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NEW ZEALAND FRESHWATER FISHERIES MISCELLANEOUS REPORT NO. 100

**Coded-Wire Tagging Laboratory
1991 Annual Report**

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Servicing freshwater fisheries and aquaculture

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MAF Fisheries is the fisheries business group of the New Zealand Ministry of Agriculture and Fisheries. The name MAF Fisheries was formalised on 1 November 1989 and replaces MAFFish, which was established on 1 April 1987. It combines the functions of the former Fisheries Research and Fisheries Management Divisions, and the fisheries functions of the former Economics Division of MAF.

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1. Introduction

Coded-wire tagging is widely used in New Zealand for monitoring returns at maturity of hatchery reared juvenile salmon (Unwin, Lucas and Gough 1987). The tags used are miniature lengths (1.25 mm) of fine stainless steel wire, engraved with a binary code, which are injected into the nose cartilage of the young fish. Since the tag cannot be seen externally, tagged fish are also marked by removal of the adipose fin, so returning adults can be readily identified by anglers, hatchery staff etc.

Most coded-wire tagging is carried out by MAF Fisheries, which holds three of the four tagging machines in the country. MAF also processes all tags recovered from anglers, commercial fishing vessels, surveys of spawning areas etc., as well as returns to most commercial salmon farms. The one exception is the New Zealand Salmon Company, which owns the other tagging machine and which conducts its own tag-recovery programme for salmon returning to the Coleridge and Tentburn hatcheries. To encourage the return of tags from anglers and the general public, MAF provides a network of "Head Depots" throughout the South Island, and administers an annual lottery with a \$1000 first prize awarded to an angler drawn at random from those who have returned a tagged head over the previous year.

This report provides a summary of coded-wire tag returns and releases over the period 1 August 1990 to 30 July 1991. These include details of all tag releases and recoveries by MAF or by salmon angling interests (Acclimatisation Societies, N Z Salmon Anglers etc.). However, for releases conducted by commercial salmon farms, return data for individual tag codes are not included. These data are held by MAF but, for reasons of business confidentiality, are not made available to the general public. Return data for each farm have been included where appropriate, but appear only in summary form.

Throughout this report, two figures are given for tag return data. These are N , the number of tags actually recovered, and N_{ext} , the total number of returning fish for releases which included both tagged and untagged salmon. For these releases, N_{ext} represents the extrapolated return assuming the survival of the untagged fish to have been the same as for the tagged fish. Approximate 95% confidence limits have been estimated where possible. Details of the calculations involved are given by Unwin, Lucas and Gough (1987), and Unwin and Lucas (1988).

2. The 1991 Tag Recovery Season

2.1 Tag Recoveries

A total of 726 salmon heads from the 1990/91 season were received at the tagging laboratory (Table 1). Tags were recovered from 668 heads, while 54 failed to show a tag on an X-ray and were recorded as having lost their tag. Although the percentage tag loss varies substantially according to the mode of recovery, the figure for hatchery recoveries (6.9%) is likely to be the most accurate. A further 4 tags were lost during recovery, leaving a total of 664 which were examined and de-coded. No allowance has been made for lost tags when computing N_{ext} , so that these estimates should be increased by approximately 5%.

A further 218 tags were recovered from salmon returning to the New Zealand Salmon Company's facilities at Coleridge and Tentburn. These comprised 203 salmon of NZ Salmon

origin, and 15 which had strayed from other release sites, bringing the total number of recovered tags to 882.

The recovered tags were from 20 release locations on 11 catchments (Table 2). The largest contributions were from Tentburn and Glenariffe, with smaller numbers of fish returning from releases at Silverstream, the Rangitata Salmon Ranch, and Otago Harbour. Allowing for untagged fish, the recoveries equate to an estimated $10\,600 \pm 1300$ salmon of hatchery origin. This represents an overall "expansion factor" of 12.0, a figure heavily influenced by the very high average expansion factor (40) associated with releases from Tentburn.

Three year old fish made up two-thirds of the returns, with roughly equal numbers of 2-year old and 4-year old fish (Table 3). Returns of 4-year old fish were significantly higher than in 1990, reflecting the relatively strong showing from the 1987 brood year. Returns of 2-year old fish (62 tags) made up only 15% of the total, suggesting a rather poor return from the 1989 brood. Two tagged five year old fish were recovered, both from the 1986 brood year releases into Otago Harbour.

Returns from anglers (353 tags) and hatcheries such as Glenariffe, Silverstream, and Tentburn (480 tags) collectively accounted for nearly 95% of the recoveries (Table 4). We assume that there is no under-reporting of tagged fish returning to hatcheries, but angler returns are, as always, likely to be incomplete (Unwin 1991). In one instance which came to our attention, an angler who caught 61 salmon in Lake Coleridge noted that 20 of these were tagged, but inadvertently gave away 5 of these fish to friends before handing in the remaining 15 tagged heads.

Only 40 tags were recovered from sea-caught salmon, representing a total by-catch of approximately 500 salmon of hatchery origin. Given that the total 1990/91 by-catch (5 tonnes) represents between 1500 and 2000 fish, and that scale analysis indicates that virtually all of these fish were of hatchery origin, the tag recovery rate for sea-caught salmon may have been as low as 25%. However, the new by-catch agreement to be implemented the 1991/92 season, which provides for observers on the larger domestic trawlers and improved data reporting procedures for all vessels, should see the recovery rate improve markedly.

Returns to Tentburn (including fish caught by anglers fishing from the beach below the hatchery outfall) accounted for two-thirds of the extrapolated returns (Table 5), with most of the remaining fish caught in the Rakaia, Waimakariri, and Rangitata rivers. The Waimakariri recoveries include a number of fish caught in the Kaiapoi River, which enjoyed another productive season as local anglers took the opportunity to fish for salmon returning to Silverstream. Recoveries for these three rivers are summarised further in Table 6.

2.2 Brood Year Returns

Returns for all non-commercial releases from the 1987, 1988, and 1989 brood years are summarised in Table 7. With the exception of the 1987 brood releases into Otago Harbour, for which the average return is over 6.5%, few returns exceed 1%.

Returns for the 1987 brood year are now complete. With the exception of two releases (codes 63/41/07 and 63/37/12), the addition of data on four year old fish returning this

season generally made little difference to the survival figures based on returns of two- and three-year old fish given in last years annual report (Unwin, Lucas and Gough 1990). For these two releases, four-year old fish made up 35% and 38%, respectively, of the total returns. By contrast, four-year old fish made up only 4% of the total return from the three 1987 Otago Harbour releases.

Of the 1988 brood year returns, the three Otago Harbour releases again show the highest return (average 1.5%), although the survival for all three tag groups has been poor compared to previous releases, and has generated some concern amongst the Otago Branch of the NZ Salmon Anglers Association in relation to obtaining funding for future releases. The only other releases to yield a return exceeding 1% were the two Glenariffe to Silverstream transfers (codes 63/39/19 and 63/39/24), and the May 1989 release of 7300 triploid salmon into Lake Coleridge (code 63/37/47). Most of the remaining releases, including eight tag groups representing the total 1988 Glenariffe production, and various transfer releases to the Waimakariri and Rangitata rivers, yielded returns of 0.2 - 0.3%. An exception was MAF's experimental release into Lyttelton Harbour, which has so far yielded a return of 0.5%.

The poor two-year-old returns for the 1989 brood year have already been mentioned above, although for one group (the August 1980 all-female release from Glenariffe) the absence of returning fish this season was anticipated (and is, of course, one of the reasons behind this particular experimental programme). As always, we are reluctant to draw any firm conclusions from returns of two year olds (e.g., compare codes 63/27/03 and 63/41/07 from the 1987 brood year releases), but there is at present no reason to expect the 1989 brood to be any more successful than the 1988 brood.

2.3 Tag Lottery

A total of 365 anglers were eligible for this years lottery. The \$1000 first prize was won by Mr P Bell of Christchurch, with the remaining winners comprising 19 anglers from Canterbury region, five from Dunedin, and one from Foxton in the North Island. The full list of prize winners is given in Table 8. MAF extends its thanks to all anglers who supported the tagging programme by looking for and recovering tagged fish.

2.4 Tag Releases

Tag release data for the 1989 brood year are summarised in Table 9. The table includes all releases for the 1990 season, although full details for releases from Tentburn have been omitted from the table for the reasons outlined in Section 1.

Overall, these releases amount to over 2.8 million fish, of which 173 000 (6.1%) were tagged. Excluding releases from Tentburn, however, tagged fish made up 15.9% of the total, which is equivalent to an average "expansion factor" of about 6:1. This is consistent with MAF Fisheries policy that, wherever possible, at least 15%, and preferably 20%, of the fish released from Glenariffe should be tagged.

Tagging operations this season have been greatly improved by the purchase of a new tagging unit. This unit (the Mark IV) is the latest model to be produced by Northwest Marine

Technology, and replaces the two original Mark II machines which have become increasingly unreliable, and will now serve as backups in case of a breakdown. In the Mark IV unit, both the tag injector and QCD have been completely redesigned, using up-to-date electronics technology to produce a system which is more versatile, faster to set up, and easier to operate and maintain than the Mark II units.

3. Discussion

Detailed analysis is hardly necessary to confirm that tag returns for the 1990/91 season continue the poor results which have been apparent since about 1986 (Unwin, Lucas and Gough 1990). A convincing explanation for this decline is not easy to formulate, particularly as there seems to be no consistent pattern from year to year, as well as considerable variation within a single season. For example, over the last three seasons, transfers from Glenariffe to Silverstream have generally performed better than the corresponding releases from Glenariffe itself, and even the 1989 brood year release into Lyttelton Harbour (63/38/62) has yielded a higher return than the closest Glenariffe equivalent (63/39/08). Likewise, the 1989 brood returns for salmon of Glenariffe origin transferred to Otago Harbour, while below expectations, are four to six times ahead of those released from Glenariffe.

The low numbers of returning fish confound attempts to draw any firm conclusions from some of the 1987 and 1988 brood experimental releases. Two of the 1987 Glenariffe releases (codes 63/39/56 and 63/39/57) were part of a study to investigate the relationship between the age of the parent stock and age at maturity. Returns from this programme (which was abandoned in 1988 because of the difficulty of obtaining sufficient ripe fish of ages 2, 3 and 4 to generate the required number of age-crosses) are far too sparse to establish whether any such relationship exists. A similar comment applies to the two 1988 brood Glenariffe to Silverstream transfers (63/39/19, 63/39/24). One aim of these releases was to investigate whether a two week holding period after completing the transfer (code 63/39/24) would have any impact on survival. The returns to date show no such difference (1.03% v. 1.14% for the "held" group), but because of the low numbers of returning fish any difference smaller than 0.4% would not have been statistically significant.

4. Literature Cited

Unwin, M.J., and Lucas, D.H. 1988. Measuring hatchery contributions - tag recoveries and the "expansion factor". *Freshwater Catch* 38:14.

Unwin, M.J., Lucas, D.H., and Gough, T. 1987. Coded-wire tagging of juvenile chinook salmon (*Oncorhynchus tshawytscha*) in New Zealand, 1977-86. *New Zealand Fisheries Technical Report No. 2*. 24p.

Unwin, M.J., Lucas, D.H., and Gough, T. 1990. Coded-wire tagging laboratory 1990 annual report. *New Zealand Fisheries Miscellaneous Report No. 60*. 11p.

Unwin, M.J. 1991. Coded-wire tag recoveries and the "awareness factor". *New Zealand Freshwater Fisheries Miscellaneous Report No. 99*. 10p.

Table 1. Salmon heads received at the tagging laboratory by method of recovery, 1990/91.

Method of recovery	Heads examined	Tags recovered	Lost during recovery	No tag found	% tag loss
Angler	395	353	4	38	9.5
Spawning survey	10	9	0	1	10.0
Hatchery	275	262	0	13	4.7
By-catch	42	40	0	2	4.8
Total, laboratory	722	664	4	54	7.4
NZ Salmon Company	-	218	-	-	-
Total, all sources	-	882			

Table 2. 1990/91 tag returns by origin.

Catchment	Release location	N	N _{ext}	
Kahutara River	Mahunga Salmon Farm	1	8 ±	16
Waimakariri River	Cora Lynn Swamp	25	117 ±	69
	Silverstream Hatchery	127	407 ±	109
	Winding Creek	19	49 ±	25
Avon River		1	2 ±	4
Lyttelton Harbour		23	58 ±	25
Tentburn Hatchery		222	7128 ±	1243
Lake Coleridge	Homestead Beach	68	78 ±	19
	Ryton Bay	1	4 ±	8
Rakaia River	Glenariffe Hatchery	193	1768 ±	301
	Coleridge Hatchery	16	213 ±	130
Rangitata River	Rangitata Salmon Ranch	80	218 ±	49
	S.H. 1 Bridge	21	99 ±	42
	Arundel Bridge	5	33 ±	31
Opihi River		1	3 ±	7
Waitaki River	Main Road Bridge	4	7 ±	7
	Hakataramea River	1	5 ±	10
Otago Harbour	Inner harbour	40	232 ±	75
	Leith Stream	16	85 ±	43
	Portobello	18	64 ±	29
Total		882	10580 ±	1298

Table 3. 1990/91 tag recoveries by age.

Age	N	N_{ext}
2	132 (15.0%)	2284 ± 618
3	598 (67.8%)	6026 ± 1020
4	148 (16.8%)	2263 ± 513
5	2 (0.2%)	8 ± 12
Total	882	10580 ± 1298

Table 4. 1990/91 tag recoveries by method of capture.

How caught	N	N_{ext}
Angler	353 (40.0%)	2037 ± 365
Hatchery	480 (54.4%)	8098 ± 1201
Spawning survey	9 (1.0%)	44 ± 36
By-catch	40 (4.5%)	523 ± 380
Total	882	10580 ± 1298

Table 5. 1990/91 tag recoveries by river/area caught.

River/area	N	N_{ext}
Hurunui River	2	30 ± 46
Waimakariri River	171	719 ± 191
Lyttelton Harbour	13	31 ± 18
Tentburn	221	6641 ± 1182
Lake Coleridge	69	82 ± 20
Rakaia River	190	1743 ± 306
Rangitata River	102	455 ± 131
Orari River	4	38 ± 57
Opihi River	2	6 ± 8
Waitaki River	4	10 ± 12
Otago Harbour	73	373 ± 90
By-catch	31	451 ± 355
Total	882	10580 ± 1298

Table 6. 1990/91 coded-wire tag recoveries for the Waimakariri, Rakaia, and Rangitata rivers, by method of recovery and release location.

Waimakariri River							
Release location	Angler		Method of recovery Silverstream			Spawning survey	
	N	N _{ext}	N	N _{ext}		N	N _{ext}
Silverstream	61	211 ± 80	65	196 ± 74		-	-
Winding Creek	10	18 ± 14	-	-		6	22 ± 18
Cora Lynn	17	46 ± 35	-	-		2	16 ± 29
Rangitata River	1	5 ± 9	-	-		-	-
Lyttelton Harbour	1	2 ± 4	-	-		-	-
Tentburn	6	221 ± 193	2	34 ± 56		-	-
Total	96	503 ± 213	67	230 ± 93		8	38 ± 34

Rakaia River							
Release location	Angler		Method of recovery Glenariffe/Coleridge			Spawning survey	
	N	N _{ext}	N	N _{ext}		N	N _{ext}
Glenariffe	35	443 ± 181	136	1147 ± 227		1	7 ± 13
Coleridge Hatchery	1	15 ± 29	2	35 ± 59		-	-
Tentburn	-	-	1	31 ± 61		-	-
Rangitata Salmon Ranch	2	5 ± 7	2	5 ± 7		-	-
Rangitata River	1	9 ± 17	8	43 ± 32		-	-
Otago Harbour ¹	-	-	1	4 ± 8		-	-
Total	39	471 ± 184	150	1266 ± 244		1	7 ± 13

Rangitata River							
Release location	Angler		Method of recovery Rangitata Salmon				
	N	N _{ext}	N	N _{ext}			
Rangitata Salmon Ranch	25	64 ± 25	45	126 ± 38			
Rangitata River	11	52 ± 31	2	9 ± 13			
Cora Lynn	1	5 ± 9	-	-			
Glenariffe	9	60 ± 40	-	-			
Coleridge	4	37 ± 39	1	6 ± 11			
Tentburn	3	73 ± 93	1	23 ± 45			
Total	53	291 ± 116	49	164 ± 61			

¹ Probably a fish which escaped into Glenariffe Stream before being transported to Otago Harbour.

Table 7. Release and return data for all non-commercial releases of coded-wire tagged salmon, 1987-89 brood years.

1987 Brood Year											
Released by	Description	Tag code	Release weight(g)	Release date	Number tagged	2	Number recovered			Total	%
							3	4			
MAF Fisheries	Silverstream production release	63/27/03	70	25/02/88	5102	2	4	0	6	0.12	
MAF Fisheries	Glenariffe to Silverstream transfer	63/41/07	52	3/08/88	5030	3	50	29	82	1.63	
MAF Fisheries	Glenariffe production release	63/38/17	70	28/06/88	5184	22	39	8	69	1.33	
MAF Fisheries	Glenariffe production release	63/39/52	50	22/03/88	4987	1	7	1	9	0.18	
MAF Fisheries	Glenariffe production release	63/39/54	56	14/07/88	5536	13	20	11	44	0.79	
MAF Fisheries	Glenariffe production release	63/39/55	34	2/08/88	5022	3	9	5	17	0.34	
MAF Fisheries	Glenariffe production release	63/39/58	46	2/08/88	5051	7	21	10	38	0.75	
MAF Fisheries	Glenariffe 4 x 4 cross	63/39/56	61	2/08/88	5162	5	13	10	28	0.54	
MAF Fisheries	Glenariffe 3 x 4 cross	63/39/57	34	2/08/88	4083	1	12	6	19	0.47	
NZSA ¹ Canterbury	Avon River enhancement	63/39/51	-	-	5106	3	1	0	4	0.08	
NCAS ²	Silverstream to Cora Lynn transfer	63/37/12	47	23/08/88	5059	4	19	14	37	0.73	
NCAS	Glenariffe to Lake Coleridge transfer	63/39/53	80	14/07/88	5000	1	8	1	10	0.20	
NCAS	Silverstream to Winding Creek transfer	63/37/11	43	23/08/88	5218	0	10	8	18	0.34	
NCAS	Silverstream to Winding Creek transfer	63/38/09	42	2/03/88	5111	6	8	0	14	0.27	
NZSA Otago	Leith Stream release	63/37/46	80	27/06/88	1939	53	53	9	115	5.93	
NZSA Otago	Dunedin wharf release	63/49/01	80	30/06/88	2029	70	35	2	107	5.27	
NZSA Otago	Portobello release	63/48/01	85	23/07/88	2002	91	78	5	174	8.69	
NZSA Otago	Waitahuna River release	63/50/01	80	23/06/88	2086	9	14	0	23	1.10	
1988 Brood Year											
Released by	Description	Tag code	Release weight(g)	Release date	Number tagged	2	Number recovered			Total	%
							3	4			
MAF Fisheries	Glen. to Silv. transfer (not held)	63/39/19	52	23/06/89	5033	9	43	0	52	1.03	
MAF Fisheries	Glen. to Silv. transfer (held)	63/39/24	50	9/06/89	5154	8	51	0	59	1.14	
MAF Fisheries	Lyttelton Harbour release	63/38/62	56	26/07/89	5479	11	17	0	28	0.51	
MAF Fisheries	Glenariffe production release	63/38/39	51	27/03/89	10020	5	27	0	32	0.32	
MAF Fisheries	Glenariffe production release	63/38/55	43	27/03/89	4995	2	9	0	11	0.22	
MAF Fisheries	Glenariffe production release	63/38/56	43	27/03/89	5144	0	13	0	13	0.25	
MAF Fisheries	Glenariffe production release	63/38/58	43	27/03/89	5197	1	15	0	16	0.31	
MAF Fisheries	Glenariffe production release	63/38/61	54	31/05/89	4795	0	16	0	16	0.33	
MAF Fisheries	Glenariffe production release	63/39/06	59	31/05/89	9610	3	11	0	14	0.15	
MAF Fisheries	Glenariffe production release	63/39/08	59	13/08/89	10061	7	18	0	25	0.25	
MAF Fisheries	Glenariffe production release	63/39/21	48	31/05/89	10247	0	19	0	19	0.19	
MAF Fisheries	Coleridge transfer (triploids)	63/37/47	60	3/05/89	7348	9	68	0	77	1.05	
Peacock Springs	Avon River release	63/39/04	20	18/03/89	4688	1	0	0	1	0.02	
NZ Salmon/NCAS	Upper Waimakariri enhancement	63/38/50	51	4/05/89	4900	1	6	0	7	0.14	
NCAS	Glenariffe to Winding Creek transfer	63/39/20	48	15/06/89	5120	0	11	0	11	0.21	
AAS ³ /SCAS ⁴	Glenariffe to Rangitata transfer	63/38/14	48	22/03/89	9531	5	21	0	26	0.27	
Waitaki Promotions	Waitaki Fishing Competition	63/38/10	36	22/04/89	3019	0	4	0	4	0.13	
NZSA Otago	Dunedin wharf release	63/36/50	55	20/07/89	3272	26	21	0	47	1.44	
NZSA Otago	Leith Stream release	63/38/15	64	10/07/89	2069	15	7	0	22	1.06	
NZSA Otago	Portobello release	63/37/31	68	13/07/89	1221	11	13	0	24	1.97	
NZSA Otago	Waitahuna River release	63/37/43	45	5/05/89	2178	0	0	0	0	-	

Table 7 (continued). Release and return data for all non-commercial releases of coded-wire tagged salmon, 1987-89 brood years.

1989 Brood Year											
Released by	Description	Tag code	Release weight(g)	Release date	Number tagged	2	Number recovered			Total	%
							3	4			
MAF Fisheries	Glenariffe to Silverstream transfer	63/40/10	50	23/04/90	5137	4	0	0	4	0.08	
MAF Fisheries	Lyttelton Harbour release	63/40/08	59	1/05/90	10183	6	0	0	6	0.06	
MAF Fisheries	Glenariffe production release	63/36/53	54	9/03/90	10128	3	0	0	3	0.03	
MAF Fisheries	Glenariffe production release	63/39/62	85	23/06/90	10191	1	0	0	1	0.01	
MAF Fisheries	Glenariffe production release	63/40/05	87	23/06/90	10138	2	0	0	2	0.02	
MAF Fisheries	Glenariffe production release	63/40/07	50	4/03/90	9577	3	0	0	3	0.03	
MAF Fisheries	Glenariffe production release	63/41/08	67	24/07/90	10522	3	0	0	3	0.03	
MAF Fisheries	Glenariffe production release	63/51/01	53	5/03/90	10102	2	0	0	2	0.02	
MAF Fisheries	Glenariffe all female release	63/39/12	47	8/08/90	5153	0	0	0	0	-	
MAF Fisheries	Glenariffe to Lake Coleridge transfer	63/01/63	94	30/07/90	811	0	0	0	0	-	
NZSA Canterbury	Avon River (Wairarapa Stream)	63/38/31	-	17/03/90	2591	1	0	0	1	0.04	
NZSA Canterbury	Avon River (University)	63/38/36	-	17/03/90	2666	0	0	0	0	-	
NCFGC ⁵ /NZSC ⁶	Coleridge enhancement release	63/38/52	60	-	5239	0	0	0	0	-	
NCFGC/NZSC	Cora Lynn enhancement release	63/38/53	56	-	5223	3	0	0	3	0.06	
NCFGC/NZSC	Low Farm Stream enhancement	63/38/54	61	-	5160	2	0	0	2	0.04	
SCFGC ⁷	Glenariffe to Rangitata transfer	63/39/63	46	15/03/90	5100	3	0	0	3	0.06	
SCFGC	Glenariffe to Rangitata transfer	63/40/11	42	15/03/90	10051	2	0	0	2	0.02	
SCFGC	Glenariffe/Opihi transfer	63/39/11	55	12/06/90	5200	1	0	0	1	0.02	
Electricorp	Waitaki River enhancement	63/39/15	54	-	14129	1	0	0	1	0.01	
NZSA Otago	Dunedin Wharf release	63/40/58	94	30/07/90	13327	15	0	0	15	0.11	
NZSA Otago	Waitahuna River release	63/40/13	50	6/02/90	2600	0	0	0	0	-	

¹NZSA = New Zealand Salmon Anglers Association (Inc.)

²NCAS = North Canterbury Acclimatisation Society

³AAS = Ashburton Acclimatisation Society

⁴SCAS = South Canterbury Acclimatisation Society

⁵NCFGC = North Canterbury Fish and Game Council

⁶NZSC = New Zealand Salmon Company

⁷SCFGC = South Canterbury Fish and Game Council

Table 8. 1991 coded-wire tag lottery winners.

Name	Tag code	Year released	Release funded by	Where released	Where caught
1st prize of \$1000					
Mr P. Bell, Christchurch	63/39/08	1989	MAF Fisheries	Glenariffe Hatchery	Rakaia River mouth
Four 2nd prizes of \$100					
Mr C. Bunting, Timaru	63/38/33	1989	Rangitata Salmon Ranch	Rangitata River	Rangitata River
Mr M. Burke, Christchurch	63/41/47	1988	NZ Salmon Company	Tentburn Hatchery	Kaiapoi River
Mr E. Kenton, Dunedin	63/38/15	1989	NZ Salmon Anglers	Leith Stream	Portobello
Mr A. Stratford, Harper Village	63/37/47	1989	MAF Fisheries	Lake Coleridge	Harper River mouth
Twenty 3rd prizes of \$20					
Mr F. Alexander, Christchurch	63/41/07	1988	MAF Fisheries	Silverstream Hatchery	Waimakariri River mouth
Mr C. Collins, Christchurch	63/38/33	1989	Rangitata Salmon Ranch	Rangitata River	Rakaia River mouth
Mr P. Cooper, Kaiapoi	63/39/24	1989	MAF Fisheries	Silverstream Hatchery	Kaiapoi River
Mr P. Cooper, Kaiapoi	63/39/24	1989	MAF Fisheries	Silverstream Hatchery	Kaiapoi River
Mr D. Edwards, Rangiora	63/41/07	1988	MAF Fisheries	Silverstream Hatchery	Waimakariri River
Mr J. Greenland, Christchurch	63/37/47	1989	MAF Fisheries	Lake Coleridge	Harper River mouth
Mr B. Hawkins, Springfield	63/37/47	1989	MAF Fisheries	Lake Coleridge	Lake Coleridge
Mr C. Haydon, Christchurch	63/41/57	1989	NZ Salmon Company	Tentburn Hatchery	Tentburn outfall
Mr C. Johnson, Timaru	63/38/50	1989	NZ Salmon Co./NCAS †	Upper Waimakariri	Rangitata River mouth
Mr E. Kenton, Dunedin	63/40/28	1987	NZ Salmon Anglers	Dunedin Wharf	Portobello
Mr J. Lattimore, Ashburton	63/37/47	1989	MAF Fisheries	Lake Coleridge	Lake Coleridge
Mr J. Mallinson, Christchurch	63/37/12	1988	NCAS	Upper Waimakariri	Waimakariri River
Mr L. Papps, Christchurch	63/38/43	1989	NZ Salmon Company	Tentburn Hatchery	Tentburn outfall
Mr K. Parish, Dunedin	63/37/31	1989	NZ Salmon Anglers	Portobello	Otago Harbour
Mr L. Reid, Dunedin	63/38/15	1989	NZ Salmon Anglers	Leith Stream	Otago Harbour
Mr T. Robinson, Foxton	63/38/33	1989	Rangitata Salmon Ranch	Rangitata River	Rangitata River
Ms R. Satterthwaite, Christchurch	63/37/47	1989	MAF Fisheries	Lake Coleridge	Lake Coleridge
Mr P. Stubbs, Ashburton	63/38/33	1989	Rangitata Salmon Ranch	Rangitata River	Rangitata River
Mr L. Tan, Dunedin	63/36/50	1989	NZ Salmon Anglers	Dunedin Wharf	Otago Harbour
Mr P. Wright, Dunsandel	63/38/39	1989	MAF Fisheries	Glenariffe Hatchery	Rakaia River

† NCAS = North Canterbury Acclimatisation Society (now North Canterbury Fish and Game Council)

Table 9. Coded-wire tagged salmon releases, 1990 brood year. Release dates and weights for Tentburn commercial releases are not listed. Refer to Table 7 for a list of the abbreviations used.

Tag code	Released by	Description	Release location	Number released		Release weight (g)	Release date
				Tagged	Untagged		
63/36/52	MAF Fisheries	Glenariffe early release	Glenariffe Hatchery	16 054	272 785	17	7 Jan 91
63/38/34	MAF Fisheries	Glenariffe production release	Glenariffe Hatchery	9 891	41 162	49	13 Feb 91
63/38/37	MAF Fisheries	Glenariffe production release	Glenariffe Hatchery	4 874	9 185	60	13 Feb 91
63/41/09	MAF Fisheries	Glenariffe production release	Glenariffe Hatchery	9 920	37 685	50	13 Mar 91
63/41/12	MAF Fisheries	Glenariffe production release	Glenariffe Hatchery	9 875	52 607	51	13 Feb 91
63/41/13	MAF Fisheries	Glenariffe all female release	Glenariffe Hatchery	10 937	43 673	59	20 May 91
63/41/26	MAF Fisheries	Glenariffe all female release	Glenariffe Hatchery	9 258	43 673	59	20 May 91
63/41/27	MAF Fisheries	Glenariffe all female release	Glenariffe Hatchery	11 173	26 804	58	22 May 91
63/41/28	MAF Fisheries	Glenariffe all female release	Glenariffe Hatchery	8 856	26 804	58	22 May 91
63/41/29	MAF Fisheries	Glenariffe all female release	Glenariffe Hatchery	10 100	6 405	77	6 Aug 91
63/41/30	MAF Fisheries	Glenariffe all female release	Glenariffe Hatchery	10 234	6 406	77	6 Aug 91
63/02/63	MAF Fisheries	Glenariffe/Coleridge transfer	Harper River mouth	752	5 844	90	21 Jun 91
63/41/11	MAF Fisheries	Glenariffe to Silverstream	Silverstream Hatchery	5 047	32 953	57	7 Apr 91
63/41/10	Electricorp	Glenariffe to Waitaki transfer	Waitaki River	10 116	89 448	45	4 Mar 91
63/39/49	NCFG/NZSC	Waimakariri enhancement	Cora Lynn	5 022	71 190	31	14 May 91
63/39/50	NCFG/NZSC	Waimakariri enhancement	Cora Lynn	5 050	71 191	30	14 May 91
63/40/49	NCFG/NZSC	Rakaia enhancement release	Coleridge Hatchery	4 989	146 413	39	22 May 91
63/40/28	NZSA (Otago)	Otago Harbour early release	Inner harbour	2 125	0	52	18 Mar 91
63/38/38	NZSA (Otago)	Otago Harbour main release	Inner harbour	4 931	25 000	90	15 Jun 91
63/41/06	NZSA (Otago)	Otago Harbour all females	Inner harbour	5 069	25 000	90	15 Jun 91
63/39/39	NZ Salmon Co	Tentburn production release	Tentburn Hatchery	4 654	}	-	-
63/40/48	NZ Salmon Co	Tentburn production release	Tentburn Hatchery	5 017	}	1 806 740	-
63/40/50	NZ Salmon Co	Tentburn production release	Tentburn Hatchery	4 273	}	-	-
63/40/51	NZ Salmon Co	Tentburn production release	Tentburn Hatchery	4 985	}	-	-
Totals				173 202	2 840 968		