



CENTRAL SOUTH ISLAND REGION

2019/2020 Central South Island Sea-run Salmon Returns - Season Summary

Mark Webb

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For any information regarding this report please contact Central South Island Fish and Game Council - phone: (03)615-8400, email: csi@fishandgame.org.nz

2019/20 Central South Island Sea-run Salmon Returns–Season Summary

Annual review of salmon spawning effort for each salmon river in the Region has historically relied on ground survey of salmon redds as an index of spawner abundance and more latterly the additional use of repeat aerial counts of spawning salmon as a more direct measure of salmon abundance. The sum of estimated spawners and angler catch provides an estimate of the total run of salmon returning to fresh water for the season.

Between 1993/94 and 2015/16 annual catch of salmon by adult CSI whole season licensed anglers was obtained from end-of-season telephone interviews of approximately 10% of whole season adult and family licensed anglers or about 1,200 phone calls. Since 2016/17 additional use has been made of licence holder email addresses to obtain responses from up to 1,800 anglers. The addition of the email survey at very little cost has enabled reduction in the number of anglers that need to be interviewed by telephone and a reduction in overall survey costs. In 2018/19 North Canterbury Fish and Game joined the survey with telephone and email surveys of their anglers being added and in the 2019/20 season Otago Fish and Game joined the survey. For the 2019/20 season survey responses were obtained from 2,215 CSIFG licenced anglers, 3,075 NCFG licenced anglers and 2,519 OFG licenced anglers.

Typically harvest estimates for our larger fisheries now have improved 95% confidence limits that are +/- 25% of the estimate while smaller fisheries may be +/- 50%. The greater difficulty in contacting sufficient numbers of anglers who have fished the smaller rivers increases the variability of the results and reduces the confidence of our estimates.

The spawning component of the run is assessed by two methods in the CSI Region. Salmon redd (nest) counts continue in the Ashburton River system, tributaries of the Rangitata, and the Orari, Opihi, Tengawai, Waihi-Temuka, Waitaki and Hakataramea rivers. Some of these counts are completed by volunteers. These counts provide a valuable and continuing long-term record used as an index of spawning population size. Spawning estimates based on redd counts in the Ashburton, Orari, Opihi and Hakataramea catchments can be considered to underestimate total spawning effort.

The second method used to assess salmon spawning requires multiple counts of live salmon present in spawning tributaries of the Rangitata River at fortnightly intervals from March to June. An estimate of Waitaki River spawners was able to be made by this method until about 1999 when the Hakataramea River run began to be impacted by low flows. In recent years lower Waitaki River spawning has been assessed by aerial redd count as part of a joint project with Meridian Energy Limited.

The following summary for each salmon fishery in the CSI Region presents spawning counts and angler harvest estimates up to the end of the 2019/20 season and highlights sea-run salmon population trends where apparent. An overall, regional summary is also provided.

Ashburton River

Two salmon were estimated to have been shared between 52 anglers who fished the river for salmon (Figure 1). In the 2018/19 season 6 salmon were shared between 130 anglers estimated to have fished it. No fin-clipped salmon were reported to have been caught in either season indicating it was unlikely any salmon of hatchery origin entered the river.

Good river flows were present in the Ashburton for most of the season. Through November and December average river flow at SH1 was 109 m³/s following three floods with flows exceeding 300 m³/s. There were only occasional minor freshes from the end of December and by mid

February river flow had dropped below 5 m³/s at which point the mouth blocked for 14 days from 10 to 23 February. A fresh of 14 m³/s reopened it. Flows remained between 5 and 8 m³/s until 25 March when the river went below 5 m³/s and the mouth blocked for a further 3 days until a 20 m³/s fresh reopened it. Across the December to March salmon season flows maintained an open river mouth for all but 17 days of the fishing season. This was the lowest incidence of mouth closure in the last 9 years.

Across the 15 years of December to March salmon fishing seasons for which we have reliable daily river mouth closure records, on average the mouth has closed 36 days per season and 82% of those days have been in January and February. In seasons with up to 70 days closed out of the 121 days in the season there does not appear to be any relationship between the size of the angler catch and number of days with river mouth closure

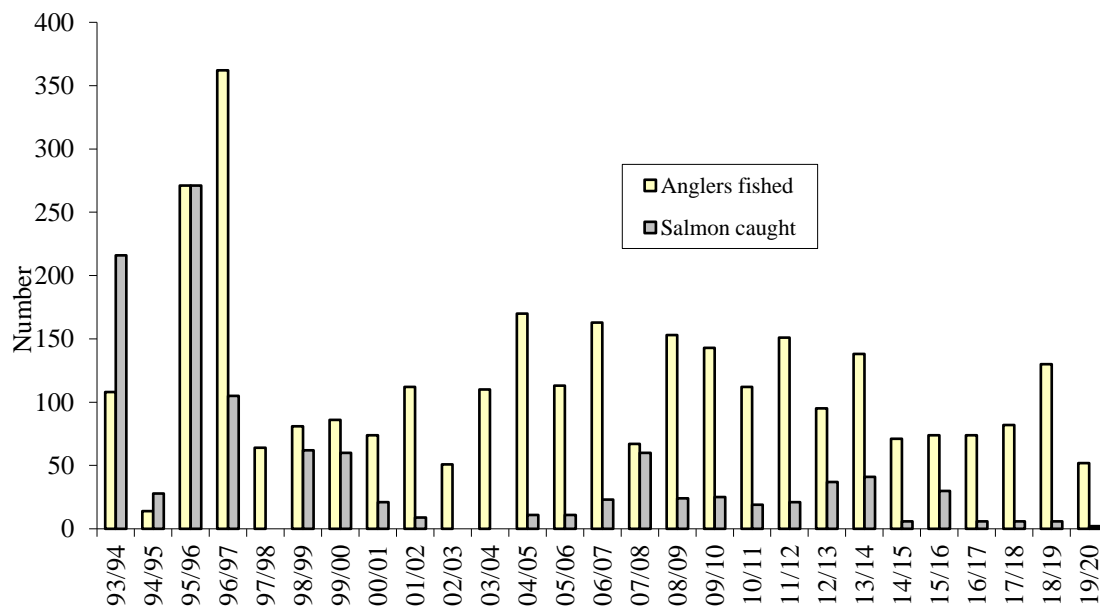


Figure 1. Number of anglers fishing and salmon taken from the Ashburton River estimated from end of season random survey, for October to April seasons from 1993 to 2006, October to March seasons from 2006/07 to 2018/19, and December to March for the 2019/20 season.

When river conditions allow, up to nine sections of the Ashburton River and tributaries are surveyed in June and July as indicators of relative salmon spawning population size. Across the catchment Bowyers Stream and Maori Lakes Outlet produce the most consistently surveyed salmon spawning records (Figure 2). Since 1976 these two spawning sites have sustained about 75% of all spawning in the catchment.

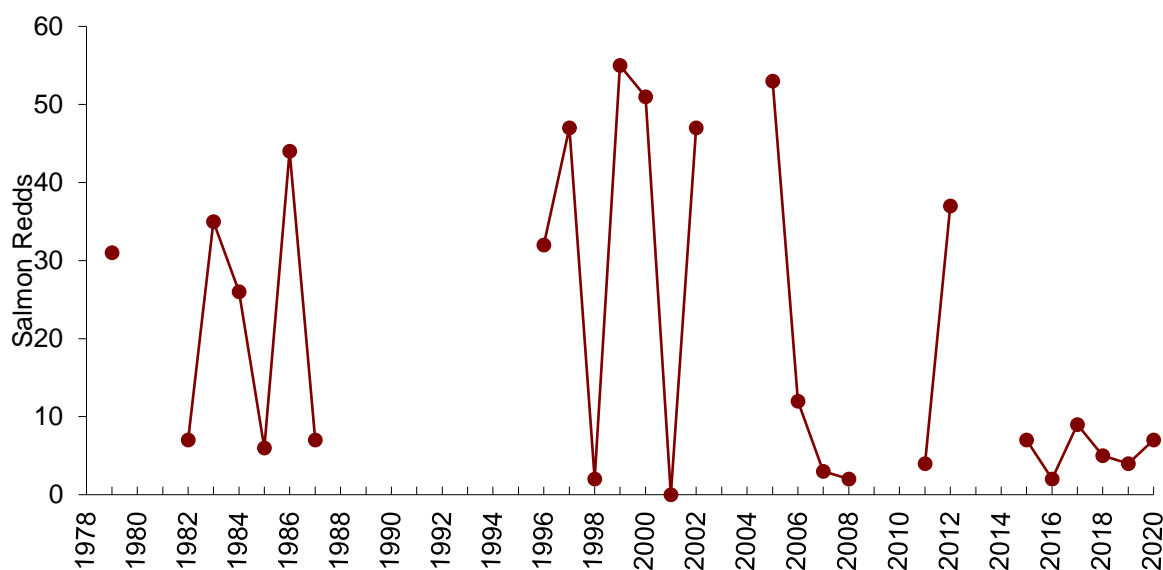


Figure 2. Annual salmon redd counts for Bowyers Stream and Maori Lakes Outlet in the Ashburton Catchment, 1979 to 2020.

Since at least the early 1980’s salmon spawning in Bowyers and Maori Lakes Outlet has been extremely variable with lows of less than 10 redds often preceded or followed the next year by counts exceeding 40. While the last six year’s counts have been low they have not been beyond historical lows back to at least the early 1980’s. The concern is the consistency of the current lows.

In December 2011 Maori Lakes Outlet received 25,000 McKinnon’s hatchery-origin juvenile salmon. This was followed by 5,000 in December 2013 and 20,000 in December 2014. There is nothing in the 2014 to 2017 angler catch or spawning records to indicate these releases generated improved adult salmon returns.

Rangitata River

Salmon spawning surveys by redd count were first completed on Deep Stream and Deep Creek in the upper Rangitata in 1957 and continue today to maintain the long-term database. Over that time there have been large scale changes in the areas used by salmon and the quality of those areas predominantly caused by Rangitata flooding and land management. The quality of recording in terms of identification of reaches surveyed up to the 1980’s also leaves much to the imagination. Despite these changes and limitations it has been possible to piece together a continuous long-term record of annual salmon spawning (number of redds) for 60% of Deep Stream and 80% of Deep Creek as they exist today (Figure 3).

Prior to 1957 there were no surveys of salmon spawning activity in the Rangitata or any other river. However there are some clear indicators of the state of the Rangitata salmon fishery sporadically recorded in Annual Reports for Ashburton and South Canterbury Acclimatisation Societies. These reports relate solely to angler catch with occasional estimates of the number of salmon caught at the river mouth and their average size. There is also one other indisputable estimate of Rangitata salmon population size – there were no sea-run salmon returning to any rivers in New Zealand prior to the first return to the Waitaki River in 1905. The first sea-run

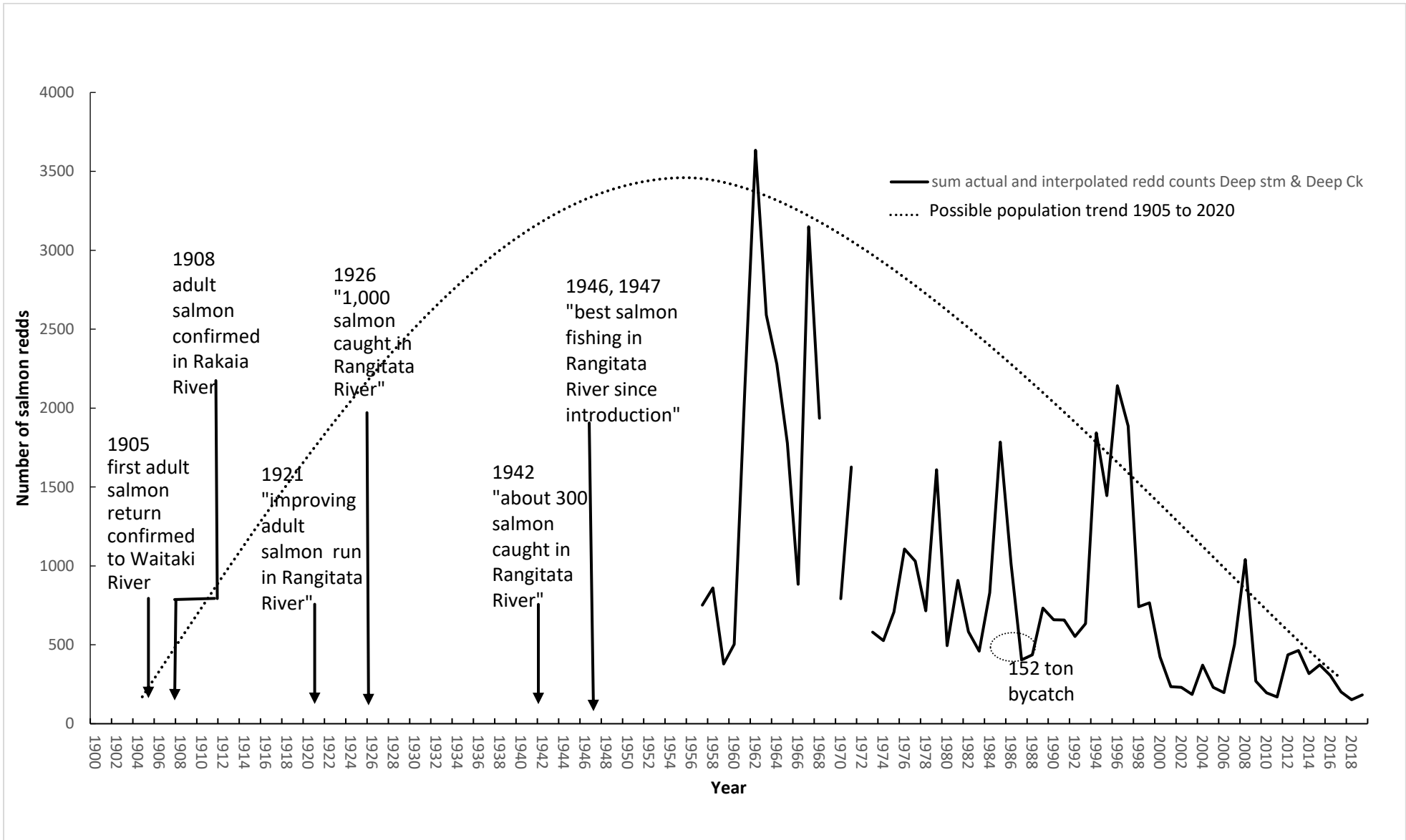


Figure 3. Possible Rangitata salmon spawning population trend from introduction of salmon to present day from Deep Stream and Deep Creek total surveyed redd counts and interpolated estimates for reaches representing 60% and 80%, respectively, of all spawning in those streams from 1957 to 2020, plus reported comments on salmon catch from South Canterbury and Ashburton Acclimatisation Society Annual Reports 1904 to 1957.

salmon was reported to have returned to the Rakaia in 1908 so it is likely that the first sea-run salmon in the Rangitata River was present between 1905 and 1908.

These long-term records may paint a different picture of salmon population trends than those concentrating on only the last 20 years. The long-term records could support a contention that salmon populations expanded and increased from the early 1900's and peaked in the late 50's through to the early 70's. This peak is supported by the comments of long-term anglers who recount their best fishing days in the 1960's. Following the peak years there has been a dramatic and almost steady decline over the last 50 years. The reason the decline has become more apparent in the last 20 years is that the low years have directly impacted on the number of salmon that anglers have been able to catch where prior to this even in the bad years there remained an abundance of fish for anglers and poor years were relatively rare.

Live salmon counts this season estimated that 102 fish spawned in Deep Stream (Mesopotamia) and 304 in Deep Creek (Mt Potts) for a catchment estimate of 437 spawning salmon (Figure 4).

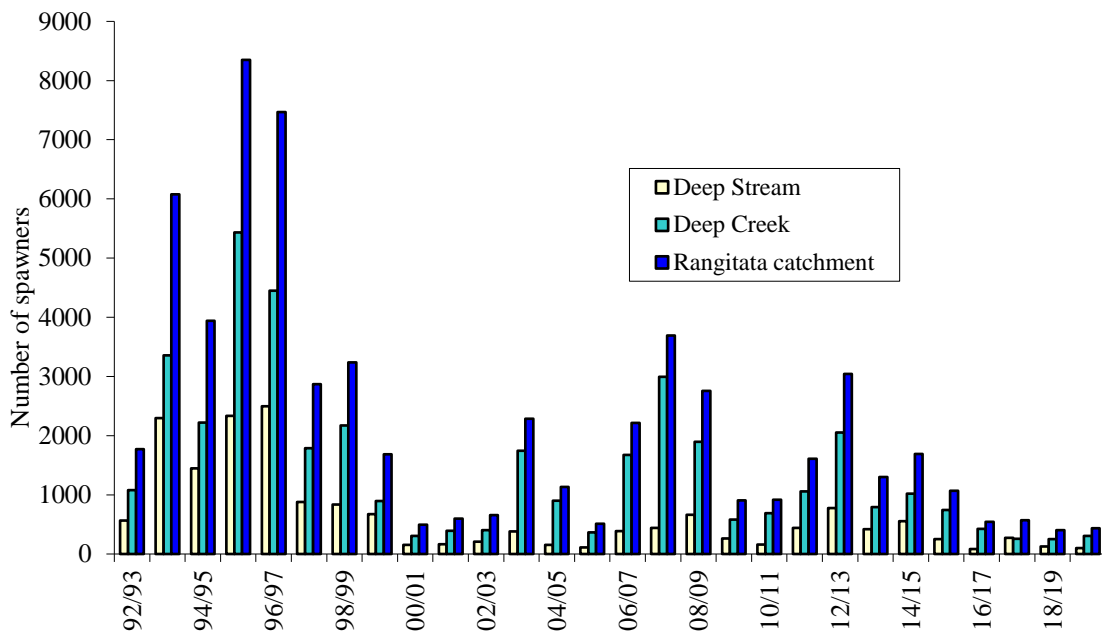


Figure 4. Estimated annual number of salmon spawning in Deep Stream, Deep Creek and total for the Rangitata Catchment 1992/93 to 2019/20.

Two positives can be taken from this year's spawning population estimate - it was 30 salmon more than for the 2018/19 season and Deep Stream spawning over the last seven years has averaged 30% of the total compared to 20% for the ten years prior to that. It was the aim of our Deep Stream habitat enhancement programme introduced in 2010 and managed by Hamish Stevens, to address the decline in spawning habitat quality in this stream. While it cannot be confirmed that the habitat project has contributed to this improvement, it is almost certain that the wider distribution of spawning in Deep Stream is a result of willow removal immediately enhancing spawning habitat through reduction in ponded water, increasing water velocity and flushing of silted streambed.

In 2009, 140 spawned-out salmon from Deep Stream and Deep Creek were examined for a fin clip and two fish (1.42%) were believed to be of hatchery origin. In 2012 assessment of the origin of 38 spawned out salmon from Deep Stream and Deep Creek by visual check for fin clip and

further analysis by scale reading did not identify the presence of any hatchery origin salmon on these spawning grounds. In 2018, 18 salmon were examined for fin clips during spawning surveys on Deep Stream and Deep Creek and during the Winnemem Wintu June to September weekly surveys of Deep Creek. None of these fish were identified to be of hatchery origin. In 2020, 34 dead salmon on the spawning grounds were examined that were able to be definitively identified as fin-clipped or fin-present. None of these fish had a fin-clip. These results suggest that since 2008/09 when McKinnon’s Hatchery origin salmon first returned as adults, straying of hatchery fish into the headwaters of the Rangitata has been very minor with hatchery fish contributing between 0% and 1.42% of annual spawning in the wild.

Aerial spawning surveys estimated a total catchment spawning population of 437 salmon all of which were likely to have been of wild origin. An estimated 105 wild fish strayed into McKinnons Creek. It is estimated that 542 wild salmon were not caught by anglers.

Angler success in the Rangitata was poor with an estimated 448 anglers fishing for salmon and 120 salmon caught (Figure 5). The last five seasons catches have been comparable with those of 2000 to 2006. This season approximately 20% of anglers who fished for salmon on the Rangitata caught fish and the average catch for successful anglers was 1.6 fish each. Less than 1% of anglers caught five or more salmon and 82% of all salmon were landed below SH1.

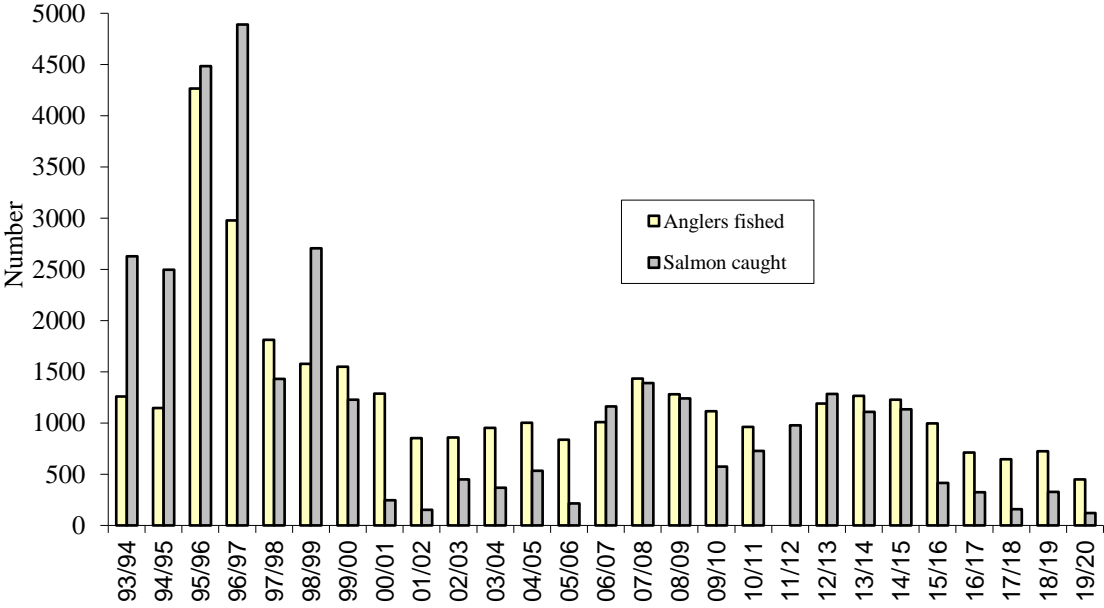


Figure 5. Number of anglers fishing and salmon taken from the Rangitata River, for October to April seasons from 1993 to 2006, for October to March seasons from 2006/07 to 018/19, and December to March for 2019/20.

Fin-clipped salmon accounted for 23 of the 120 salmon estimated to have been caught. Under normal hatchery operation, hatchery-origin adult salmon returning to the Rangitata in the 2019/20 season could have originated from hatchery releases of one-year old salmon in 2017, 2018, and 2019. None of the 68,000 juveniles released in July 2017 were fin clipped and there were no salmon available for release in 2019. The only source of hatchery-origin fin-clipped salmon returning to the river as adults, at almost three years of age in 2019/20, was from the 55,000 fin-clipped fish released in July 2018. Hatchery-origin salmon that were not fin-clipped and were released in 2017 could also have returned in 2019/20 and because of the absence of a fin clip would not have been recognised by anglers. The 23 fin-clipped salmon recorded as angler catch

were part of the July 2018 hatchery release when 37% of the release was fin-clipped. It follows that in total 62 (23 fin-clipped plus 39 fin-present) salmon from the 2018 hatchery release were caught by anglers in the 2019/20 season.

It is estimated 80% of the hatchery-origin salmon were caught at the river mouth where they made up about 70% of the catch. One fin-clipped salmon was reported to have been caught above SH1 and none were recorded above the Arundel Bridge.

In summary approximately 87 hatchery-origin salmon returned to the Rangitata of which 23 were fin-clipped fish caught by anglers, 39 were hatchery-origin fin-present salmon caught by anglers and 25 returned to the McKinnons Hatchery trap. No hatchery-origin salmon were considered to have spawned in the wild. The total wild salmon run was estimated at 600 fish of which 58 were caught by anglers (Figure 6).

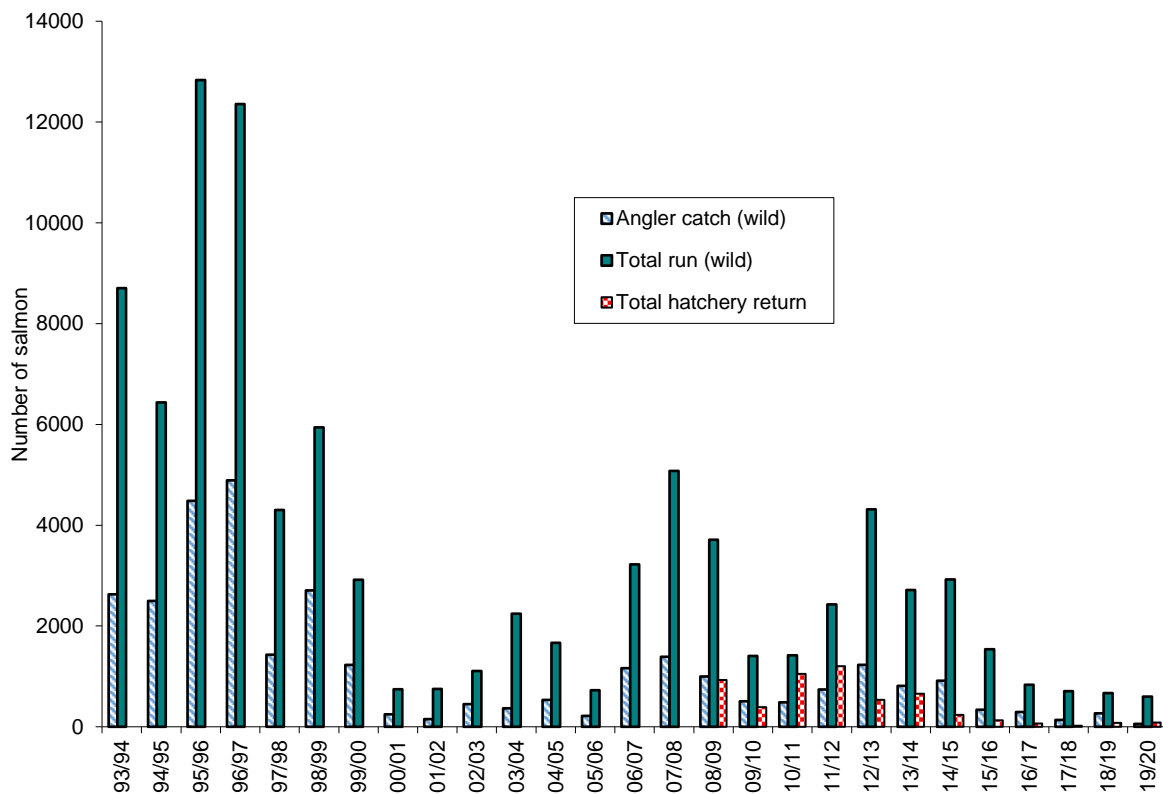


Figure 6. Annual salmon runs for the Rangitata River and component caught by anglers 1993 to 2018 and contribution of hatchery returns 2008 to 2018.

In the 2019/20 season anglers harvested approximately 9.7% of wild salmon returning to the Rangitata. Over the last twelve seasons wild harvest has averaged 29% of the wild run with annual harvest rates ranging from 9% to 36%. Over the same period 20 to 290 hatchery-origin fish have been taken annually by anglers at an average harvest rate of 43% of returning hatchery-origin fish.

Orari River

In the last ten years the Orari salmon fishery has been dominated by the extraordinarily high return for the 2013/14 season that was not mirrored in any other fishery, and the low returns of the last five years that have been common in all CSI salmon fisheries.

Approximately 80 anglers fished the river at some time during the 2019/20 season for a catch of 13 salmon. This is far from the worst season – no salmon were caught at all in five seasons between 2000 and 2008 (Figure 7).

Five fin-clipped hatchery-origin salmon were reported to have been caught during the season and when the proportion of released fish that were fin clipped is taken in to account this would suggest all salmon returning to the river in 2019/20 were of hatchery origin. In the twelve years that McKinnons Hatchery salmon have strayed to the Orari on their return as adults, they have sustained an average of 35% of the angler catch. In two of those years, hatchery-origin salmon have outnumbered wild salmon. A random sample of 80 spawned out salmon carcasses from the upper Ohapi South Branch in 2014 showed 35% to be fin-clipped and were therefore McKinnons hatchery-origin fish released into McKinnons Creek that strayed to the Orari on their return.

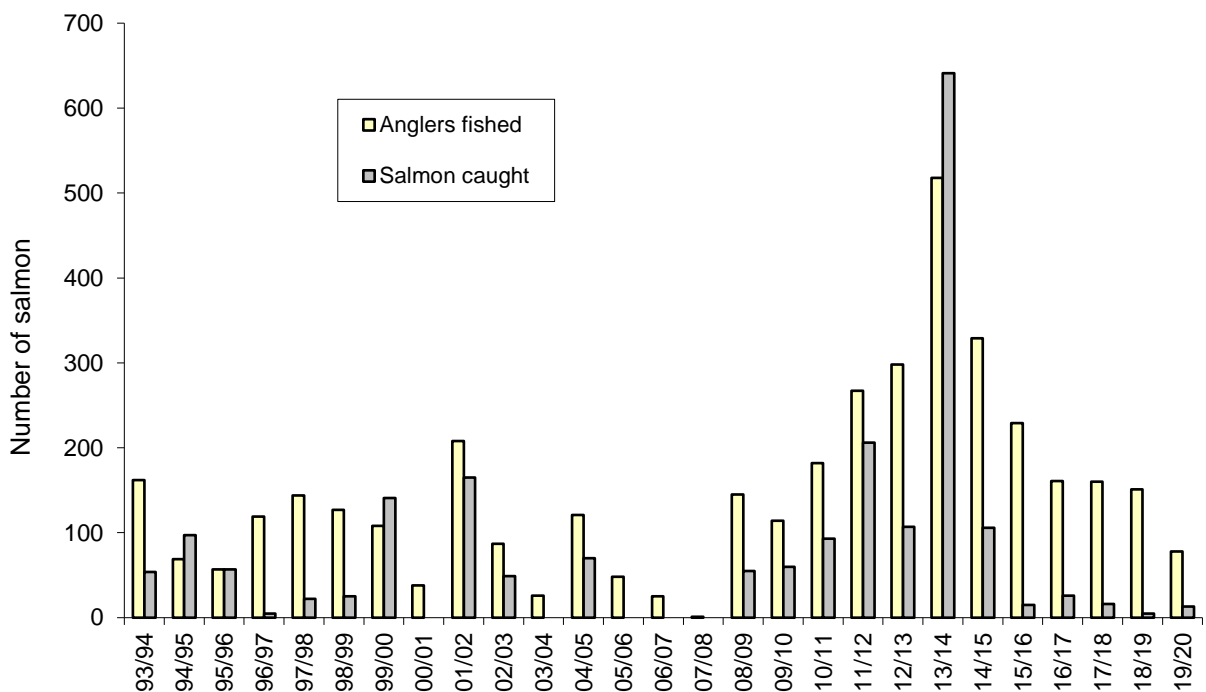


Figure 7. Number of anglers fishing and salmon taken from the Orari River, for October to April seasons from 1993 to 2006 and for October to March seasons from 2006/07 to 2018/19 and December to March for 2019/20.

Spawning surveys in 2020 identified 14 redds in the main spawning reaches of the Ohapi Stream providing an estimated spawning population of about 35 fish. Combined with angler catch the total salmon run for the Orari is estimated at about 50 salmon. The median run size since 2000 has been approximately 150 fish.

Opihi River

Angler activity and harvest during the 2019/20 season was consistent with the previous five years with approximately 175 anglers fishing the Opihi for salmon and landing 28 (Figure 8). Prior to 2014 the Opihi was the standout performer of all of our salmon fisheries back to start of annual harvest surveys in 1993.

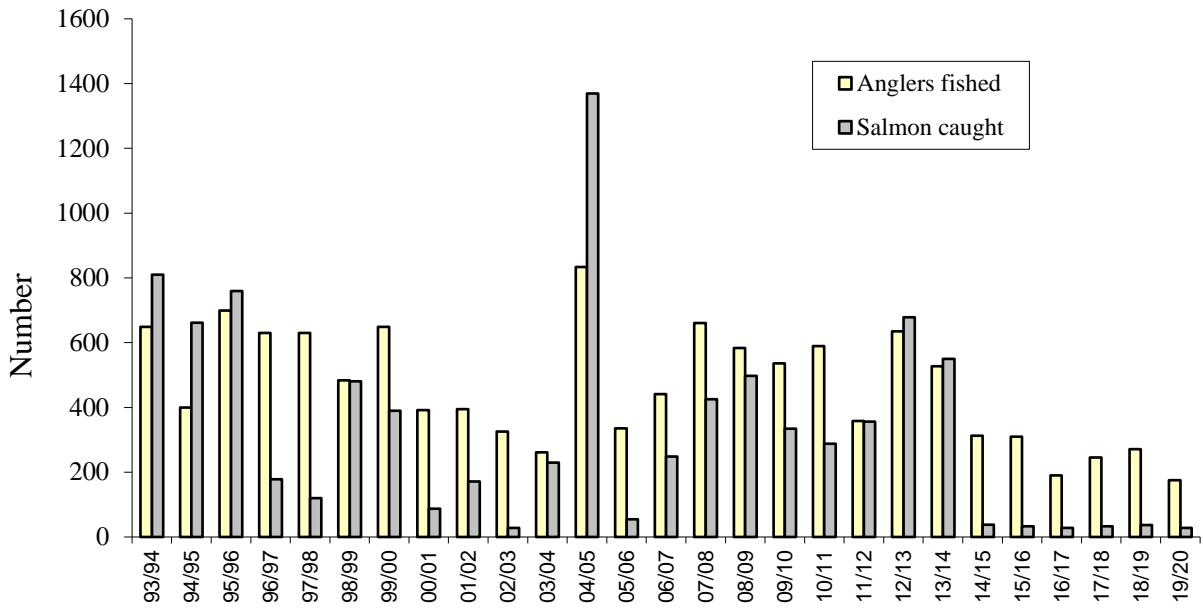


Figure 8. Number of anglers fishing and salmon taken from the Opihi River, for October to April seasons from 1993 to 2006 and for October to March seasons from 2006/07 to 2018/19 and for December to March 2019/20.

Ground-based spawning surveys were undertaken from June in most of the high use salmon spawning reaches of the Opihi and its tributaries (Figure 9). Estimated Opihi Catchment spawning was 74 redds corresponding to an estimated spawning population of at least 200 salmon. Added to angler catch this indicates a 2019/20 salmon run of about 250 salmon and is slightly better than the 100 to 200 salmon estimated for the five previous seasons.

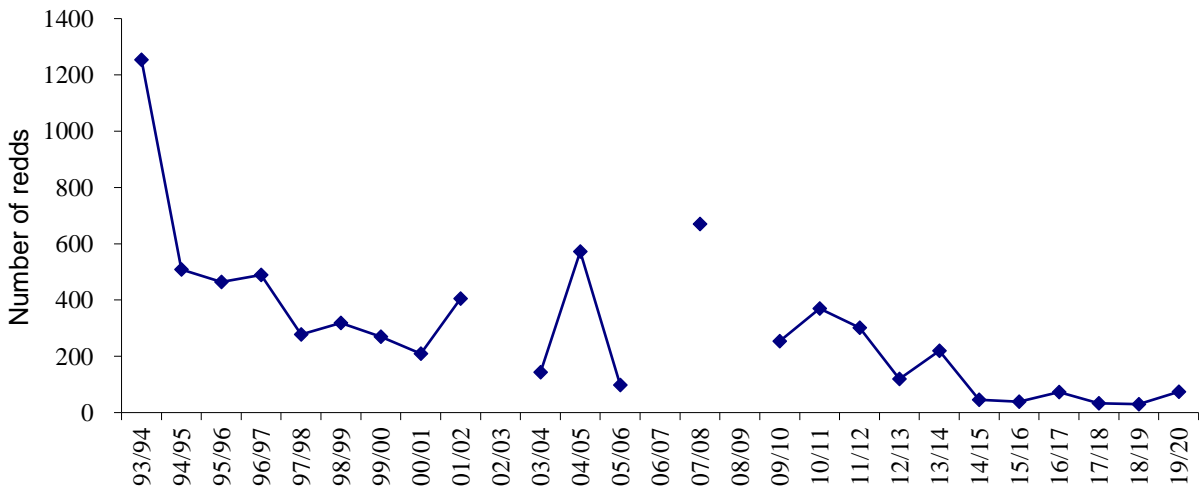


Figure 9. Estimated annual Opihi Catchment salmon spawning from 1993 to 2020 from complete survey of the catchment by helicopter in seven years and survey of representative reaches in remaining years.

Waitaki River

The 9 July 2020 Waitaki River salmon spawning survey provided information for comparison with 15 other surveys undertaken between 1975 and 2019. Surveys have been completed in every one of the last nine seasons. In 2020 total lower Waitaki River salmon spawning excluding the Hakataramea was estimated at 210 redds compared to a range of 160 to 780 redds between 2012 and 2019 (Figure 10).

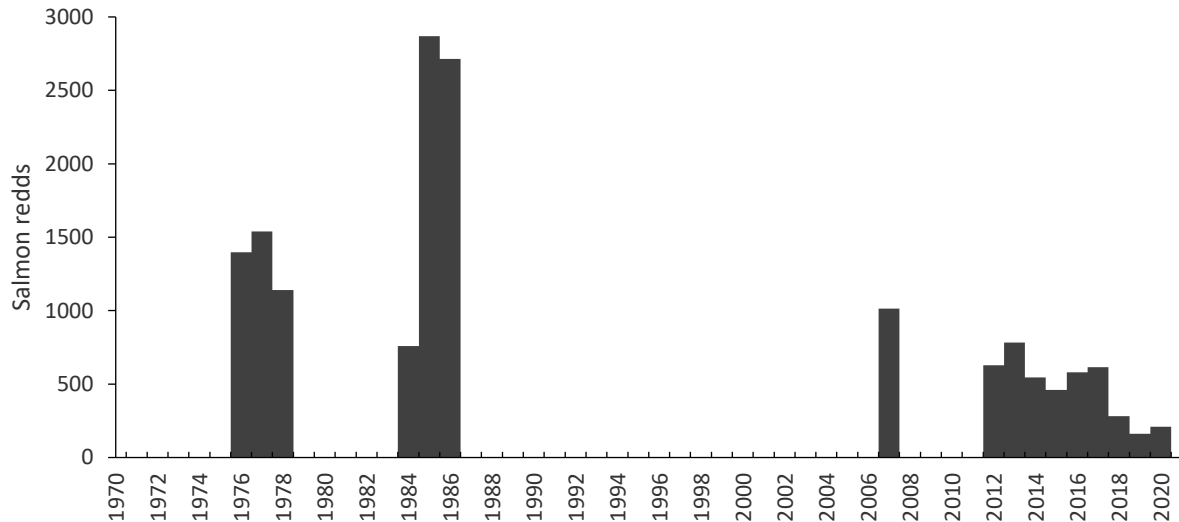


Figure 10. Aerial counts of salmon redds in the lower Waitaki River excluding the Hakataramea and Maerewhenua rivers 1976 to 2020.

Prior to 2012, the river was divided into 11 reaches and the only side stream counted independently was the Demonstration Channel system on the north bank opposite Duntroon. Since 2012, surveys have targeted identified side streams. In 2012 and 2013 these side streams contributed 44% and 33%, respectively, of all redds counted in the lower Waitaki River. This year side streams were estimated to have contributed 108 redds or 51% of Catchment spawning.

Over the past seven years the side stream spawning enhancement programme managed by CSI Fish and Game and funded by Meridian Energy Limited has removed instream and riparian vegetation, and provided flow control to improve salmon spawning habitat in the following areas – Otekaieke, Priests, Demonstration Channels, below LWIS intake, Redcliff and lower Black Point Stream. These areas sustained 64% of all side stream and 30% of total Catchment spawning in 2020.

It was estimated that 278 salmon anglers fished the Waitaki during the season and landed 85 salmon (Figure 11). While angler interest was down on the 397 who fished in 2018/19, catch rate at 2.1 fish per successful angler, remained high.

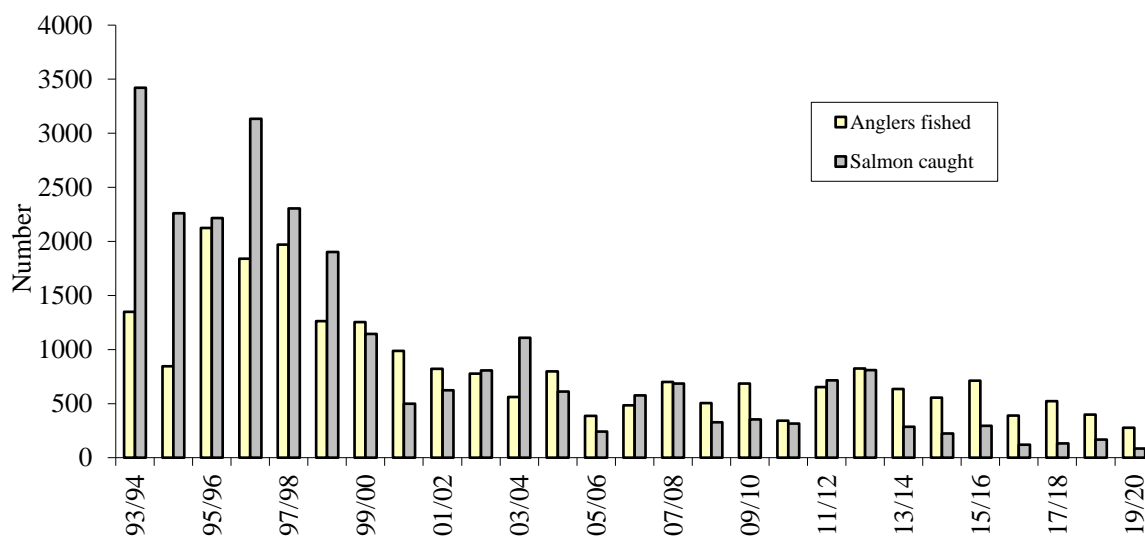


Figure 11. Number of anglers fishing, and salmon taken from the Waitaki River for October to April seasons from 1993/94 to 2005/06 and for October to March seasons from 2006/07 to 2018/19 and December to March 2019/20.

Our harvest surveys identified six anglers who had caught 8 fin-clipped salmon between them in the Waitaki. These fish were most likely to have been released as juveniles from the Waitaki Riparian Enhancement Society (WRES) hatchery. The number of fin-clipped salmon reported in our surveys was somewhat surprising since only one fin-clipped salmon was presented to WRES during the season to claim a cash prize.

The first adult fin-clipped salmon originating from WRES releases were landed in the 2013/14 season and since that time 33 have been recorded. Over the seven seasons that hatchery-origin fish have been present in the adult returning run, they have represented an average of 2.7% of angler catch. Over the same seven-year period, the WRES Hakataramea trap has caught 164 salmon on their spawning run of which only one (0.6%) has been confirmed as having a fin-clip indicative of hatchery origin. On the assumption that hatchery-origin salmon are represented in the total annual returning population either at the Haka spawning rate of 0.6% or the angler catch rate (2.6%), it is estimated that total returns of hatchery fish to the Waitaki have averaged 23 salmon per year and ranged from 6 to 43 per year since 2013/14.

Regional Perspective

CSI Fish and Game have been making annual harvest estimates for catch of all salmon by CSI licence holders since 1993. In that time there have been significant changes to fishing opportunity. This has occurred through reduction in season length since 2005/06, and introduction of a one-fish daily bag limit in 2019/20. Potentially offsetting these restrictions, an opportunity has been the supplementation of angler catch with hatchery fish in at least three rivers since 2008/09 (Table 1).

Table 1. Season angler catch of sea-run wild salmon in CSI Region rivers and total for the Region for fishing seasons from 1993/94 to 2019/20 and estimated catch of hatchery-origin salmon from 2008/09 in the Rangitata, Orari and Opihi rivers and from 2013/14 for the Waitaki River. Regulation Category “A” had a season from October to April, and a two-salmon daily bag limit. Regulation Category “B” had an October to March season and a two-salmon daily bag limit. Regulation Category “C” had a December to March season and a one-salmon daily bag limit.

Season	Regulation Category	Ashburton	Rangitata	Orari	Opihi	Waitaki	Total Wild fish	Rangi + Orari + Opihi Hatchery fish (Waitaki)
93/94	A	216	2,628	54	810	3,420	7,128	
94/95	A	28	2,497	97	662	2,261	5,545	
95/96	A	271	4,483	57	760	2,217	7,788	
96/97	A	105	4,890	5	178	3,135	8,313	
97/98	A	0	1,430	22	120	2,306	3,878	
98/99	A	62	2,706	25	481	1,903	5,177	
99/00	A	60	1,228	141	390	1,143	2,962	
00/01	A	21	247	0	87	500	855	
01/02	A	9	152	165	171	623	1,120	
02/03	A	0	449	49	28	807	1,333	
03/04	A	0	367	0	230	1,108	1,705	
04/05	A	11	533	70	1,600	611	2,825	
05/06	A	11	216	0	55	240	522	
06/07	B	23	1,163	0	248	576	2,010	
07/08	B	60	1,389	0	425	686	2,560	
08/09	B	24	998	27	277	327	1,653	490
09/10	B	25	506	32	197	353	1,113	232
10/11	B	19	485	23	225	314	1,066	374
11/12	B	21	740	177	252	715	1,905	419
12/13	B	37	1,229	94	665	811	2,836	178
13/14	B	41	812	371	408	280	1,912	706 (5)
14/15	B	6	914	86	28	222	1,256	180 (2)
15/16	B	30	338	15	25	232	640	84 (3)
16/17	B	6	293	22	15	115	451	46 (6)
17/18	B	6	136	16	33	127	318	23 (6)
18/19	B	6	267	5	35	183	496	62 (3)
19/20	C	2	58	0	20	77	157	83 (8)

Hatchery Supplementation

Since 2007, McKinnons Hatchery on the lower Rangitata has been annually releasing between 7,000 and 95,000, one-year old fin-clipped juvenile salmon to the Rangitata. The 2019/20 season was the twelfth season where adult returning hatchery-origin fish have supplemented angler catch.

In the 2019/20 season, 23 McKinnon's-origin fin-clipped salmon were caught by anglers in the Rangitata and with approximately 37% of McKinnon's releases being fin-clipped it is likely another 39 hatchery-origin fish were caught by anglers and not recognised as the adipose fin of these would have been intact. It is estimated 13 and 8 hatchery-origin salmon were caught in the Orari and Opihi rivers, respectively. An estimated 25 hatchery-origin salmon returned to the hatchery and surveys on the upper Rangitata, River spawning grounds did not find any fin-clipped salmon. Based on the proportion of hatchery-origin salmon to wild salmon in the angler catch, an estimated 92 hatchery-origin salmon spawned in the Orari and Opihi rivers. Overall, McKinnon's-origin salmon totalled 200 fish or 20.8% of the 963 returning salmon in the Rangitata, Opihi and Orari rivers in the 2019/20 season (Table 2).

Table 2. Number of wild and hatchery-origin salmon returning to the Rangitata, Orari and Opihi rivers that were caught by anglers, or spawned in those rivers, or returned to McKinnons Hatchery for the 2008/09 to 2019/20 seasons. Four fin-clipped salmon caught by anglers in the Ashburton River have not been included.

River	Season	Hatchery Origin				Wild Origin			
		Angler caught	Spawned in wild	Hatchery return	Total	Angler caught	Spawned in wild	Hatchery return	Total
Rangitata	08/09	240	39	650	929	994	2,714	0	3,708
	09/10	68	2	314	384	512	901	0	1,413
	10/11	240	33	774	1,047	483	905	31	1,419
	11/12	237	42	731	1,010	740	1,610	79	2,429
	12/13	68	61	408	537	1,215	3,042	42	4,299
	13/14	294	18	344	656	814	1,283	621	2,718
	14/15	161	24	64	249	978	1,666	346	2,990
	15/16	76	15	37	128	337	1,055	146	1,538
	16/17	30	7	28	65	293	498	42	833
	17/18	23	0	0	23	136	573	0	709
	18/19	60	0	18	78	268	403	0	671
	19/20	61	0	25	86	58	437	105	600
Orari	08/09	28	72		100	27	48		75
	09/10	28	90		118	32	60		92
	10/11	70	62		132	23	41		64
	11/12	29	49		78	177	51		228
	12/13	13	24		37	94	176		270
	13/14	270	350		620	371	150		521
	14/15	20	4		24	86	12		98
	15/16	0	0		0	15	15		30
	16/17	4	7		11	22	40		62
	17/18	0	0		0	16	50		66
18/19	0	0		0	5	35		40	
19/20	13	35		48	0	0		0	
Opihi	08/09	221	25		246	277	525		802
	09/10	137	30		167	197	670		867
	10/11	63	32		95	225	668		893
	11/12	104	27		131	252	573		825
	12/13	13	9		22	665	591		1,256
	13/14	142	23		165	408	477		885
	14/15	10	30		40	28	70		98
	15/16	8	24		32	25	76		101
	16/17	12	2		14	15	148		163
	17/18	0	0		0	33	100		133
	18/19	2	4		6	35	71		106
19/20	8	57		65	20	143		163	
All rivers	08/09	489	136	650	1,275	1,298	3,287	0	4,585
	09/10	233	122	389	669	741	1,631	0	2,372
	10/11	373	127	774	1,274	731	1,614	31	2,376
	11/12	419	118	731	1,268	1,169	2,234	79	3,482
	12/13	94	94	408	596	1,974	3,809	42	5,825
	13/14	706	391	344	1,441	1,593	1,910	621	4,124
	14/15	191	58	64	313	1,092	1,748	346	3,186
	15/16	84	39	37	160	377	1,146	146	1,669
	16/17	46	16	28	90	330	686	42	1,058
	17/18	23	0	0	23	185	723	0	908
	18/19	62	4	18	84	308	509	0	817
	19/20	82	92	25	199	78	580	105	763

The age composition of returning hatchery-origin salmon has been determined from scale growth ring analysis of angler-caught and hatchery-trapped salmon for some season's returns since the 2008/09 season. In addition, the frequency with which certain sized (length) salmon occur in the angler and hatchery returns can be used to identify age classes of salmon. Age class returns, and fin-clip rates are essential information for estimating overall return (survival) for each release of juvenile fish from McKinnons Hatchery (Table 3).

Table 3. total number of fin-clipped and non-fin-clipped juvenile salmon released from McKinnons Hatchery. For cohorts yet to return the season of expected return is provided.

Brood year	Number released	Date of release	% fin-clipped	No. return 1 ⁺	No. return 2 ⁺	No. return 3 ⁺	Total return	Percent return
2006	55,000	July 07	100	0	1,253	183	1456	2.64
2007	72,000	July 08	100	22	390	89	544	0.75
2008	52,000	July 09	100	96	836	7	951	1.82
2009	65,000	July 10	100	349	1,072	8	1,429	2.20
2010	70,000	July 11	53.7	189	636	21	846	1.21
2011	95,000	July 12	47.4	36	1,400	5	1,441	1.51
2012	63,000	July 13	68.25	20	292	5	317	0.50
2013	64,000	June 14	50	5	140	5	150	0.23
2014	35,000	Jun 15	100	15	58	2	75	0.21
2015	65,000	June 16	60	27	21	42	100	0.15
2016	68,000	Jun/Jul 17	0	-	-	-	-	-
2017	55,000	July 18	37	42	200	2020/21	242+	
2018	0	-	-	-	-	-	-	-
2019	7,500	July 20	100	2020/21	2021/22	2022/23		

To date there have been ten hatchery releases that have run their full life cycle. The 2006 to 2015 broods have completed return out to 3⁺ (almost four years old) and produced a range of returns from 0.15% (1.5 fish returning for every 1,000 released) to 2.64% (26.4 fish returning for every 1,000 released) and averaged 1.12%.

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River mouth Dairy Keepers:

Robert Mann Linda Whipp

Runholders:

Ashley O'Donnell	(Mt Potts)	Ricki Sinclair	(Forest Creek)
Malcolm Prouting	(Mesopotamia)	Leighton Pye	(Ohapi)
Michael Tayler	(Korari)		