Application of Coded-Wire Tags to Chinook Salmon Fry Released at the Whitehorse Rapids Fish Hatchery in 2004

Prepared for:
Yukon Fish and Game Association:
Prepared by:

Patrick Milligan
Fisheries and Oceans Canada
Suite 100-419 Range Road
Whitehorse, Yukon
Y1A 3V1

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This is a report on Project CRE-63-04: "Application of Coded-Wire Tags to Chinook Salmon Fry Released at the Whitehorse Rapids Fish Hatchery in 2004".

Prepared by Patrick Milligan (Fisheries and Oceans Canada) for the Yukon Fish and Game Association.

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Abstract

A total of 143,804 fry were adipose fin clipped and injected with full size binary coded-wire tags at the chinook salmon hatchery located in Whitehorse, Yukon Territory in the spring of 2004. Clove oil was used to anaesthetise the fry prior to clipping and tagging. Feeding was suspended for a minimum of 24 hours prior to tagging. Seven different tag codes were used, each corresponding to a separate fry release group. Tag retention was tested and averaged 97.8%. Based on this information, 140,716 tagged and clipped fry were released and 3088 fry were released with an adipose clip only. Fish were released into five areas. Releases occurred on May 28 and 29, 2004 in Wolf Creek (at the campground and above the Cadet camp) and also at a location along the mainstem Yukon River above the dam. The releases at the remaining three locations occurred on June 8, 2004 in the McClintock River, Mitchie Creek (at the outlet of Mitchie Lake), and Byng Creek (a tributary to Michie Cr.). An additional 2,514 fry were released unclipped and untagged (due to size and/or fitness) into Wolf Creek on June 22, 2004.

Introduction

Coded-wire tags (CWTs) are small, metal, coded tags that are injected into the nose cartilage of juvenile salmon. The first tags were developed in the 1960's and carried longitudinal coloured stripes. Binary-coded tags were introduced in 1971 and quickly replaced colour-coded tags because of improved readability and an increase in the number of available codes. The size of a standard CWT is approximately 0.25mm by 1.0 mm. When tagged, the juvenile fish are given a secondary, external mark, specifically removal of the adipose fin, to allow visual identification (Johnson, 1990; Maddigan, 1998).

CWTs are widely used in North America. Studies involving them generally fall into one of the three following categories: experimental, stock assessment and stock contribution. Experimental studies are designed to compare the survival of two or more groups of fish, or their contribution to a specific fishery or fisheries. Stock assessment studies are designed to measure contributions to fisheries, survival rates, and distribution of a given stock. Contribution studies focus on exploitation of the stock in a fishery or fisheries and require more tagged fish to generate meaningful results (Johnson, 1990).

Groups of upper Yukon River chinook salmon have been tagged with coded wire tags annually in the Yukon Territory since 1985[1], principally by Fisheries and Oceans Canada. Approximately 80% of all the fish tagged originated from the Whitehorse Rapids Fish Hatchery (WRFH). The hatchery was constructed in 1984 in concert with the construction of a fourth turbine at the Whitehorse hydroelectric facility in order to offset a perceived impact the hydro generating facility has on chinook salmon. Over the 1985 to 2004 period, the WRFH released a total of 4,820,629 chinook salmon fry. Of these, 3,646,016 fry were tagged with CWTs and externally marked using adipose fin clips. An additional 278,276[2] fry were released with an adipose clip but not tagged and 1,174,613 fry were released without a tag or adipose clip. Annually, 34% to 100% of the hatchery release has been tagged. The tags are applied to young of the year fry (also known as age "sub 1's" or "0 check" fry) in late May or early June, after a period of hatchery rearing[3]. Almost all of the fry have been released into the Yukon River system in a number of locations upstream of the hydroelectric facility.

The long-term objectives of the WRFH chinook salmon CWT program are to:

(1) Obtain information on survival rates, exploitation rates, run timing, and distribution; of chinook salmon in the upper Yukon River system.
(2) Permit identification of returning hatchery fish in order to adhere to WRFH broodstock collection guidelines.
(3) Obtain information on the relative success of different release groups.
(4) To provide data upon which to base assessments of the success/failure of the WRFH in producing chinook salmon.

[1] An exception occurred in 1999 when all fry released from the Whitehorse Rapids Hatchery were marked with the removal of their adipose fin, but coded wire tags were not applied.
[2] This total includes 240,040 fry released in 1999.
[3] In 1998, the fry were ponded (i.e. transferred from incubation trays to rearing troughs) between February 1 and February 16 (WRFH 1998).

The specific goals of the 2004 WRFH chinook salmon CWT program were:

1. Apply tags to all chinook fry released from the WRFH;
2. Recover a representative sample of heads (CWT recovery) from the Whitehorse Rapids Fishway;
3. Determine the relevance of the broodstock protocols used at the Whitehorse Rapids Hatchery through a review of the protocol used in YR 2000 – 2004 and;
4. Monitor the relative performance of different release groups.

Methods

Phyllis Nelson of 'Eh! Fish' was contracted to conduct the tagging and fin clipping. Two taggers and four adipose fin clippers were employed. Operations commenced on May 27, 2004 and were completed on June 3, 2004.

Fry were injected with full-size binary-coded wire tags using two Northwest Marine Technology Inc. Mark IV tagging machines provided by Fisheries and Oceans Canada. A total of ten different tag codes were used. Multiple codes were used for all release sites (Figure 3). This was attributable to the size of the tag lot groups.

Fry were sorted according to size and condition prior to CWT application. Small or deformed fry were not tagged. Feeding was suspended for at least 24 hours before tagging and resumed afterwards. Feeding was suspended again 24-48 hours prior to release.

Batches of approximately 50 fry were held in a nine-litre capacity plastic tub containing anaesthetic, for a minimum of two minutes prior to fin clipping. The anaesthetic used was a clove oil mixture. Anaesthetic baths were changed frequently to prevent thermal shock in the fry, and to refresh the anaesthetic. Once the fry were fin clipped, they were made accessible to a tagger for CWT application. After tagging, each fry was immediately passed through a quality control device (QCD) to check for successful CWT implantation. The QCD automatically detected, separated, and enumerated tagged and untagged specimens. Untagged fry were held until the end of the day or until a particular tag code was completely used. At this time, the fry were re-anaesthetised and run through the QCD again and checked a second time for CWT implantation. All untagged fry were then retagged with a CWT. Once tagging was complete, the fry were held in their rearing tanks for five days, then a sample of 100 fish was taken from each tag group and passed through a QCD for a second time to check CWT retention.

Results and Discussion

Tagging and release data for each tag group is presented in Table 1.

Table 1. Summary of tagging and release dates for Whitehorse Rapids Fish Hatchery fry, 2004

Tag Code	Release Location	Release Date	Number Released
02-01-70	Wolf Creek	May 28 to May 29	29,238
02-01-69	Mainstem	May 28 to May 29	25,351
02-01-68	Byng Creek	June 8	25,027
02-01-67	McClintock	June 8	25,125
02-01-66	Mitchie Creek	June 8	25,163
02-01-65	Mitchie Creek	June 8	13,900
		TOTAL	**143,804**

The total number of fry tagged at the Whitehorse Rapids Fish Hatchery and released into the Yukon River in 2004 was 140,716 A sample of fry (n=100 for 02-01-70&69 and n=300 for 02-01-65 to 68) was collected from each tag group 5 days after tagging to determine CWT retention. Tag retention was estimated to be 97.8% (Appendix 1) thus 2.2% (n=3088) of the tagged fry released were estimated to have lost their tags. The total release of both tagged and adipose fin clipped fry was estimated to be 143,804 fish.

A total of 143 moralities were observed during the tagging operation; these are not included in the totals above (Figure 3).

Fry weight at time of release ranged from 2.9 grams to 3.4 grams (Figure 3).

An additional 2,514 fry were identified as unsuitable for clipping due to small size or deformities. These fry were released into Wolf Creek, near Whitehorse, on June 22, 2004.

Eighty-eight chinook heads were collected from adipose clipped fish in 2004. Thirty-seven male and twenty female heads were collected from the Whitehorse Rapids Fishway for broodstock. Twenty-eight heads were collected from spawning areas in tributaries of the Yukon River upstream of the Whitehorse Rapids Fishway. One male and thirteen female heads were collected from Wolf Creek, and one female and thirteen male heads from Mitchie Creek. The remaining three heads were collected in the sport and commercial fisheries on the Yukon River downstream of the Whitehorse Rapids Fishway; one was taken by an angler at the mouth of Tatchun Creek, and two more in the commercial fishery in the Dawson City area. These heads were frozen and shipped for analysis.

One difficulty encountered when evaluating differential survival based on CWT data is the requirement to obtain an adequate CWT sample from the returning adults. This requires sampling at least 20% of the return for coded wire tags. It has been difficult to mount a statistically valid sampling program in the existing fisheries (particularly the US-based fisheries) and it has been difficult to obtain samples from spawning locations due

to access issues and a lack of available carcasses. To resolve this shortcoming, a representative sample of 20% of the return adult salmon could be harvested from the Whitehorse Rapids fishway, but this method of destructive sampling is not desired, particularly in years of low returns.

The broodstock collection guidelines for the WRFH, prior to YR 2000, required that the use of hatchery fish be minimized. This approach was reviewed by DFO prior to the YR 2000 broodstock program and the requirement to minimize hatchery fish for broodstock was relaxed. Broodstock selection has since been allowed to include a higher portion of hatchery fish (hatchery staff used to avoid hatchery origin fish during broodstock collection). A literature review by DFO in Whitehorse found that hatchery broodstock requires a 10% wild component every two generations to maintain genetic diversity (Bonnell, 1999). This new approach has made the recovery of CWTs easier since more marked fish can be retained for broodstock, however, the relative sample size still remains low.

Recommendations

1) All of the WRFH chinook salmon fry released should be marked so that visual identification is possible and broodstock collection protocols can be followed. A visual mark allows specific control over how many returning hatchery-origin chinook are used in the broodstock program. Marking (both visual and CWT) of artificially propagated fry is also a recommendation of the Yukon River Panel.

2) Recovery effort of post-spawn fish in upstream spawning tributaries should be improved. Collection of additional tags (CWT) after spawning would allow further assessment of stocking performance and survival.

3) A detailed assessment of the performance of the various release groups (by location, size at release, etc…) needs to be completed and changes to the stocking plan should be made to reflect those results.

4) Additional assistance be provided to staff at the Whitehorse Fishway to enable more adequate sampling of adult chinook salmon.

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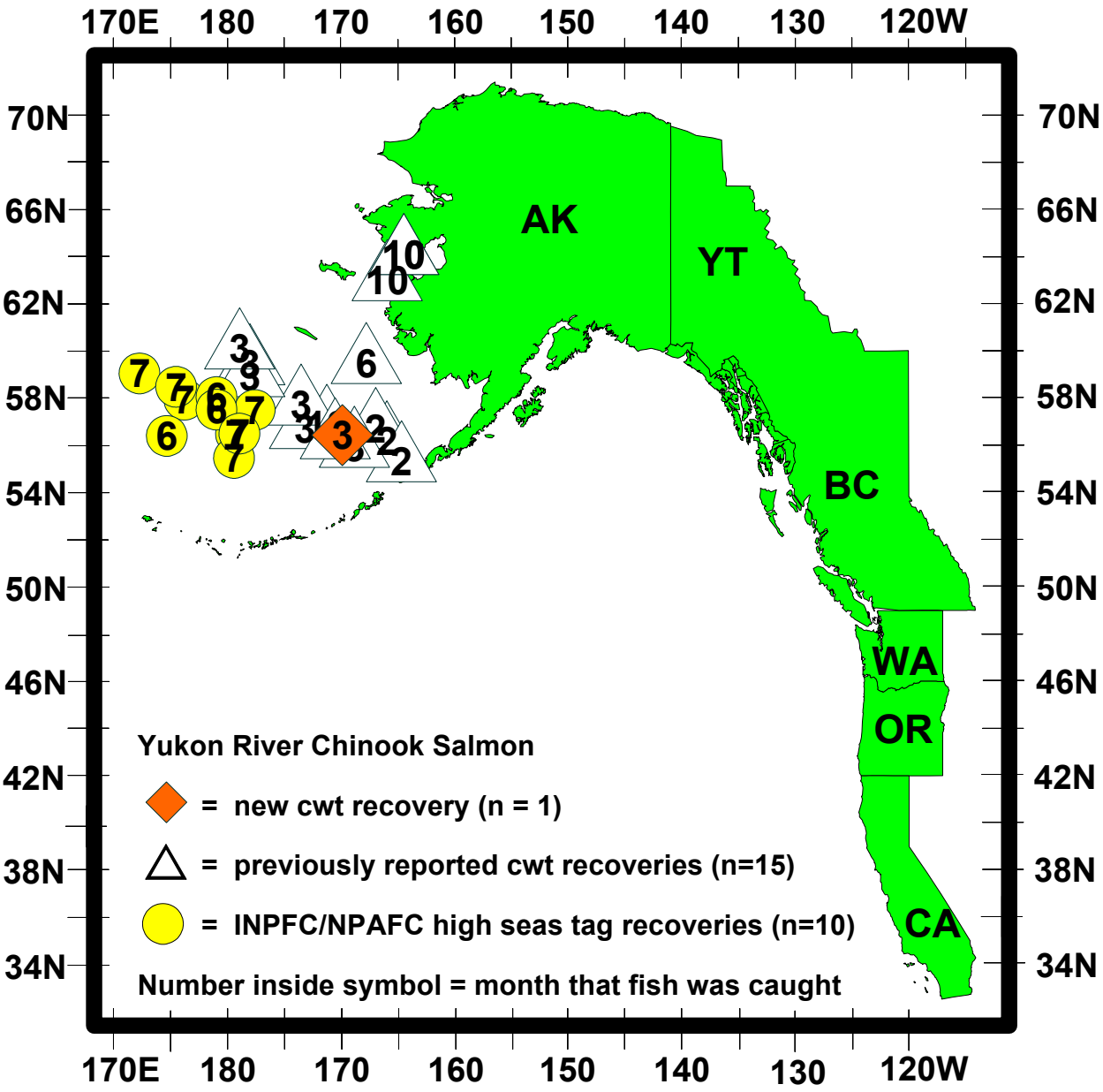

Fig. 1 Recovery locations of coded-wire tagged (CWT) Yukon River (Yukon Territory) hatchery chinook salmon in the bycatch of the U.S. commercial groundfish (trawl) fisheries and in U.S. NMFS juvenile salmon research vessel surveys in the eastern Bering Sea. The numbers at each location indicate the month of recovery. One new recovery is indicated by an orange diamond. Three recoveries of coded-wire tagged juvenile salmon during a U.S. NMFS survey in October 2002 at 64°06′N, 164°31′W (2 recoveries) and at 63°00′N, 165°58′W are northern range extensions for Yukon River chinook salmon. The previous northernmost record was an immature (age 1.3) chinook salmon tagged and released during high seas research vessel operations at 59°03′N, 178°59′E in July 1972 and recovered two years later in the Yukon River, Alaska.

Table 2. Summary of releases of coded-wire tagged chinook salmon from the Whitehorse hatchery, 1985 – 2004

Release Location	Release Date*	Tag Code	# Tagged & Clipped [c]	Adipose Clipped Only	%Tag-Loss	Days [a]	Total Clipped	Weight (grams)	Total Unclipped	Total Released
Michie	25-May-85	02-32-48	26,670	518	0.0191 [b]		27,188		0	
Michie	25-May-85	02-32-26	28,269	518	0.0180 [b]		28,787		0	
Michie	25-May-85	02-32-47	43,325	518	0.0118 [b]		43,843		0	
Wolf	1985	no-clip	0	0			0		10,520	10,520
SUM	1985		98,264	1,555			99,819		10,520	110,339
Michie	1986	02-37-31	77,170				77,170		1,000	78,170
Wolf	1986						0		5,720	5,720
SUM	1986		77,170				77,170		6,720	83,890
Michie	05-Jun-87	02-48-12	47,644	1,361	0.0278 [b]		49,005	2.50	9,598	58,603
Michie	05-Jun-87	02-48-13	49,344	808	0.0161 [b]		50,152	2.50	9,141	59,293
Michie	05-Jun-87	02-48-14	51,888	559	0.0107 [b]		52,447	2.50	9,422	61,869
Michie	05-Jun-87	02-48-15	43,367	2,066	0.0455 [b]		45,433	2.50	7,868	53,301
Michie	05-Jun-87	02-42-58	25,945	245	0.0094 [b]		26,190	2.50	4,171	30,361
Wolf	30-May-87	02-42-59	26,752	123	0.0046 [b]		26,875	2.50	422	27,297
SUM	1987		244,940	5,162			250,102		40,622	290,724
Michie	10-Jun-88	02-55-49	77,670	1,991	0.0250	15	79,661	2.80	84,903	164,564
Michie	10-Jun-88	02-555-0	78,013	1,592	0.0200	11	79,605	2.70	85,288	164,893
Wolf	05-Jun-88	no-clip	0	0			0		25,986	25,986
SUM	1988		155,683	3,583			159,266		196,177	355,443
Wolf	1989	no-clip	0	0			0		22,388	22,388
Michie	06-Jun-89	02-60-04	26,161	326	0.0123 [b]		26,487	2.30	0	26,487
Michie	06-Jun-89	02-60-05	24,951	128	0.0051 [b]		25,079	2.30	0	25,079
Michie	06-Jun-89	02-60-06	25,098	291	0.0115 [b]		25,389	2.40	0	25,389
Michie	06-Jun-89	02-60-07	25,233	156	0.0061 [b]		25,389	2.20	95,724	121,113
Fishway	06-Jun-89	02-60-08	25,194	357	0.0140 [b]		25,551	2.70	0	25,551
Fishway	06-Jun-89	02-60-09	25,190	351	0.0137 [b]		25,541	2.70	0	25,541
SUM	1989		151,827	1,609			153,436		118,112	271,548
Wolf	06-Jun-90	no-clip	0	0			0		11,969	11,969
Michie	02-Jun-90	02-02-38	24,555	501	0.0200 [b]		25,056	2.30	0	25,056
Michie	02-Jun-90	02-02-39	24,345	753	0.0300 [b]		25,098	2.30	0	25,098
Fishway	02-Jun-90	02-02-60	24,508	501	0.0200 [b]		25,009	2.20	0	25,009
Fishway	02-Jun-90	02-02-63	25,113	254	0.0100 [b]		25,367	2.20	0	25,367
SUM	1990		98,521	2,009			100,530		11,969	112,499
Wolf	08-Jun-91	18-03-22	49,477	793	0.0158 [b]		50,270	2.30	0	50,270
Fishway	06-Jun-91	18-03-23	52,948	193	0.0036 [b]		53,141	2.30	0	53,141
Michie	06-Jun-91	18-03-24	50,020	176	0.0035 [b]		50,196	2.30	87,348	137,544
SUM	1991		152,445	1,162			153,607		87,348	240,955
Wolf	04-Jun-92	18-08-29	48,239	0	0.0000 [b]		48,239	2.40	0	48,239
Fishway	04-Jun-92	18-08-28	49,356	99	0.0020 [b]		49,455	2.30	0	49,455
Michie	04-Jun-92	18-08-30	52,946	643	0.0120 [b]		53,589	2.20	249,166	302,755
SUM	1992		150,541	742			151,283		249,166	400,449
Wolf	06-Jun-93	18-12-15	50,248	0	0.0000 [b]		50,248	2.30	0	50,248
Fishway	06-Jun-93	18-12-16	49,957	434	0.0086 [b]		50,391	2.30	0	50,391
Michie	06-Jun-93	18-12-17	50,169	0	0.0000 [b]		50,169	2.30	290,647	340,816
SUM	1993		150,374	434			150,808		290,647	441,455
Wolf	02-Jun-94	18-14-27	50,155	270	0.0054 [b]		50,425	2.30	0	50,425

Michie	02-Jun-94	18-14-28	50,210	127	0.0025	[b]	50,337	2.30	158,780	209,117
Fishway	02-Jun-94	18-14-29	50,415	125	0.0025	[b]	50,540	2.30	0	50,540
SUM	1994		150,780	522			151,302		158,780	310,082
Wolf	06-Jun-95	18-12-46	10,067	164	0.0160	3	10,231	1.67	0	10,231
Wolf	06-Jun-95	18-12-47	9,122	0	0.0000	3	9,122	1.53	0	9,122
Michie	06-Jun-95	18-18-26	25,231	337	0.0132	3	25,568	2.47	4,552	30,120
Michie	06-Jun-95	18-18-27	25,187	141	0.0056	3	25,328	2.33	0	25,328
SUM	1995		69,607	642			70,249		4,552	74,801
Wolf	26-May-96	18-07-48	10,131	102	0.0100	5	10,233	2.30	0	10,233
Fox	4-Jun-96	18-28-23	35,452	0	0.0000	5	35,452	2.43	0	35,452
Byng	4-Jun-96	18-10-41	25,263	516	0.0200	5	25,779	2.37	0	25,779
Michie	5-Jun-96	18-33-45	50,082	1,022	0.0200	5	51,104	2.51	0	51,104
Michie	5-Jun-96	18-33-46	50,260	508	0.0100	5	50,768	2.43	0	50,768
Michie	5-Jun-96	18-33-47	49,985	505	0.0100	5	50,490	2.32	0	50,490
Judas	4-Jun-96	18-33-48	49,798	1,016	0.0200	5	50,814	2.43	0	50,814
McClintock	4-Jun-96	18-33-49	49,991	302	0.0060	5	50,293	2.27	0	50,293
SUM	1996		320,962	3,971			324,933		0	324,933
Wolf	1-Jun-97	18-23-25	14,850	150	0.0100	2	15,000	2.30	0	15,000
Wolf	1-Jun-97	18-23-26	20,334	0	0.0000	4	20,334		0	20,334
Wolf	8-Jun-97	18-29-06	10,158	0	0.0000	8	10,158		0	10,158
Fox	11-Jun-97	18-25-54	25,242	0	0.0000	3	25,242	2.43	0	25,242
Fox	11-Jun-97	18-25-55	24,995	253	0.0100	3	25,248		0	25,248
Byng	11-Jun-97	18-29-07	10,029	0	0.0000	1	10,029	2.37	0	10,029
Byng	11-Jun-97	18-29-05	10,155	0	0.0000	1	10,155		0	10,155
Michie	11-Jun-97	18-28-59	49,657	502	0.0100	3	50,159	2.51	0	50,159
Michie	11-Jun-97	18-28-60	50,130	0	0.0000	3	50,130	2.43	0	50,130
Judas	7-Jun-97	18-23-27	19,951	202	0.0100	3 to 7	20,153	2.43	0	20,153
Judas	11-Jun-97	18-25-53	25,146	0	0.0000	11	25,146	2.43	0	25,146
McClintock	11-Jun-97	18-25-51	25,399	0	0.0000	3	25,399	2.27	0	25,399
McClintock	11-Jun-97	18-25-52	24,792	251	0.0100	3	25,043		0	25,043
SUM	1997		310,838	1,358			312,196		0	312,196
Michie	12-Jun-98	18-41-22	49,243	1,004	0.0200	5	50,247	2.84	0	50,247
Michie	12-Jun-98	18-41-21	49,197	1,004	0.0200	5	50,201	2.81	0	50,201
Byng	12-Jun-98	18-31-60	24,518	1,022	0.0400	5	25,540	3.00	0	25,540
McClintock	12-Jun-98	18-40-43	49,810	503	0.0100	5	50,313	2.76	0	50,313
Judas	13-Jun-98	02-54-17	19,018	1,432	0.0700	5	20,450	2.55	0	20,450
Judas	12-Jun-98	18-31-59	25,331	256	0.0100	5	25,587	2.60	0	25,587
Wolf	6-Jun-98	02-19-58	10,104	421	0.0400	5	10,525	1.95	0	10,525
Wolf	4-Jun-98	02-46-06	34,813	710	0.0200	5	35,523	2.63	0	35,523
SUM	1998		262,034	6,352			268,386		0	268,386
Michie	6-Jun-99			80,393			80,393	3.13	0	80,393
Byng	6-Jun-99			64,430			64,430	2.92	0	64,430
McClintock	6-Jun-99			64,169			64,169	2.95	0	64,169
Wolf	6-Jun-99			31,048			31,048	3.07	0	31,048
SUM	1999			240,040			240,040		0	240,040
Michie	8-Jun-00	18-31-28	25,114	254	0.0100	5	25,368	2.80	0	25,368
Michie	8-Jun-00	18-31-29	25,037	253	0.0100	5	25,290	2.80	0	25,290
Michie	8-Jun-00	18-43-03	10,907	110	0.0100	5	11,017	2.84	0	11,017
McClintock	8-Jun-00	18-13-54	25,041	254	0.0100	5	25,295	2.70	0	25,295
McClintock	8-Jun-00	18-13-55	25,016	253	0.0100	5	25,269	2.68	0	25,269
Wolf	4-Jun-00	18-23-53	25,071	253	0.0100	5	25,324	2.67	0	25,324
Wolf	4-Jun-00	18-23-54	25,012	254	0.0101	5	25,266	2.40	0	25,266
SUM	2000		161,198	1,631			162,829		0	162,829
Michie	8-Jun-01	18-44-16	25,318	256	0.0100	5	25,574	2.68	0	25,574
Michie	8-Jun-01	18-44-17	27,293	276	0.0100	5	27,569	2.68	0	27,569
Michie	8-Jun-01	18-44-18	27,337	276	0.0100	5	27,613	2.60	0	27,613
Michie	8-Jun-01	18-44-19	11,629	117	0.0100	5	11,746	2.60	0	11,746
McClintock	8-Jun-01	18-44-12	24,526	248	0.0100	5	24,774	3.13	0	24,774
McClintock	8-Jun-01	18-44-13	25,033	253	0.0100	5	25,286	3.13	0	25,286

McClintock	8-Jun-01	18-36-50	10,840	110	0.0100	5	10,950	3.13	0	10,950
Byng	8-Jun-01	18-44-14	25788	260	0.0100	5	26,048	2.84	0	26,048
Byng	8-Jun-01	18-44-15	25,136	254	0.0100	5	25,390	2.84	0	25,390
Wolf	28-May-01	18-44-10	26,205	265	0.0100	5	26,470	3.34	0	26,470
Wolf	28-May-01	18-44-11	23,902	241	0.0100	5	24,143	3.34	0	24,143
SUM	2001		253,007	2,556			255,563		0	255,563
Wolf	23-May-02	18-51-01	25,334	126	0.0049	5	25460	3.30	0	25460
Wolf	02-Jun-02	18-51-02	25,079	177	0.0070	5	25256	3.10	0	25256
McClintock	10-Jun-02	18-51-03	24,769	505	0.0200	5	25274	3.60	0	25274
Byng	10-Jun-02	18-51-04	24,907	0	0.0000	5	24907	3.00	0	24907
Byng	10-Jun-02	18-51-05	24,925	125	0.0050	5	25050	3.00	0	25050
Michie	10-Jun-02	18-51-06	27,114	191	0.0070	5	27305	3.20	0	27305
Michie	10-Jun-02	18-51-07	26,854	0	0.0000	5	26854	3.02	0	26854
Michie	10-Jun-02	18-50-61	27,850	281	0.0100	5	28131	3.20	0	28131
Michie	10-Jun-02	18-50-62	27,241	0	0.0000	5	27241	3.04	0	27241
Michie	10-Jun-02	18-50-63	8,481	86	0.0100	5	8567	3.20	0	8567
SUM	2002		242,554	1,491			244,045		0	244,045
Wolf	25-May-03	18-47-48	27,489	83	0.0030	5	27,572	2.72	0	27,572
Wolf	25-May-03	18-47-49	26,704	161	0.0060	5	26,865	2.69	0	26,865
Byng	2-Jun-03	18-47-47	23,483	71	0.0030	5	23,554	3.01	0	23,554
Byng	2-Jun-03	18-47-46	27,058	54	0.0020	5	27,112	2.98	0	27,112
Michie	2-Jun-03	18-49-58	28,485	0	0.0000	5	28,485	3.05	0	28,485
Michie	2-Jun-03	18-49-59	27,519	0	0.0000	5	27,519	2.98	0	27,519
Michie	2-Jun-03	18-49-60	15,541	0	0.0000	5	15,541	3.07		15,541
SUM	2003		176,279	369			176,648		0	176,648
Wolf	5/28&30/2004	01-01-70	28,946	292	2.2000	5	29,238	2.90		29,238
Mainstem	5/28-29/2004	02-01-69	24,920	431	1.7000	5	25,351	3.10		25,351
Byng	8-Jun-04	02-01-68	24,401	626	2.5000	5	25,027	3.36		25,027
McClintock	8-Jun-04	02-01-67	24,246	879	3.5000	5	25,125	3.20		25,125
Michie	8-Jun-04	02-01-66	24,609	554	2.2000	5	25,163	3.12		25,163
Michie	8-Jun-04	02-01-65	13,594	306	2.2000	5	13,900	3.12		13,900
SUM	2004		140,716	3,088			143,804			143,804
TOTAL			3,367,740	278,276			3,646,016		1,174,613	4,820,629

a:The number of days refers to the period of the the fish were held to determine tag loss.

b: Unknown period.

c: usually corresponds to "tagged" category on MRP release forms.

CWT Data recorded from CWT release sheets 1989-94.
CWT Data prior to 1987 not verified against SEP records.

Table 3. Summary of coded-wire tagging and release information from tagged chinook salmon in 2004

CONTACT Lawrence Vano - Operations Manager

										CODED WIRE TAGGED FISH								
CWT TAG CODE	BROOD YEAR	RUN	STUDY	EXPID	STOCK TYPE	STOCK	RELEASE	REL PERIOD	RELSTAGE	CWT FINCLIP	# CWT TAGGED	# SHED CWT	SAMPLE SIZE	TAGLOSS	NUMBER	ENUM METHOD	TOTAL RELEASE	WEIGHT
						CODE	CODE	DDMMYY						DAYS				
Ag D1 D2			R S			NAME	NAME	DDMMYY						%				gm
02-01-70	2004	2	H P		W	Yukon River	Wolf Creek	280504 300504	FF	Adipose	28,946	292	100	5 1.0	0	C	29,238	2.9
COMMENTS	Tagged 29,277 - 39 mortalities = 29,238 x 1.0% Tag Loss = 292 clipped with no tag and 28,946 clipped with tag retained.																	
02-01-69	2004	2	H P		W	Yukon River	Mainstem	280504 290504	FF	Adipose	24,920	431	100	5 1.7	0	C	25,351	3.1
COMMENTS	Tagged 25,373 - 22 mortalities = 25,351 x 1.7% Tag Loss = 431 fry clipped with no tag and 24,920 clipped with tag retained.																	
02-01-68	2004	2	H P		W	Yukon River	Byng Creek	80604	FF	Adipose	24,401	626	300	5 2.5	0	C	25,027	3.4
COMMENTS	Tagged 25,057 - 30 mortalities = 25,027 x 2.5% Tag Loss = 626 clipped with not tag and 24,401 clipped with tag retained.																	
02-01-67	2004	2	H P		W	Yukon River	M'Clintock River	80604	FF	Adipose	24,246	879	300	5 3.5	0	C	25,125	3.2
COMMENTS	Tagged 25,149 - 24 mortalities = 25,125 x 3.5 % Tag Loss = 879 clipped with no tag and 24,246 clipped with tag retained.																	
02-01-66	2004	2	H P		W	Yukon River	Michie Creek	80604	FF	Adipose	24,609	554	300	5 2.2	0	C	25,163	3.1
COMMENTS	Tagged 25,175 - 12 mortalities = 25,163 x 2.2% Tag Loss = 554 clipped with no tag and 24,609 clipped with tag retained.																	
02-01-65	2004	2	H P		W	Yukon River	Michie Creek	80604	FF	Adipose	13,594	306	300	5 2.2	0	C	13,900	3.1
COMMENTS	Tagged 13,916 - 16 mortalities = 13,900 x 2.2% Tag Loss = 306 clipped with no tag and 13,594 clipped with tag retained.																	