.8%	0.0%	0.4%	0.0%	0.0%	2.6%	5.4%	0.0%	3.2%	0.0%	41.2%	0.0%	27.5%
1996	743	16.3%	0.0%	0.5%	0.7%	0.4%	0.9%	1.9%	1.5%	0.7%	0.1%	1.5%	0.5%	0.0%	1.2%	0.0%	0.0%	0.0%	5.7%	2.5%	0.0%	0.0%	0.0%	65.5%	0.0%	8.7%
1997	608	13.3%	0.7%	8.7%	2.1%	0.5%	0.0%	2.1%	1.2%	2.3%	0.0%	0.7%	3.8%	0.2%	0.0%	0.0%	0.0%	0.0%	14.9%	0.7%	0.0%	2.3%	0.0%	46.5%	0.0%	21.5%
1998	745	21.7%	9.7%	7.1%	14.2%	0.0%	0.0%	1.5%	1.2%	4.6%	0.7%	1.1%	0.4%	0.0%	0.0%	0.7%	0.0%	0.0%	3.1%	2.4%	0.0%	0.8%	0.0%	30.9%	0.0%	30.7%
1999	832	15.5%	6.0%	0.7%	4.6%	0.0%	0.0%	0.5%	1.8%	2.3%	0.0%	0.2%	0.0%	0.0%	0.0%	0.4%	0.0%	0.0%	0.8%	4.6%	0.0%	0.0%	0.0%	62.6%	0.0%	10.1%
2000	711	11.1%	10.0%	0.0%	4.8%	0.0%	0.0%	1.0%	0.3%	2.4%	0.0%	0.0%	0.0%	0.0%	1.4%	0.0%	0.0%	0.0%	3.8%	2.7%	0.0%	0.1%	0.4%	62.0%	0.0%	8.4%
2001	1159	8.1%	1.6%	0.0%	0.0%	0.0%	0.0%	1.8%	4.1%	3.5%	0.0%	1.0%	0.7%	0.3%	0.2%	1.4%	0.0%	0.0%	0.9%	0.5%	0.1%	0.4%	0.0%	75.2%	0.0%	11.5%
2002	1577	18.0%	2.5%	13.7%	4.1%	1.3%	0.0%	1.5%	0.9%	1.2%	0.0%	1.6%	0.0%	0.1%	0.0%	0.4%	0.0%	0.0%	3.6%	4.9%	0.0%	0.0%	0.0%	46.3%	0.0%	24.3%
2003	1872	9.8%	2.5%	7.9%	2.5%	0.0%	0.0%	4.0%	2.1%	0.7%	0.3%	0.4%	0.0%	1.3%	1.3%	1.0%	0.0%	0.1%	2.1%	2.5%	0.3%	0.5%	0.0%	60.9%	0.0%	19.1%
2004	1156	18.3%	1.6%	9.3%	4.0%	0.8%	0.0%	0.5%	1.0%	3.9%	0.0%	4.8%	0.0%	0.0%	1.5%	1.2%	0.0%	0.0%	8.4%	3.5%	0.3%	1.0%	0.0%	39.7%	0.0%	24.3%
2005	824	15.0%	1.8%	12.4%	5.3%	0.4%	3.2%	2.2%	9.7%	1.9%	0.0%	1.3%	0.0%	0.0%	2.0%	1.0%	0.0%	0.6%	0.6%	6.4%	0.2%	0.4%	0.0%	35.4%	0.0%	36.4%
2006	1312	12.0%	2.7%	13.3%	8.2%	0.3%	0.9%	1.2%	3.3%	5.4%	0.0%	1.7%	0.0%	0.0%	2.6%	0.5%	0.0%	0.0%	2.7%	4.5%	0.2%	0.8%	0.0%	39.5%	0.0%	34.4%
2007	504	7.7%	9.9%	3.6%	10.1%	0.0%	1.0%	2.0%	0.0%	1.4%	0.0%	0.0%	0.0%	0.0%	3.4%	0.0%	0.0%	1.8%	0.3%	4.6%	0.0%	0.0%	0.0%	54.2%	0.0%	18.1%
2008	1771	8.8%	0.6%	8.1%	7.7%	0.0%	1.6%	2.1%	1.7%	3.4%	0.0%	0.0%	0.0%	0.0%	0.3%	2.2%	0.4%	0.1%	0.4%	2.5%	0.0%	0.0%	0.0%	60.1%	0.0%	24.7%
2009	1687	9.2%	1.3%	6.5%	3.4%	0.8%	2.3%	4.1%	2.3%	2.5%	0.0%	0.6%	0.0%	0.0%	0.9%	5.2%	0.0%	0.0%	1.2%	8.8%	0.1%	0.0%	0.1%	50.6%	0.0%	22.4%
2010	2001	9.9%	1.5%	10.6%	3.1%	0.0%	0.5%	1.6%	4.9%	2.3%	0.0%	0.3%	0.0%	0.0%	0.6%	1.3%	0.0%	0.0%	4.4%	5.2%	0.3%	1.5%	0.1%	51.6%	0.0%	23.4%
2011	1852	8.2%	1.8%	7.6%	4.4%	1.3%	0.7%	3.8%	1.5%	2.7%	0.3%	0.0%	0.0%	0.0%	1.2%	1.6%	0.0%	0.1%	1.9%	8.7%	0.5%	0.3%	0.3%	53.2%	0.0%	22.3%
2012	1942	6.8%	2.5%	7.6%	4.4%	1.1%	1.2%	3.8%	2.4%	3.3%	0.4%	0.6%	0.0%	0.0%	1.0%	4.0%	0.0%	0.0%	0.4%	4.5%	0.4%	0.1%	2.0%	53.5%	0.0%	24.8%
2013	8008	7.6%	0.6%	7.7%	2.2%	0.2%	1.0%	5.1%	1.1%	3.7%	0.2%	0.4%	0.0%	0.0%	0.0%	2.0%	0.1%	0.0%	1.0%	3.2%	0.6%	0.3%	0.5%	62.6%	0.0%	21.6%
2014	4591	11.1%	1.1%	7.2%	1.9%	3.4%	1.7%	1.9%	0.5%	2.2%	0.2%	0.2%	0.9%	0.0%	0.5%	0.9%	0.5%	0.0%	1.4%	9.1%	2.3%	0.5%	0.9%	51.6%	0.0%	20.1%
2015	4977	6.7%	0.3%	3.7%	1.5%	0.5%	1.3%	3.3%	1.4%	3.7%	0.1%	0.7%	0.0%	0.0%	1.7%	2.0%	0.0%	0.0%	0.6%	2.9%	2.4%	0.9%	1.1%	65.3%	0.0%	16.1%
2016	2177	9.7%	2.3%	8.9%	2.2%	2.0%	1.1%	0.6%	3.5%	2.4%	0.0%	1.2%	0.0%	0.0%	0.0%	1.1%	0.0%	0.0%	0.4%	2.5%	0.3%	0.4%	0.8%	60.5%	0.0%	22.0%

Annex 4

Table C.1 Percent distribution of Harrison River AEQ total fishing mortalities and escapement to represent hatchery marked fish.

		AABM Fisheries						ISBM Fisheries																							
		SEAK		NBC		WCVI		Cdn. Ocean Sport						Cdn. Ocn Net		Terminal Fraser River								US ISBM Fisheries			Escapement		Canadian Marine		0.25	0.35	
Catch Year	Estimated # of CWTs	Troll	Net & Sport	Troll	Sport	Troll	Sport	Juan de Fuca[5]	Johnstone Strait	Strait of Georgia	WCVI	NBC	Cdn. Ocean Net[1]	Cdn. Ocean Troll[2]	Fraser Mainstem Sport	Shuswap Sport	Chiliwack Sport	Nicola/ Thompson Sport	Comm. Net[4]	FN FSC[4]	Troll	Net	Sport[5]	Esc.	Stray	Total Mortality	CDN Total	25% CDN Red'n	35% CDN Red'n	US Total		
1985	1,783	0.1%	0.0%	1.1%	0.0%	23.8%	0.4%	0.0%	0.0%	24.1%	0.2%	0.0%	3.8%	9.2%	0.3%	0.0%	0.0%	0.0%	0.6%	0.1%	1.2%	3.4%	3.2%	28.5%		63%	63.7%	16%	22%	7.9%		
1986	960	1.6%	0.0%	0.4%	0.0%	17.7%	0.4%	0.6%	0.0%	22.7%	0.0%	0.3%	5.3%	21.5%	0.0%	0.0%	0.0%	0.0%	5.1%	0.4%	0.0%	1.0%	4.2%	18.8%		69%	74.5%	19%	26%	6.8%		
1987	584	0.9%	0.0%	0.0%	0.0%	9.4%	0.0%	0.0%	0.0%	26.0%	0.0%	0.0%	2.4%	9.4%	0.9%	0.0%	0.0%	0.0%	2.5%	1.2%	3.3%	6.8%	2.6%	34.6%		47%	51.9%	13%	18%	13.5%		
1988	1,662	0.4%	0.6%	0.0%	0.0%	3.5%	2.0%	0.0%	1.3%	29.4%	1.1%	0.0%	3.7%	10.9%	0.3%	0.0%	0.0%	0.0%	1.8%	1.7%	4.1%	6.7%	5.4%	27.0%		52%	55.7%	14%	20%	17.3%		
1989	2,450	0.2%	0.0%	0.3%	0.0%	24.2%	0.9%	0.4%	0.0%	22.6%	0.0%	0.0%	3.3%	6.0%	0.0%	0.0%	0.0%	0.0%	2.2%	0.3%	6.3%	4.4%	4.8%	24.1%		58%	60.2%	15%	21%	15.7%		
1990	2,995	0.5%	0.0%	0.8%	0.0%	19.5%	1.2%	0.1%	0.0%	11.3%	0.0%	0.0%	1.5%	5.0%	0.3%	0.0%	0.0%	0.0%	0.5%	0.8%	5.9%	2.7%	6.0%	44.1%		39%	40.9%	10%	14%	15.0%		
1991	1,704	0.0%	0.1%	0.0%	0.0%	27.6%	0.0%	0.2%	0.4%	12.2%	0.0%	0.0%	4.0%	8.6%	0.4%	0.0%	0.0%	0.0%	0.7%	0.5%	11.4%	2.0%	4.6%	27.3%		53%	54.6%	14%	19%	18.1%		
1992	1,732	0.0%	0.0%	0.4%	0.0%	18.1%	0.0%	0.9%	0.0%	11.1%	0.0%	0.0%	1.3%	13.0%	0.2%	0.0%	0.0%	0.0%	0.6%	0.1%	11.2%	1.0%	7.0%	35.1%		45%	45.7%	11%	16%	19.2%		
1993	1,139	1.0%	0.0%	0.3%	0.0%	19.1%	0.0%	0.2%	0.0%	7.1%	0.0%	0.0%	1.1%	6.9%	0.0%	0.0%	0.0%	0.0%	1.7%	0.4%	10.0%	0.6%	2.1%	49.7%		35%	36.6%	9%	13%	13.7%		
1994	422	0.0%	0.0%	0.0%	0.0%	20.6%	2.4%	0.7%	0.0%	6.6%	0.0%	0.0%	3.8%	10.2%	0.9%	0.0%	0.0%	0.0%	0.9%	1.0%	3.3%	2.8%	2.4%	44.3%		44%	47.2%	12%	17%	8.5%		
1995	415	0.0%	0.0%	0.0%	0.0%	18.8%	0.0%	0.5%	0.0%	17.6%	0.7%	0.0%	2.7%	0.0%	0.7%	0.0%	0.0%	0.0%	1.0%	1.2%	8.2%	3.1%	4.3%	41.2%		40%	43.1%	11%	15%	15.7%		
1996	1,208	0.0%	0.2%	0.0%	0.0%	1.6%	0.2%	0.3%	0.0%	22.9%	0.3%	0.0%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	0.0%	4.1%	0.0%	7.8%	61.8%		26%	26.2%	7%	9%	12.1%		
1997	851	1.5%	0.0%	0.0%	0.0%	13.2%	3.4%	0.9%	0.2%	17.9%	0.1%	0.0%	1.4%	0.1%	0.0%	0.0%	0.0%	0.0%	2.2%	0.0%	9.9%	3.1%	6.5%	39.6%		37%	39.5%	10%	14%	20.9%		
1998	1,166	0.9%	0.0%	0.0%	0.0%	0.6%	0.0%	0.3%	0.0%	3.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	5.1%	0.2%	0.3%	89.2%		4%	4.3%	1%	2%	6.5%		
1999	1,238	0.2%	0.4%	0.5%	0.0%	0.6%	1.3%	0.2%	0.9%	8.6%	0.6%	0.0%	0.0%	0.2%	0.2%	0.0%	0.0%	0.0%	0.6%	0.1%	14.4%	0.9%	1.1%	69.1%		13%	13.9%	3%	5%	17.0%		
2000	584	1.7%	0.0%	0.5%	0.0%	13.7%	4.3%	0.0%	0.0%	11.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	15.1%	0.7%	0.9%	51.5%		30%	30.1%	8%	11%	18.3%		
2001	936	0.3%	0.0%	0.0%	0.0%	6.1%	2.1%	0.0%	0.0%	6.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.8%	1.1%	4.5%	72.5%		15%	14.7%	4%	5%	12.7%		
2002	499	0.4%	0.0%	0.0%	0.0%	8.8%	2.2%	1.4%	0.0%	6.4%	0.0%	0.0%	5.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%	0.2%	11.0%	2.2%	3.4%	57.9%		24%	25.1%	6%	9%	17.0%		
2003	414	1.7%	0.0%	0.0%	0.0%	10.9%	3.9%	2.4%	0.0%	3.1%	1.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.3%	0.6%	9.4%	0.2%	3.1%	62.1%		21%	23.4%	6%	8%	14.5%		
2004	571	1.2%	0.0%	0.9%	0.0%	17.7%	6.5%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.2%	0.2%	15.9%	0.2%	3.9%	50.6%		26%	28.2%	7%	10%	21.2%		
2005	717	0.0%	0.0%	0.3%	0.0%	14.5%	4.2%	2.5%	2.6%	1.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.9%	0.3%	6.6%	0.4%	3.2%	58.7%		26%	31.1%	8%	11%	10.2%		
2006	415	1.2%	0.0%	0.7%	0.0%	20.5%	5.8%	2.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	15.7%	0.0%	1.4%	52.0%		30%	29.6%	7%	10%	18.3%		
2007	971	0.0%	0.0%	0.0%	0.0%	8.9%	0.5%	0.0%	0.0%	2.9%	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%	0.0%	2.2%	84.3%		13%	12.9%	3%	5%	2.8%		
2008	879	0.5%	0.5%	0.0%	0.0%	25.8%	9.4%	1.3%	0.0%	4.4%	1.5%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	0.1%	5.6%	1.8%	2.6%	46.1%		43%	43.0%	11%	15%	10.9%		
2009	2,175	0.0%	0.0%	0.2%	0.0%	1.3%	3.6%	0.3%	0.0%	4.4%	0.0%	0.0%	0.0%	0.0%	0.3%	0.0%	0.7%	0.0%	1.3%	0.2%	0.8%	0.1%	1.9%	84.9%		10%	12.3%	3%	4%	2.9%		
2010	2,003	0.6%	0.0%	0.2%	0.0%	3.9%	3.7%	1.4%	1.1%	2.6%	0.4%	0.2%	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%	1.0%	0.1%	4.0%	0.6%	3.1%	76.5%		14%	15.0%	4%	5%	8.4%		
2011	2,728	0.3%	0.0%	0.1%	0.4%	3.3%	5.3%	0.2%	0.5%	3.4%	1.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	1.4%	3.2%	0.5%	2.7%	76.9%		14%	16.5%	4%	6%	6.6%		
2012	2,089	0.2%	0.0%	0.0%	0.0%	1.3%	0.7%	1.1%	0.4%	7.7%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.9%	0.0%	0.1%	0.3%	3.6%	0.2%	5.5%	77.5%		12%	13.0%	3%	5%	9.6%		
2013	3,419	0.0%	0.2%	0.0%	0.1%	2.0%	2.3%	0.4%	0.1%	6.6%	0.3%	0.1%	0.0%	0.0%	0.5%	0.0%	0.0%	0.0%	1.1%	0.0%	5.4%	0.7%	4.8%	75.5%		12%	13.3%	3%	5%	11.2%		
2014	2,265	0.5%	0.2%	0.0%	0.0%	3.9%	0.9%	0.7%	0.3%	11.9%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.3%	4.1%	6.0%	0.6%	2.9%	66.3%		18%	23.6%	6%	8%	10.2%		
2015	1,891	0.1%	0.1%	0.4%	0.0%	0.9%	1.0%	1.7%	0.0%	10.8%	0.0%	0.0%	0.0%	0.0%	0.4%	0.0%	0.0%	0.0%	1.1%	2.1%	4.3%	0.5%	2.0%	74.7%		15%	18.4%	5%	6%	6.9%		
2016	2,585	0.4%	0.2%	0.3%	0.0%	0.6%	2.3%	0.8%	0.0%	6.5%	0.0%	0.0%	0.0%	0.0%	0.5%	0.0%	0.0%	0.0%	0.2%	1.7%	1.3%	0.8%	2.4%	82.0%		10%	12.8%	3%	4%	5.2%		
averages																															
2009-2012		0.3%	0.0%	0.1%	0.1%	2.5%	3.3%	0.8%	0.5%	4.5%	0.4%	0.1%	0.0%	0.0%	0.2%	0.0%	0.4%	0.0%	0.8%	0.5%	2.9%	0.4%	3.3%	78.9%	#####	12.3%	14.2%	3.5%	5.0%	6.9%		
2013-2016		0.3%	0.2%	0.2%	0.0%	1.9%	1.6%	0.9%	0.1%	8.9%	0.2%	0.0%	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%	0.9%	2.0%	4.3%	0.7%	3.0%	74.6%	#####	13.8%	17.0%	4.3%	6.0%	8.4%		

Footnotes:

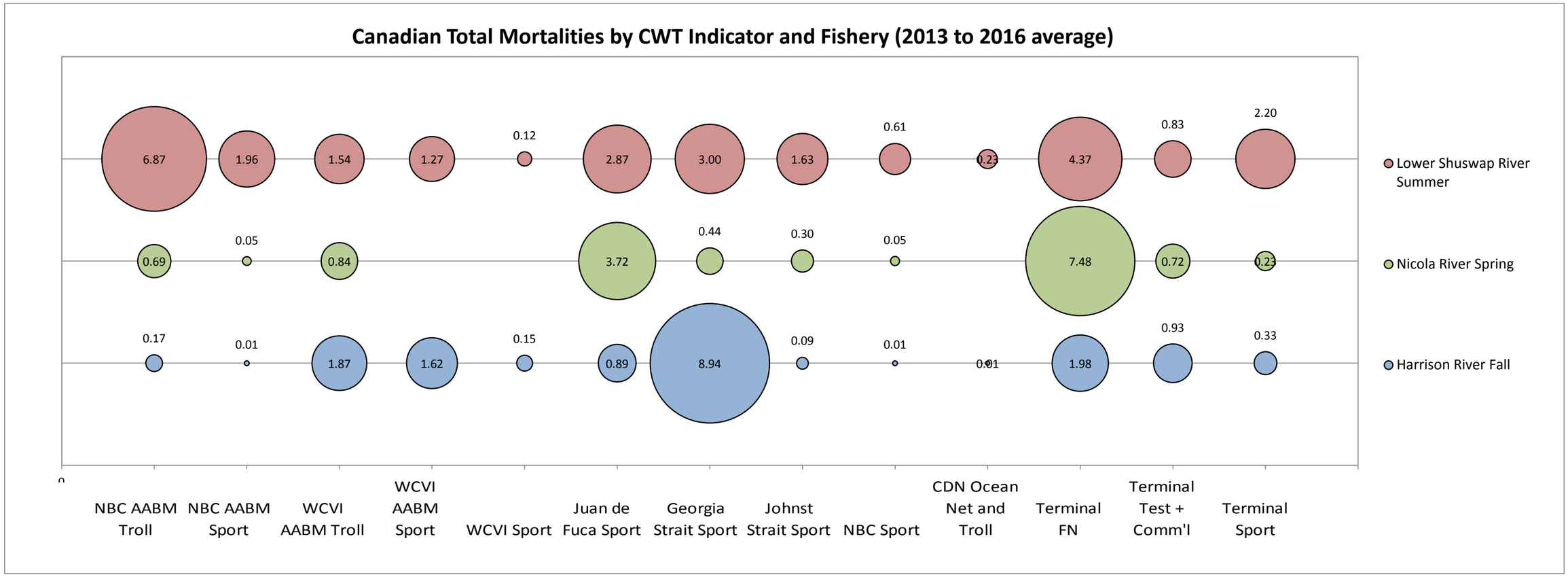
1. Canadian Ocean Net includes Juan de Fuca net, Johnstone Strait net, Northern net, Central net and WCVI net.
2. Canadian ocean troll includes Central and any other Canadian troll fisheries not listed.
4. The CWT data for all Fraser net fisheries was combined for the CTC CWT cohort analysis. The estimated CWT recoveries were used to prorate the CTC analysis into FN FSC and commercial categories for 2011-2016.
5. No adjustments have been made for any mark selective fisheries.

Annex 5

Table: Summary of 25% and 35% reductions in total fishing mortalities in Canadian fisheries only for specified Fraser River chinook coded-wire tag indicators.
All units shown are total fishing mortalities.

Fishery Management Unit	Indicator Population	Year	Canadian Total Mortality	CDN Total Mortality Reduction 25% Red'n	CDN Total Mortality Reduction 35% Red'n	US Total Mortality	CDN Total Mortality after 25% Red'n	CDN Total Mortality after 35% Red'n	US + CDN Total Mortality after 25% Red'n	US + CDN Total Mortality after 35% Red'n
Spring 4_2	**Nicola**	2009	47.5%	11.9%	16.6%	4.3%	35.6%	30.9%	39.9%	35.2%
		2010	7.7%	1.9%	2.7%	1.4%	5.8%	5.0%	7.2%	6.4%
		2011	11.8%	3.0%	4.1%	3.7%	8.9%	7.7%	12.6%	11.4%
		2012	23.8%	6.0%	8.3%	8.1%	17.9%	15.5%	26.0%	23.6%
		2013	7.8%	2.0%	2.7%	4.5%	5.9%	5.1%	10.3%	9.6%
		2014	14.5%	3.6%	5.1%	1.6%	10.9%	9.4%	12.5%	11.0%
		2015	14.9%	3.7%	5.2%	1.7%	11.2%	9.7%	12.9%	11.4%
		2016	20.9%	5.2%	7.3%	1.6%	15.7%	13.6%	17.3%	15.2%
	Average	2009-2012	22.7%	5.7%	7.9%	4.4%	17.0%	14.8%	21.4%	19.1%
	Average	**2013-2016**	**14.5%**	**3.6%**	**5.1%**	**2.3%**	**10.9%**	**9.4%**	**13.2%**	**11.8%**
Summer 4_1	**Lower Shuswa**	2009	38.6%	9.6%	13.5%	10.9%	28.9%	25.1%	39.8%	36.0%
		2010	35.5%	8.9%	12.4%	13.4%	26.6%	23.1%	40.1%	36.5%
		2011	35.7%	8.9%	12.5%	11.3%	26.8%	23.2%	38.1%	34.5%
		2012	34.7%	8.7%	12.1%	12.5%	26.0%	22.6%	38.5%	35.1%
		2013	27.9%	7.0%	9.8%	9.9%	21.0%	18.2%	30.8%	28.0%
		2014	32.7%	8.2%	11.5%	16.4%	24.5%	21.3%	40.9%	37.6%
		2015	23.3%	5.8%	8.2%	11.7%	17.5%	15.1%	29.2%	26.9%
		2016	26.0%	6.5%	9.1%	13.5%	19.5%	16.9%	33.0%	30.4%
	Average	2009-2012	36.1%	9.0%	12.6%	12.0%	27.1%	23.5%	39.1%	35.5%
	Average	**2013-2016**	**27.5%**	**6.9%**	**9.6%**	**12.9%**	**20.6%**	**17.9%**	**33.5%**	**30.7%**
Fall 4_1	**Harrison**	2009	12.3%	3.1%	4.3%	2.9%	9.2%	8.0%	12.1%	10.8%
		2010	15.0%	3.8%	5.3%	8.4%	11.3%	9.8%	19.7%	18.2%
		2011	16.5%	4.1%	5.8%	6.6%	12.4%	10.7%	19.0%	17.4%
		2012	13.0%	3.2%	4.5%	9.6%	9.7%	8.4%	19.3%	18.0%
		2013	13.3%	3.3%	4.6%	11.2%	10.0%	8.6%	21.1%	19.8%
		2014	23.6%	5.9%	8.3%	10.2%	17.7%	15.3%	27.8%	25.5%
		2015	18.4%	4.6%	6.4%	6.9%	13.8%	12.0%	20.7%	18.9%
		2016	12.8%	3.2%	4.5%	5.2%	9.6%	8.3%	14.8%	13.5%
	Average	2009-2012	14.2%	3.5%	5.0%	6.9%	10.6%	9.2%	17.5%	16.1%
	Average	**2013-2016**	**17.0%**	**4.3%**	**6.0%**	**8.4%**	**12.8%**	**11.1%**	**21.1%**	**19.4%**

Annex 6


Canadian Total Mortalities by CWT Indicator and Fishery (2013 to 2016 average)
6.87
1.96
1.54
1.27
0.12
2.87
3.00
1.63
0.61
0.23
4.37
0.83
2.20
0.69
0.05
0.84
3.72
0.44
0.30
0.05
7.48
0.72
0.23
0.17
0.01
1.87
1.62
0.15
0.89
8.94
0.09
0.01
0.01
1.98
0.93
0.33
0
Lower Shuswap River Summer
Nicola River Spring
Harrison River Fall
WCVI
CDN Ocean
Terminal
NBC AABM Troll
NBC AABM Sport
WCVI AABM Troll
WCVI AABM Sport
WCVI Sport
Juan de Fuca Sport
Georgia Strait Sport
Johnst Strait Sport
NBC Sport
CDN Ocean Net and Troll
Terminal FN
Terminal Test + Comm'l
Terminal Sport