Photo Richard Cosgrove

2020 SALMON MONITORING REPORT

Report Compiled by Steve Terry : August 2020

INTRODUCTION

North Canterbury Fish & Game Council has been consistently monitoring sea-run Chinook salmon returns for 28 years. The South Islands East Coast salmon fishery has seen a steady decline over the last decade, with very low returns to all rivers in 2018 and 2019. Population estimates indicate returns were only marginally improved in 2020. Despite the COVID-19 lockdown, North Canterbury Fish & Game were still be able to gather data on salmon, such as spawning activity, harvest rates and returns to hatcheries.

The sea-run salmon fishery on the East Coast of the South Island has performed poorly in recent years and anglers are looking to Fish & Game to restore the fishery and ensure harvest rates are kept at sustainable levels. There are many variables that effect salmon survival and even more theories amongst anglers as to the reason the fishery has not been performing. From Fish & Game's perspective, there are essentially two areas the salmon spend their life, freshwater and the ocean. While ocean variables such as sea temperature, predator numbers, food available etc are beyond our direct control, many of the freshwater variables that influence salmon survival can be improved to minimise mortality during this stage in their lifecycle and Fish & Game continue to advocate for these parameters to be improved or maintained.

Our headwater surveys showed a peak spawning count for the Rakaia River of 547 and 306 for the Waimakariri River. This compares with 442 in the Rakaia and 207 in the Waimakariri in 2019.

Based on our angler harvest surveys an estimate of the total salmon catch in each river was: Rakaia 380, Waimakariri 567, Hurunui 233 and Waiau 89. This compares with Rakaia 729, Waimakariri 492, Hurunui 184 and Waiau 72 in the 2018/19 angling season.

METHODS

Estimates of annual salmon returns consist of combining the number of salmon that reach their spawning streams, angler catch, and returns to hatchery facilities such as Silverstream and the Fish & Game managed hatcheries.

a. Spawning Escapement

Financial constraints meant helicopters were only used to count each spawning stream once as a peak count. Foot surveys were carried out in Double Hill Stream in the Rakaia catchment at the end of the Covid-19 lockdown to determine the likely timing of the spawning peak to determine the appropriate time to carry out aerial peak counts.

There is likely to be some error with the spawning escapement reported, as one flight does not allow for seasonal variances in the timing of the peak run between various rivers and individual spawning streams, along with encountering discolored water in the mainstem below the spawning streams. Due to financial constraints, the Hurunui and Waiau catchments were not counted in 2020.

The accuracy of the reporting of salmon spawning escapement and harvest / catch estimates is affected by the methods used to interpret these counts, specifically the relationship between individual salmon aerial count data and the proportion of the run this represents, compared with angler catch. Since 2013 key spawning streams in both the Rakaia and the Waimakariri catchments

have been surveyed by helicopter around observed historic peaks in salmon spawning numbers (Peak Count). Salmon generally congregate in pools around the entrance to the spawning streams in reasonable numbers towards the end of March in the Rakaia, and end of April in the Waimakariri. Peak salmon spawning occurs late April to late May, and most runs taper off by mid-June when very few live salmon are left. Although isolated runs of salmon may spawn as late as August.

Generally, the Rakaia salmon numbers reach their peak in the spawning streams at the beginning of May, the Hurunui and Waiau rivers the second week of May, and the Waimakariri River the third week of May. When only a single trend count is carried out (at peak spawning time) as much of the river is counted as possible to ensure any salmon waiting below the traditional spawning reaches are accounted for, as well as counting all carcasses. Historically during peak counts, very few dead salmon are usually observed, with 5 - 10% carcass to live fish considered to be the peak.

To calculate the annual total trend count for the Rakaia River, the peak count data from all streams in the catchment was added to the aerial observations by CSI staff for Mellish Stream and the total salmon returning to the Montrose and Whisky Creek hatcheries. To calculate the annual total trend count for the Waimakariri River, the peak aerial count data from all streams in the catchment was added to the total returns to Silverstream hatchery. With no trap in the Otukaikino Stream flowing from the Isaacs hatchery where salmon have been released in recent years, no returns were recorded this year. Although post lockdown spawning surveys did record salmon redds in several areas.

Historical Area Under the Curve (AUC) peak aerial count data for each stream cannot be used to compare the more recent Peak Count data. Historic count data does not give a true representation of the total numbers of salmon present during each flight, as there would usually still be a significant number of salmon waiting below the spawning reaches, along with a small number of spent carcasses, both of which were not traditionally recorded, and these salmon are therefore not included in the historic AUC data.

Observations over the last 19 years indicate that the salmon observed during the peak counts represents the majority of the spawning salmon. There are usually very few carcasses observed at this time (<10%). Calculations indicate that the historically reported AUC spawning numbers are likely to be around 1.5 x the number seen on the recent Peak Counts. Using this multiplier for calculating comparable spawning numbers in each stream, the graphed results look very similar to the historically reported results using the AUC model (Figure 3).

b. Angler Salmon Catch

Email and phone surveys (Table 1) were carried out at the end of the salmon fishing season in conjunction with CSI and this year for the first time, Otago Fish & Game, to determine the number of salmon that were caught from each river. This survey began in 1993 and now offers a long-term dataset of comparable results.

The survey consisted of an email sent to all full season licence holders in the three regions who had supplied an email address, with a follow-up email sent to non-respondents. The results from this email survey were treated as a separate known harvest strata and were not included in the harvest extrapolation from further phone surveys.

Licence holders that harvested one or more salmon in the previous four seasons were classed as the top strata, and as many as possible were phoned. All strata were further broken down by licence and

licence type. Licence type was split into family and adult. The adult category includes adult whole season, loyal senior and local area licences. A number of anglers were then surveyed in the random strata.

The survey results were then analysed and the results extrapolated to include all licence holders in the three regions. An estimate of the total salmon catch in each river by NC, CSI and Otago licence holders was then calculated.

The full list of questions can be found in Appendix 3, however the survey format is not easily displayed.

Table 1. Email & Phone Survey methodology

Region	Licence type	Category	Email type	Number surveyed	Population total	Percent surveyed
North Canterbury	Adult	Email	Respondent	1,650	1,650	100.0%
		Random	No email	88	1,383	6.4%
			Non-respondent	203	2,815	7.2%
		Successful	No email	41	89	46.1%
			Non-respondent	79	118	66.9%
	Family	Email	Respondent	823	823	100.0%
		Random	No email	30	553	5.4%
			Non-respondent	97	1,517	6.4%
		Successful	No email	21	27	77.8%
			Non-respondent	43	59	72.9%

RESULTS

a. Rakaia River Returns

The AUC historic total run has been calculated using the 1.5 multiplier of the Peak Count from 2013, and from the graph below, the total run in the Rakaia was the second lowest on record. See Appendix 1 for counts on each spawning stream, and Appendix 4 for total counts.

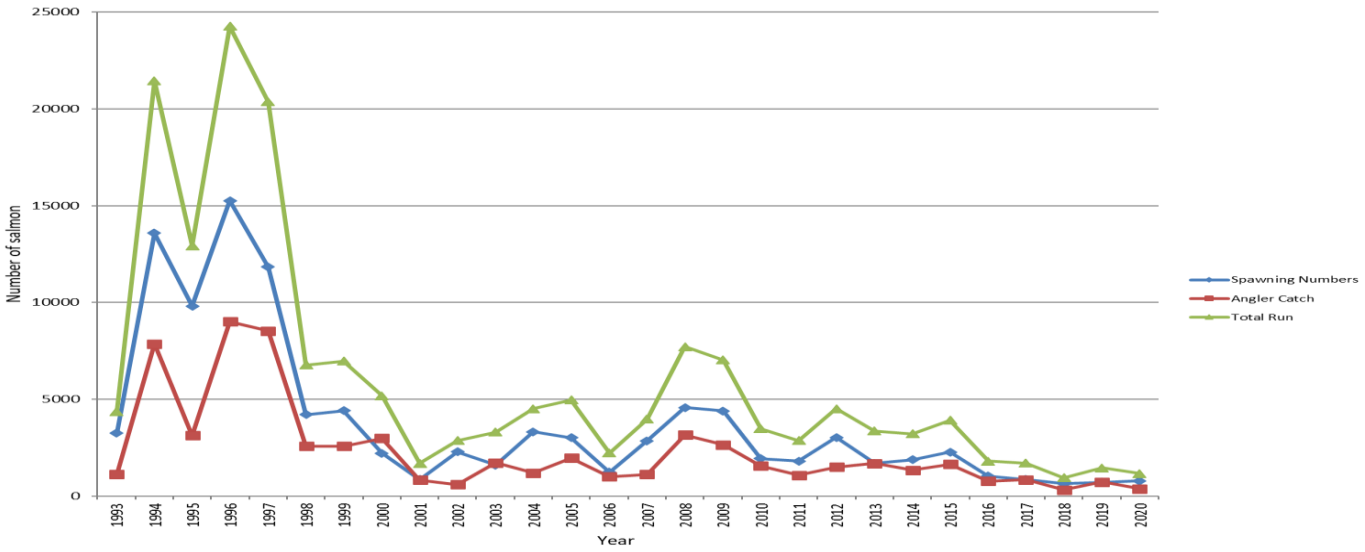

Figure 1 – Rakaia River salmon spawning escapement, angler catch and total run

b. Waimakariri River Returns

Many salmon anglers reported perceiving last season as a poor but marginally better than the 2018 and 2019 season, which was some of the poorest runs on record for the Waimakariri River. The Peak Count total run has been estimated by multiplying the Peak Count by 1.5. See Appendix 1 for counts on each spawning stream, and Appendix 4 for total counts.

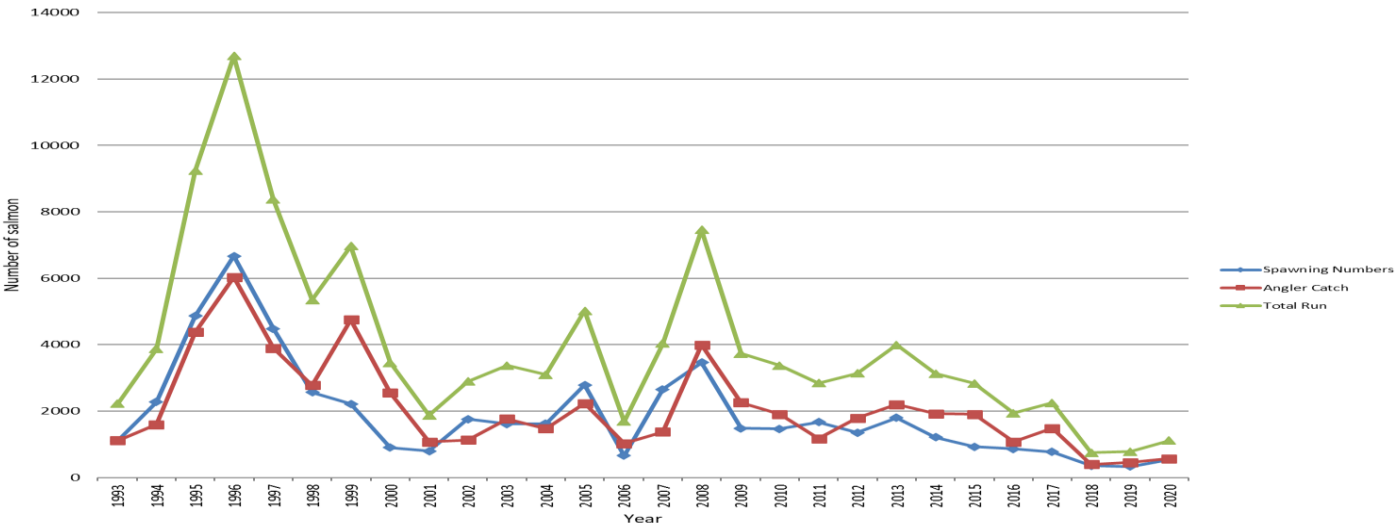

Figure 2 – Waimakariri River salmon spawning escapement, angler catch and total run

c. Peak Count vs Traditional AUC Methodology

The graph below shows what percentage the peak count calculated total run is, of the historically calculated AUC total run for the Rakaia and Waimakariri rivers. This ranges from around 65% in the Rakaia to 90% in the Waimakariri, but is trending up as the peak count and angler harvest methodology is refined each year. The peak count method is likely to lead to a further reduction in this difference in future years, as carcasses and salmon below the spawning reaches are now also included in the peak count figures, which had not previously been included.

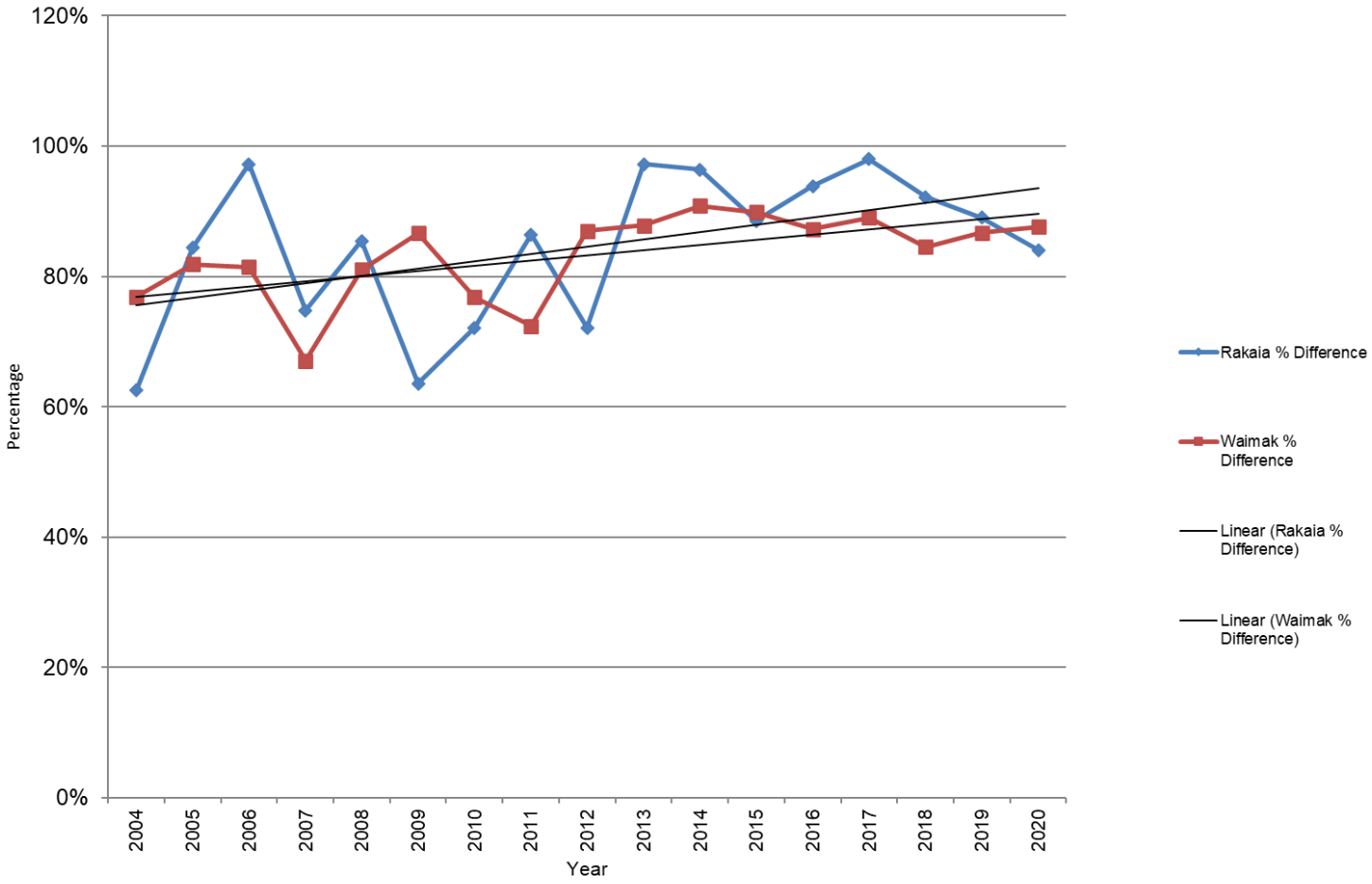

Figure 3 – Estimated percentage the peak count total run is of the AUC total run

d. Angler Catch in Canterbury Rivers

The Waimakariri had the second lowest number of salmon caught since records began. Anglers Colin and Diane Eaton, along with Peter Robinson collected catch data from the McIntosh's Rocks and Mouth areas in the lower Waimakariri River again this year, including fin-clipped salmon (see Appendix 5). This data has not been compared with the phone harvest data. Table 2 below shows the breakdown of the harvest survey.

Table 2. Salmon harvested by NC & CSI anglers in 2020

Riv_Region	River	Number Fished	Salmon Caught	Finclips	Succesful anglers	se.Number Fished	se.Salmon Caught	se.Finclips	se.Succesful anglers
cs	Ashburton	51.7	2.0	0.0	1.0	15.2	0.0	0.0	0.0
cs	Kakanui	2.0	1.0	0.0	1.0	0.0	0.0	0.0	0.0
cs	Opihi	175.4	28.1	3.3	21.3	32.7	8.5	0.7	8.3
cs	Orari	78.2	12.6	5.3	8.6	10.6	0.8	0.7	0.8
cs	Rangitata	448.1	119.9	23.4	77.3	41.0	18.9	9.2	18.5
cs	Waihao	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
cs	Waitaki	278.4	85.4	8.0	42.3	41.5	17.2	0.0	8.7
nc	Hope	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
nc	Hurunui	453.8	233.4	7.0	115.6	51.0	65.4	0.0	28.1
nc	Kaiapoi	167.2	75.6	56.8	33.9	19.3	40.4	27.0	13.6
nc	Rakaia	1246.8	379.9	44.5	208.4	89.0	34.9	0.9	27.8
nc	Tentburn	4.0	2.0	0.0	1.0	0.0	0.0	0.0	0.0
nc	Waiau	152.6	89.2	3.0	38.7	20.6	2.6	0.0	2.2
nc	Waimakariri	1876.9	483.0	71.8	276.6	109.1	61.4	14.2	35.2

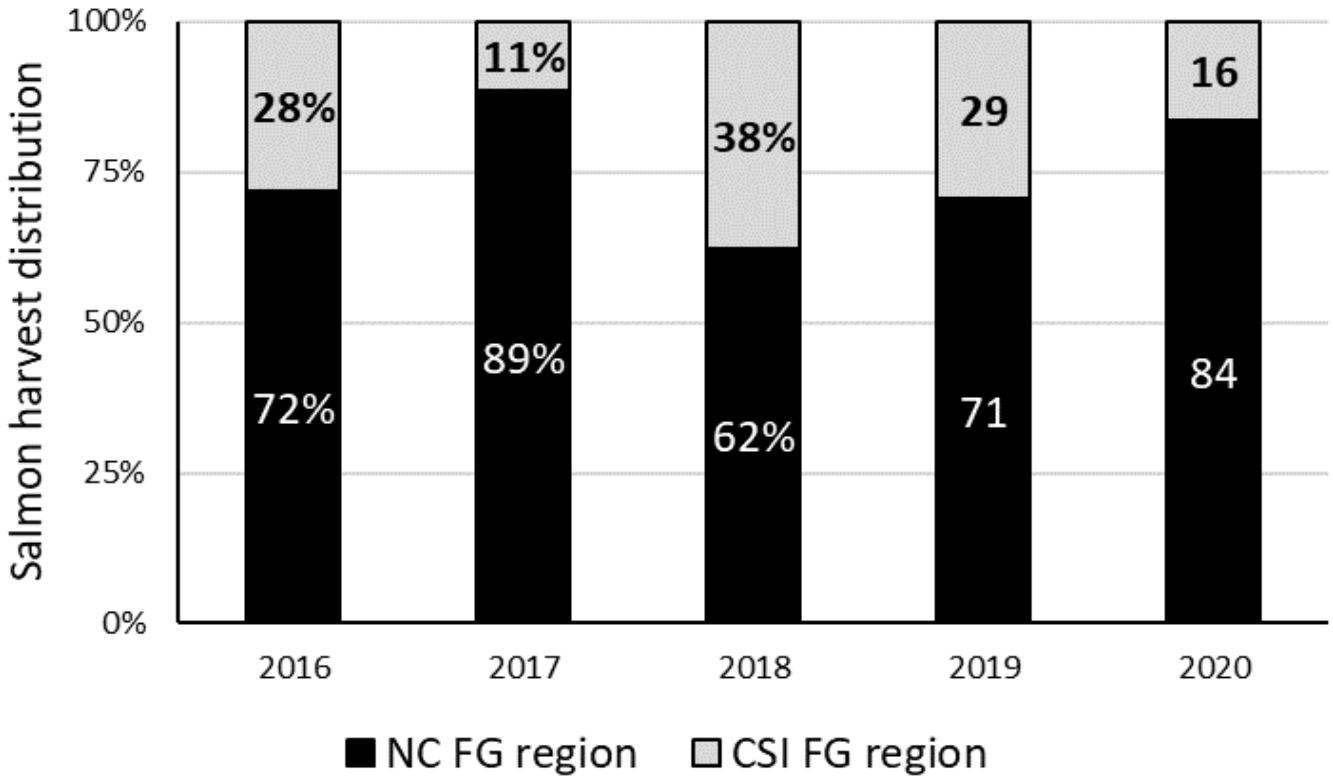

Figure 4 - Proportion of sea-run salmon harvested in each Fish & Game region, based on the Canterbury wide harvest surveys (20016 - 2020).

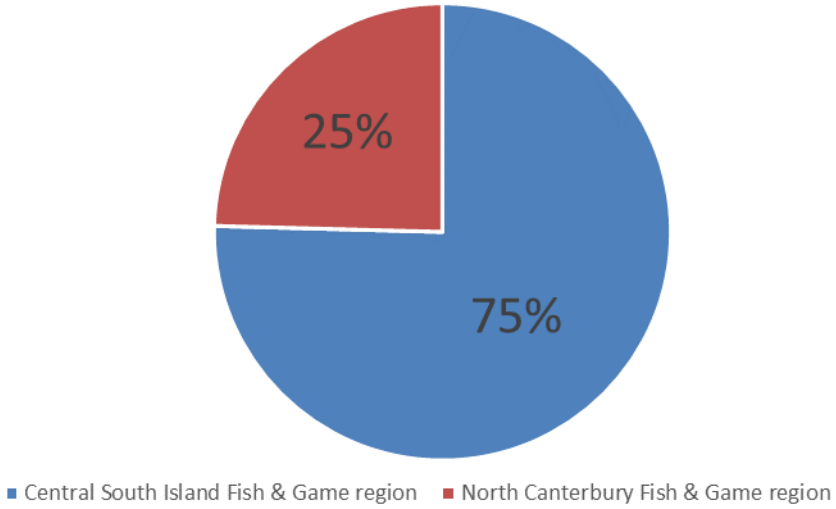

Figure 5 – Average proportion of salmon harvested on the east coast of the South Island from 2016 - 2020.

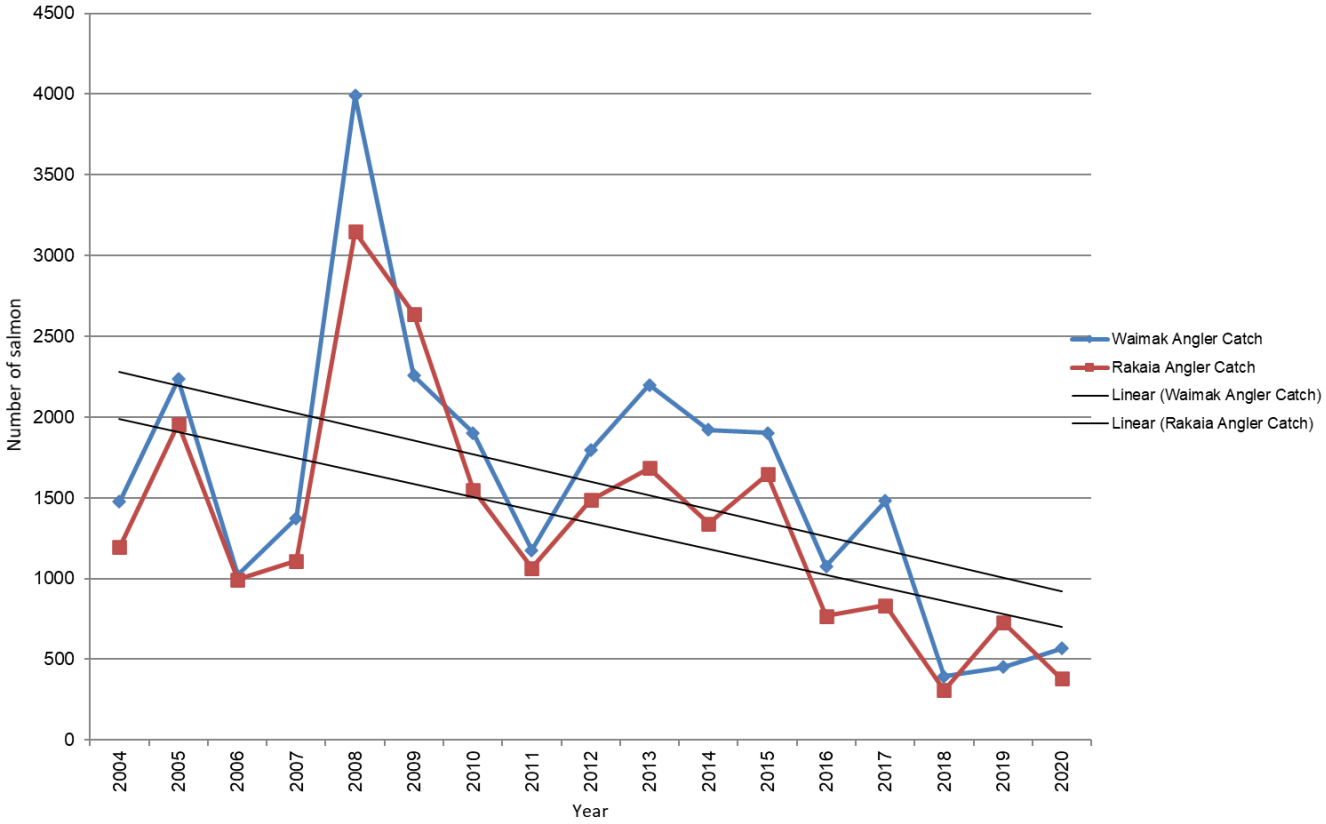

Figure 6 – Angler catch numbers in the Rakaia and Waimakariri rivers.

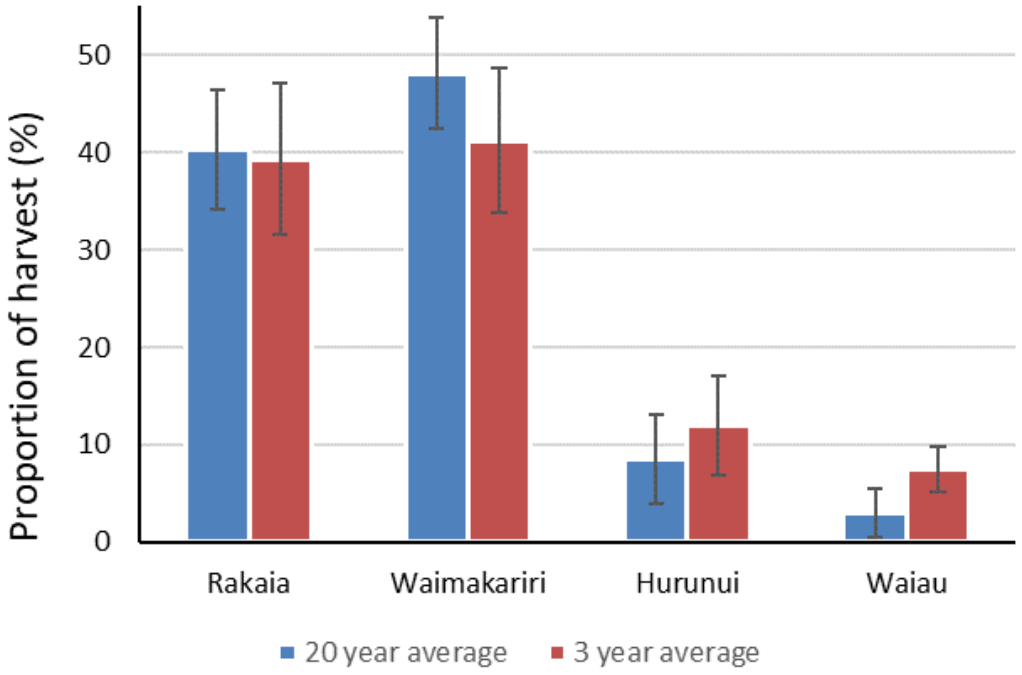

Figure 7 – Comparison of the average (mean) harvest distribution across North Canterbury salmon rivers in the last 20 years (blue) vs three (red) years, showing that the Waiau and Hurunui rivers in recent years appear to support a growing portion of the regions total salmon harvest. Error bars on harvest estimates illustrate ±1 SD.

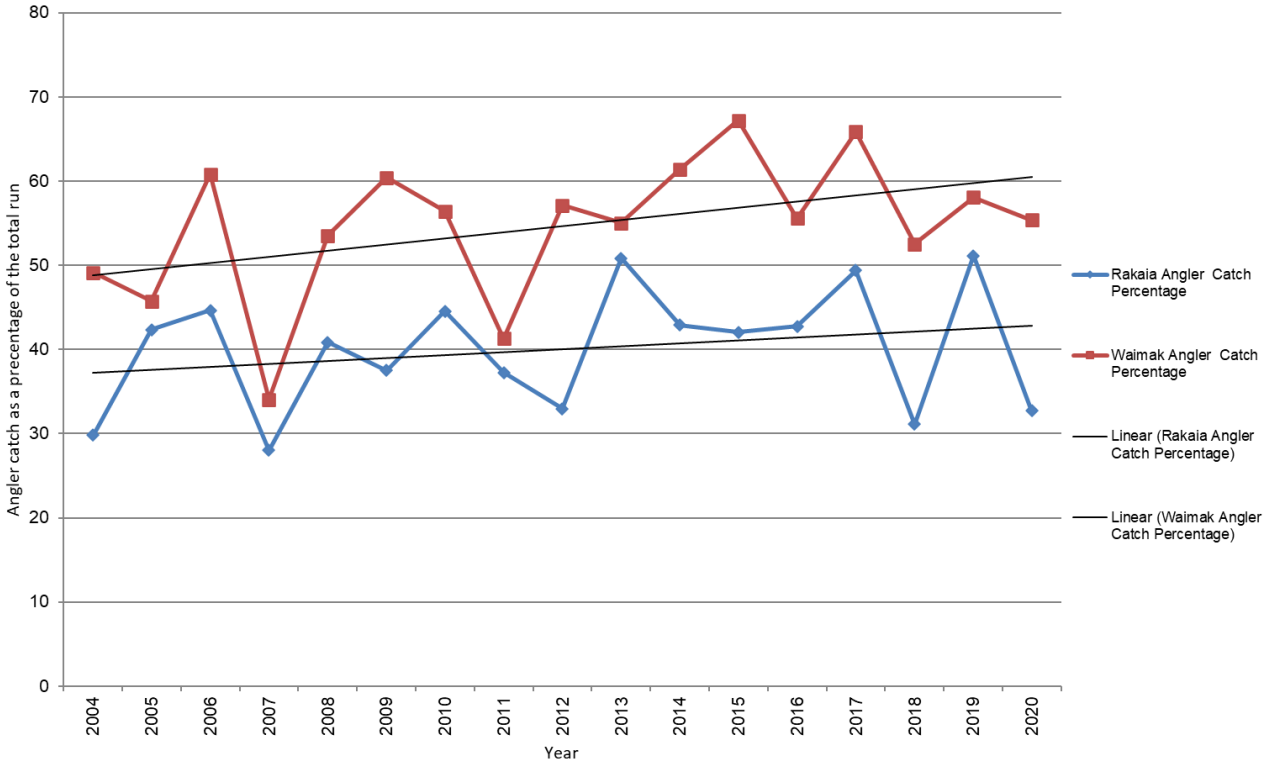

Figure 8 - Angler catch as a percentage of the total estimated salmon run in the Rakaia and Waimakariri rivers since 2004, with both these catch rates trending up over the last 16 years.

DISCUSSION

Preserving the pristine state of our spring fed streams and wetlands is critical to ensure ecological values of these areas are protected. Fish & Game spend considerable staff time advocating for improved environmental requirements in local and regional plans. However, many of the factors and variables that are likely to influence juvenile salmon survival in fresh water are now beyond our direct control. These include variables such as the allocated increase in water abstraction in the last 20 years, ineffective but already consented fish screens and the long-term cumulative degradation of habitat and water quality.

In recent years, staff have placed more emphasis on the overall ecological health of the high-country salmon spawning streams, including the wetlands and riparian zones surrounding them. A gradual decline in instream and riparian habitat on some of the streams is likely to have reduced the spawning and rearing habitat quality. This is likely to have resulted in reduced spawning success (lower % of fry hatch / emergence survival). Reduced ecosystem health and food (invertebrate) abundance may also stimulate premature migration of many juvenile fry from the relative safety of these streams, into flood-prone mainstem river segments.

River flats and riparian areas in the Canterbury high country bordering some of the salmon spawning streams continue to be developed. Intensification in the catchments of these spring creeks can result in groundwater nutrient loading and contamination, which surfaces in and can adversely influence the springs. Due to the significant adverse impacts cause by excess fine sediment staff are particularly concerned at the increasing use of brassica crops to feed stock during winter months in these headwater areas.

Due to concerning observations over many years, staff approached Environment Canterbury (ECAN) in 2013 and began a three-year monitoring program to look at the health of some of our key spawning streams. ECAN published a report on this monitoring in August 2018, “High country spring-fed streams: effects of adjacent land use” (https://ecan.govt.nz/data/document-library/ type in the keywords “high country”). The report indicates that farming has an impact on stream health even when riparian buffer zones exist, by showing that detrimental effects on some of the stream invertebrate and periphyton communities can occur with only small elevations of nitrates. Staff have found that monitoring provides a valuable opportunity to involve the landowners when gathering data, enabling long-term data sets to be collected for greater understanding of the issues. This helps ensure that local changes to land use can be suggested when required. The relationships that have been carefully developed with these landowners are critical to achieving changes in land management practice that we are increasingly realizing will be required to improve and aid salmon recovery.

During the 2019/20 irrigation season, ECAN staff monitoring 30 of the significant screens in Canterbury against the NIWA guidelines, alongside consent conditions. The monitoring shows nearly all screens failed to meet the NIWA guidelines and were ineffective at screening salmon and returning them to their source river. Staff continue to lobby ECAN for recognition of the significance of ineffective fish screens and are developing a strategy for achieving measurable gains over the next 5 and 10 years.

At present, fishery managers only have a limited number of options to try and ensure adequate salmon numbers reach their spawning grounds each year. The key tool being tighter regulations to reduce harvest. There is an acceptance by both North Canterbury (NC) and Central South Island Fish

& Game (CSI) councils that we need to significantly reduce the harvest of wild salmon, in order to increase the numbers of fish returning to the spawning streams and rebuild the fishery. While we do not know the minimum number of spawning salmon required to sustain the population in each spawning stream or catchment, we do know that in the last decade salmon returns have steadily declined to record low levels. A number of regulations to incrementally reduce harvest were put in place for the 2019/20 season. However, introduction of a seasonal catch limit has been recommended by scientists as the least harmful regulation to further reduce harvest and rebuild spawning numbers. It has been noted that it is possible that life history, genetic diversity and population resilience may be adversely affected by shortening the season and areas anglers can fish over long time periods.

Moving towards an adaptive salmon management strategy and identifying minimum escapement targets at river or sub-catchment levels and implementing a model for setting harvest regulations aims to rebuild the fishery over the long-term. This requires a long-term commitment to quality monitoring. In addition to designing, funding and conducting robust total run size surveys, there is also a need to continue high quality salmon harvest monitoring between Fish & Game regions, similar to how the current national gamebird harvest survey is conducted.

ACKNOWLEDGEMENTS

The North Canterbury Fish & Game Council would like to thank the following people for their assistance with the 2019/20 salmon monitoring program:

Simon WerthMuller (Rakaia Helicopters), Richard Hill (Flock Hill Station), Mark & Belinda Ensor (Glenariffe Station), Don & Julie Paterson (Manuka Point Station), James & Jane Smiley (Mt. Algidus Station), Paul & Belinda Ensor (Glenaan Station), Tim & Anna Hutchinson (Double Hill Station), Silverstream Hatchery staff, Jayde Couper, Mark Webb & Hamish Stevens (CSIF&G), Colin and Dia Eaton, Peter Robinson (Lower Waimakariri River salmon catch records).

APPENDIX

A 1:1 Aerial Count Dates

2020	8-May	Double Hill	38
		Glenariffe	72
		Manuka Point	79
		Hydra Waters	181
		Goat Hill	2
	Mellish		175
	26-May	Winding Creek	11
		Cass Hill Stream	41
		Poulter	148
		One Tree Swamp	41
		Cora Lynn	62
		Railway Springs	2
		Bealey Springs	0
		Turkey Flat	1
	20-Jun	Cora Lynn	62
		One Tree Swamp	41
		Cox/Esk	0
		Thompson	2

A 1:2 Reported trap counts

The Salmon Smolt NZ Silverstream hatchery manager reported (on 3rd June) that 76 salmon had been counted through the trap, plus an additional 13 spawning in creek adjacent to the salmon hatchery.

The Montrose Estate farm manager reported he estimated that less than 50 salmon had entered/spawned in Montrose Stream.

A 1:3 Questions in email/phone surveys

Questions
Timestamp
First name
Surname
Would you like to be emailed a summary of the results of this survey?
What is your contact Email?
Did you fish for sea run salmon in the 2019/2020 season?
Licence number
Did you fish the Central South Island rivers (Waitaki, Opihi, Rangitata, Orari and Ashburton) for salmon this season?
Did you fish the Waitaki River or river mouth for salmon?
Did you fish the Opihi River catchment or river mouth for salmon?
Did you fish the Orari River or Orari River mouth for salmon?
Did you fish the Rangitata river or mouth for salmon?

Did you fish the Ashburton River catchment or mouth for salmon?
Did you fish for salmon in the North Canterbury Rivers? (Rakaia, Waimakariri, Kaiapoi, Hurunui or Waiau)
Did you fish for salmon on the Clutha River below the Roxburgh Dam (including the Pomahaka River)?
Did you fish for salmon in the Nelson/Marlborough region? (Clarence, Wairau or Wairau Diversion)
Did you fish for salmon in rivers not already listed?
Did you fish for salmon in the mouth and tidal zone of the Waitaki?
Did you fish for salmon in the area above the tidal zone but below State Highway 1 on the Waitaki?
Did you fish for salmon in the area above State Highway 1 but below Stonewall (Bortons/Black point pond) on the Waitaki?
Did you fish for salmon above Stonewall (Bortons/Black point pond) on the Waitaki?
How many salmon did you keep at the mouth and tidal zone of the Waitaki?
How many of those salmon were fin clipped?
How many salmon did you keep above the tidal zone but below State Highway 1 in the Waitaki?
How many were finclipped?
How Many Salmon Did you keep above State highway 1 but below Stonewall(Bortons/Black point pond) on the Waitaki?
How many were finclipped?
How Many Salmon did you keep above Stonewall (Bortons/Black point pond) on the Waitaki?
How many were finclipped?
Did you fish for salmon at the mouth/ tidal reaches of the Opihi River?
Did you fish for salmon above the tidal reach but below State Highway 1 on the Opihi?
Did you fish for salmon above State Highway 1 in the Opihi catchment?
How many salmon did you keep at the mouth/tidal reaches of the Opihi?
How many were finclipped?
How many salmon did you keep above the tidal reaches but below State Highway 1 on the Opihi?
How many were finclipped?
How many salmon did you keep above State Highway 1 in the Opihi System?
How many were finclipped?
How many salmon did you keep in the Orari?
How many were finclipped?
Did you fish for salmon at the mouth/tidal reaches of the Rangitata?
Did you fish for salmon above the tidal reaches but below State highway 1 on the Rangitata?
Did you fish for salmon above State Highway 1 but below Arundel Bridge on the Rangitata?
Did you fish for salmon above Arundel Bridge but below the gorge on the Rangitata?
Did you fish for salmon in or above the gorge on the Rangitata?
How many salmon did you keep in the mouth/tidal reaches of the Rangitata?
How many were finclipped?
How many salmon did you keep above the tidal zone but below State Highway 1 on the Rangitata?
How many were finclipped?
How many salmon did you keep above State Highway 1 but below Arundel bridge on the Rangitata?
How many were finclipped?
How many salmon did you keep in the Rangitata between Arundel bridge and the bottom of the gorge?
How many were finclipped?

How many salmon did you keep in or above the gorge on the Rangitata?
How many were finclipped?
How many salmon did you keep in the Ashburton System?
How many were finclipped?
Did you fish for salmon in the Rakaia?
Did you fish for salmon in the Waimakariri? (not including the Kaiapoi)
Did you fish for salmon in the Kaiapoi River?
Did you fish for salmon in the Hurunui?
Did you fish for salmon in the Waiau?
Did you fish for salmon at the mouth/tidal reaches on the Rakaia?
Did you fish for salmon above the tidal reaches but below State highway 1 on the Rakaia?
Did you fish for salmon on the Rakaia between state highway 1 and the gorge bridge?
Did you fish for salmon on the Rakaia above the gorge bridge?
How many salmon did you keep in the mouth/ tidal reaches of the Rakaia?
How many were finclipped?
How many salmon did you keep above the tidal reaches but below State highway 1 on the Rakaia?
How many were finclipped?
How many salmon did you keep in the Rakaia between state highway 1 and the gorge bridge?
How many were finclipped?
How many salmon did you keep in the Rakaia above the gorge bridge?
How many were finclipped?
Did you fish for salmon in the Waimakariri River below State highway 1? (not including the Kaiapoi)
Did you fish for salmon in the Waimakariri River between state highway 1 and the gorge bridge?
Did you fish for salmon in the Waimakariri River above the gorge bridge?
How many salmon did you keep in the Waimakariri below State Highway 1 (not including the Kaiapoi)?
How many were finclipped?
How many salmon did you keep in the Waimakariri between state highway 1 and the gorge bridge?
How many were finclipped?
How many salmon did you keep in the Waimakariri above the gorge bridge?
How many were finclipped?
How many salmon did you keep in the Kaiapoi River?
How many were finclipped?
Did you fish for salmon in the Hurunui River in the mouth/ tidal reaches?
How many salmon did you keep in the Hurunui in the mouth/ tidal reaches?
How many were finclipped?
Did you fish for salmon in the Hurunui River above the tidal reaches but below State highway 1?
How many salmon did you keep in the Hurunui above the tidal reaches but below State highway 1?
How many were finclipped?
Did you fish for salmon in the Hurunui River between state highway 1 and Mandamus Confluence?
How many salmon did you keep in the Hurunui between state highway 1 and Mandamus Confluence?
How many were finclipped?
Did you fish for salmon in the Hurunui River above the confluence with the Mandamus?
How many salmon did you keep in the Hurunui above the confluence with the Mandamus?

How many were finclipped?
Did you fish for salmon in the Waiau River in the mouth/ tidal reaches?
How many salmon did you keep in the Waiau in the mouth/ tidal reaches?
How many were finclipped?
Did you fish for salmon in the Waiau River above the tidal reaches but below State highway 1?
How many salmon did you keep in the Waiau above the tidal reaches but below State highway 1?
How many were finclipped?
Did you fish for salmon in the Waiau River between State highway 1 and the Hanmer Bridge?
How many salmon did you keep in the Waiau between State highway 1 and the Hanmer Bridge?
How many were finclipped?
Did you fish for salmon in the Waiau River above the Hanmer Bridge?
How many salmon did you keep in the Waiau above the Hanmer Bridge?
How many were finclipped?
How many salmon did you keep in the Clutha River below the Roxburgh Dam (including the Pomahaka River)?
How many were finclipped?
Did you fish for salmon in the Clarence River below State highway 1?
How many salmon did you keep in the Clarence River below SH1?
How many were finclipped?
Did you fish for salmon in the Clarence River above State highway 1?
How many salmon did you keep in the Clarence River above SH1?
How many were finclipped?
Did you fish for salmon in the Wairau River below State highway 1 (Not including the Wairau Diversion)?
How many salmon did you keep in the Wairau River below SH1(Not including the Wairau Diversion)?
How many were finclipped?
Did you fish for salmon in the Wairau River above State highway 1?
How many salmon did you keep in the Wairau River above SH1?
How many were finclipped?
Did you fish for salmon in the Wairau Diversion?
How many salmon did you keep in the Wairau Diversion?
How many were finclipped?
What is the name for the first other river you fished in?
How many salmon did you keep in this river?
How many were finclipped?
Did you fish for salmon in any further rivers?
What is the name for the second other river you fished in?
How many salmon did you keep in this river?
How many were finclipped?
Did you fish for salmon in any further rivers?
What is the name for the third other river you fished in?
How many salmon did you keep in this river?
How many were finclipped?

How many sea run salmon did you **intentionally** release this season?
What rivers did you **intentionally** release sea run salmon in?

A 1:4 Spawning Stream Counts, Angler Catch, Total Run

Rakaia Tributaries											Rakaia
	Hydra Waters	Manuka Pt	Double Hill	Glenariffe	Mellish, Goat	Montrose,Bully	Nat Spawning	Spawning	Angler	Total	Angler
	RT=14.67	RT=16.7*	RT=13.95	RT=18.5	Wilberforce Strm	Whisky Traps	(Exc. Montrose)	Numbers	Catch	Run	Catch %
1993	1113	209	704	713	504		3243	3243	1116	4359	26
1994	4021	467	2491	4497	2110		13586	13586	7861	21447	37
1995	3689	386	1185	3026	1524		9810	9810	3120	12930	24
1996	4653	811	1985	5442	2371		15262	15262	9008	24270	37
1997	2998	966	2401	3630	1838		11833	11833	8531	20364	42
1998	1559	216	857	912	652		4196	4196	2567	6763	38
1999	1510	302	377	1528	684		4401	4401	2567	6968	37
2000	812	175	604	271	342		2204	2204	2975	5179	57
2001	476	43	103	100	133		855	855	829	1684	49
2002	1382	193	258	93	354		2280	2280	585	2865	20
2003	674	196	284	89	229	120	1472	1592	1714	3306	52
2004	1456	298	303	649	498	110	3204	3314	1195	4509	27
2005	898	289	306	325	334	850	2152	3002	1958	4960	39
2006	357	87	132	147	400	110	1123	1233	994	2227	45
2007	1471	286	243	583	90	180	2673	2853	1110	3963	28
2008	1499	990	463	811	550	250	4313	4563	3149	7712	41
2009	1372	618	647	958	350	450	3945	4395	2639	7034	38
2010	497	377	289	504	150	112	1817	1929	1550	3479	45
2011	748	169	98	173	350	257	1538	1795	1066	2861	37
2012	798	758	129	628	500	210	2813	3023	1488	4511	33
2013	516	198	98	234	384	250	1430	1680	1683	3363	50
2014	183	533	111	198	341	500	1366	1866	1341	3207	42
2015	503	602	173	599	263	130	2140	2270	1647	3917	42
2016	153	368	101	165	228	17	1015	1032	769	1801	43
2017	288	227	30	47	245	20	837	857	834	1691	49
2018	185	122	32	81	117	101	537	638	309	947	33
2019	183	155	48	83	150	96	619	715	729	1444	50
2020	**272**	**119**	**57**	**108**	**178**	**50**	**734**	**784**	**380**	**1164**	**33**

Waimakariri Tributaries											Waimak
	Poulter	Winding Crk	Cass Hill	Cora Lynn	Bealey/Rail/Turk	Silverstream	Nat.Spawning	Spawning	Angler	Total	Angler
	RT=21*	RT=15.42	RT=16.7	RT=28	One Tree Swamp	TrapCensus	excl.Silverstrm	Numbers	Catch	Run	Catch %
1993	304	327	213	186	75		1105	1105	1116	2221	50
1994	363	236	438	285	96	855	1418	2273	1597	3870	41
1995	1225	1011	817	337	247	1230	3637	4867	4372	9239	47
1996	1559	2336	1045	508	397	818	5845	6663	6033	12696	48
1997	726	824	1362	491	248	830	3651	4481	3893	8374	46
1998	505	417	840	389	157	260	2308	2568	2778	5346	52
1999	593	417	302	289	117	500	1718	2218	4748	6966	68
2000	166	86	185	80	38	347	555	902	2553	3455	74
2001	63	27	117	28	17	547	252	799	1075	1874	57
2002	878	313	148	69	103	250	1511	1761	1128	2889	39
2003	414	183	342	Not Counted^	68	600	1007	1607	1764	3371	52
2004	480	278	251	312	96	205	1417	1622	1475	3097	48
2005	960	689	320	381	138	300	2488	2788	2234	5022	44
2006	89	88	131	101	80	170	489	659	1022	1681	61
2007	521	433	532	788	110	275	2384	2659	1373	4032	34
2008	1601	443	386	355	320	360	3105	3465	3991	7456	54
2009	537	109	244	127	100	360	1117	1477	2256	3733	60
2010	468	318	473	109	40	60	1408	1468	1902	3370	56
2011	577	354	281	333	65	60	1610	1670	1175	2845	41
2012	400	297	148	192	70	240	1107	1347	1793	3140	57
2013	723	140	162	408	24	340	1457	1797	2199	3996	55
2014	362	173	129	108	86	350	858	1208	1921	3129	61
2015	495	77	83	126	78	70	859	929	1902	2831	67
2016	386	41	107	86	123	120	743	863	1077	1940	56
2017	405	35	107	93	101	27	741	768	1482	2250	66
2018	171	48	51	45	29	8	344	352	394	746	53
2019	104	32	72	51	53	16	312	328	452	780	58
2020	**222**	**17**	**62**	**93**	**62**	**89**	**456**	**545**	**567**	**1112**	**51**

A 1:5 Salmon harvest records reported to North Canterbury Fish and Game

Please note that while external harvest reports provide a useful indication of localised harvest numbers, they are not a harvest census count nor a quantitative estimate. Therefore, while helpful, these reports are neither compatible nor comparable to the Fish & Game email / phone survey. The Fish & Game harvest survey provides a statistically robust quantitative harvest estimate based on an extensive survey of licence holders across several Fish & Game regions.

New Zealand Salmon Anglers Association harvest report

The salmon community from the Mackintosh's area of the Waimakariri River annually conduct a survey of salmon caught and keep records of the number of 'Finned Clipped' fish, to the best endeavour of accuracy.

This year was no different except that the season was shortened to only December until the end of March.

Within that period, a number of floods/freshes occurred, which kept the water temperature cooler throughout the entire period.

Covid 19 did not help by closing the last part of March as well.

The catch figures are as follows:
December 2019 zero salmon landed.
January 2020 = 27 landed, 19 were fin clipped.
February 2020 = 42 landed, 15 were fin clipped.
March 2020 = 59 landed, 11 were fin clipped.
Total =128 landed, 45 were fin clipped.
Percentage of fin clipped fish = 35.1%

Colin Eaton
Vice President NZSAA.

Peter Robinson harvest report from the Waimakariri River mouth

Dec 0,
Jan 4 at Kairaki (K) 4 Sth Side (S)
Feb 4 K, 7 ,
March 8 K, 64 S
65 taken between Sun 15 March and Wed 25 March