

Fishery Data Series No. 08-36

**Coho and Chinook Salmon Smolt Releases into Cook
Inlet, Prince William Sound, and Resurrection Bay,
Alaska, 2006**

by

Diane P. Loopstra

and

Patricia A. Hansen

August 2008

Alaska Department of Fish and Game

Division of Sport Fish and Commercial Fisheries



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TABLE OF CONTENTS

	Page
LIST OF TABLES.....	ii
LIST OF FIGURES.....	ii
LIST OF APPENDICES.....	ii
ABSTRACT.....	1
INTRODUCTION.....	1
METHODS.....	2
Smolt Marking.....	2
Coded Wire Tagging.....	2
Thermal Marking.....	4
Smolt Enumeration.....	7
Tagging Inventory.....	8
Hatchery Inventory Estimates.....	8
Volumetric Estimates.....	8
RESULTS.....	9
Smolt Marking.....	9
Coded Wire Tagging.....	9
Thermal Marking.....	9
Smolt Releases.....	9
Smolt Enumeration.....	10
DISCUSSION.....	10
Smolt Marking.....	10
Smolt Enumeration.....	11
Size Estimation.....	11
RECOMMENDATIONS.....	11
ACKNOWLEDGMENTS.....	11
REFERENCES CITED.....	12
APPENDIX A.....	13

LIST OF TABLES

Table	Page
1. Total number of fish stocked at various locations in Cook Inlet, Prince William Sound, and Resurrection Bay in 2006.	3
2. Summary of coded wire tagging data and release estimates for Chinook salmon smolt stocked at three locations in Cook Inlet, 2006.	4
3. Summary of Chinook and coho salmon thermal marks (hatch codes) applied at Fort Richardson Hatchery for smolt stocked at 10 locations in Cook Inlet, 2 locations in Prince William Sound, and 2 locations in Resurrection Bay in 2006.....	6
4. A comparison of hatchery inventory and water volume population estimates to a tagging inventory count for four units of Chinook salmon reared at Fort Richardson Hatchery.....	10

LIST OF FIGURES

Figure	Page
1. Proper placement of a coded wire tag in a small fish.	5
2. Image of a thermal mark with hatch code 2,3H applied to Chinook salmon released in 2006.....	7
3. Thermal marking temperature profile for Chinook salmon with a thermal mark hatch code of 2,3H.....	8

LIST OF APPENDICES

Appendix	Page
A1. Historical releases of coho salmon that were adipose-clipped and tagged with coded wire tags, and/or thermally marked.....	14
A2. Historical releases of Chinook salmon that were adipose-clipped and tagged with coded wire tags, and/or thermally marked.	19

ABSTRACT

Approximately 956,169 coho salmon *Oncorhynchus kisutch* and 1,516,967 Chinook salmon *O. tshawytscha* smolt were released in Cook Inlet, Prince William Sound, and Resurrection Bay in 2006. All 19 release groups were thermally marked to identify the area of release from returning adults; however, an outbreak of Bacterial Kidney Disease (BKD) in the Chinook salmon made alternate location releases necessary (regardless of the applied thermal mark) for fish in six raceways. Approximately 219,668 Chinook salmon from three release groups were also marked with an adipose clip and a coded wire tag. These fish were not sampled for size distribution, long-term CWT retention, and finclip quality to reduce the risk of spreading BKD to unaffected areas of the hatchery. Overnight tag retention for individual release groups ranged from 99.9 to 100%. Percentage of acceptable adipose clips ranged from 99.9 to 100%.

The number of Chinook salmon in the three release groups with adipose clips and coded wire tags was obtained during tagging. Hatchery inventory methods were used to estimate the number of fish in all seven coho salmon release groups and nine Chinook salmon release groups that did not receive adipose clips and coded wire tags.

Key words: hatchery, adipose-clip, coded wire tags, thermal marking, otolith, Chinook salmon, *Oncorhynchus tshawytscha*, coho salmon, *Oncorhynchus kisutch*, tag retention, size composition.

INTRODUCTION

Southcentral Alaska receives the vast majority of the state's sport fishing effort (Jennings et al. 2007). Chinook salmon *Oncorhynchus tshawytscha* and coho salmon *O. kisutch* smolt reared at Fort Richardson Hatchery (FRH) are stocked in numerous locations throughout Southcentral Alaska to improve or create terminal sport fisheries and relieve pressure on wild stocks (Appendices A1 and A2). One element of the coho and Chinook salmon hatchery smolt stocking projects in Cook Inlet, Prince William Sound, and Resurrection Bay is the use of thermal marks (TM) to identify fish. Some salmon smolt are also marked with an adipose clip and a coded wire tag (CWT). TMs and CWTs are used to estimate the contribution of hatchery stockings to commercial fisheries, marine and freshwater recreational fisheries, and personal use fisheries. They can also be used to estimate spawning escapement in stocked streams, and estimate straying of stocked coho and Chinook salmon.

The accuracy of hatchery contribution estimates from CWT recoveries is highly dependent upon the accuracy of unmarked fish estimates in the release groups. Estimating the number of unmarked fish is not needed when using TMs because all fish are marked. However, determining the number of fish in each release group is still necessary. The methods used at FRH for determining the total number of unmarked fish and/or total number of fish in release groups include a tagging inventory (TI) count, a hatchery inventory (HI) estimate, and a water volume (WV) displacement estimate.

Another important element of hatchery smolt stocking programs is fish size. Weight and length of smolt at release are indicators of quality (Peltz and Starkey 1993). If smolt are too small at release, then ocean survival will be poor; and if smolt are too large at release, then ocean residence will be reduced, thus shifting age composition of returns to younger, smaller fish (Sweet and Peltz 1994). To maximize ocean survival of hatchery smolt and maintain the age composition of an existing population, Peltz and Starkey (1993) recommended that 80% of coho salmon smolt released weigh between 15.1 and 25.0 g, and Chinook salmon weigh between 5.1 and 15.0 g.

This project documented the release of Chinook and coho salmon with TMs and CWTs in Cook Inlet, Prince William Sound, and Resurrection Bay in 2006. Specific objectives for this project were:

1. To estimate the long-term (>30 days) tag retention rate and adipose finclip quality of each release group marked with CWTs;
2. Verify the TM applied to the otoliths in each coho and Chinook salmon release group;
3. To estimate the weight distribution for each smolt release group marked with CWTs and one smolt release group of coho salmon without CWTs.

Our tagging goal was to mark all Chinook salmon in three release groups with an adipose clip and a CWT. A second goal was to mark all fish in all release groups with a thermal mark. We also compared smolt abundance using HI and WV estimates to the TI count for all Chinook salmon release groups marked with an adipose clip and CWT.

Included in this report are recommendations for future marking and collecting of smolt release data. All data for this report are held and archived by Research and Technical Services, Division of Sport Fish, Alaska Department of Fish and Game (ADF&G).

METHODS

Coho salmon broodstock from Bear Lake, Ship Creek (Little Susitna River), and Eklutna Tailrace (Jim Creek) were raised at FRH. Chinook salmon broodstock from Deception Creek, Ship Creek, Crooked Creek, and Ninilchik River were also raised at FRH (Table 1). Fish from 19 release groups were stocked at 10 locations in Cook Inlet, 2 locations in Prince William Sound, and 2 locations in Resurrection Bay.

SMOLT MARKING

Coded Wire Tagging

All Chinook salmon smolt in three release groups were adipose clipped and injected with a CWT. Unique tag codes were used for each release group marked with CWTs (Table 2).

To determine which head mold sizes would provide the best tag placement, approximately 100 fish from each of the three broodstocks were measured to fork length (to the nearest millimeter) within 7 days of tagging. Two or three head mold sizes that fit at least 80% of the length distribution were selected for tagging (Peltz and Hansen 1994). All fish were graded and tagged accordingly with a full-length CWT (1.1 mm) using a Northwest Marine Technology¹ Mark IV tag injector.

Fish were anesthetized with MS-222 before tagging. The adipose fin was excised at the base using surgical scissors. Tags were then injected into the noses of the fish, and the fish were sent through a Quality Control Device (QCD). The QCD detected the magnetized tag and separated the fish with tags from those without tags. All fish without tags were injected again. Quality control checks for tag placement were conducted following initial daily startup, and following a change in head mold size or a change in tagging personnel. During each quality control check, a minimum of two tagged fish were dissected to determine tag placement (Moberly et al. 1977; Figure 1). Head mold or wire placement adjustments were made when necessary. The fish dissected to determine tag placement were not included in the tagged fish counts.

After tagging, all fish were held in net pens overnight to determine short-term mortality, short-term tag retention rates, and monitor adipose-clip quality. All overnight mortalities were

¹ Use of a company's name does not constitute endorsement.

Table 1.-Total number of fish stocked at various locations in Cook Inlet, Prince William Sound, and Resurrection Bay in 2006.

Release Area	Release Location	Broodstock	Inventory method used	Number of fish in release group
<u>Chinook Salmon</u>				
Cook Inlet	Deception Creek	Deception Creek	tagging inventory	50,426
Cook Inlet	Ship Creek	Ship Creek	hatchery inventory	176,055
Cook Inlet	Crooked Creek	Crooked Creek	tagging inventory	111,705
Cook Inlet	Eklutna Tailrace	Ship Creek	hatchery inventory	213,250
Cook Inlet	Halibut Cove	Ninilchik River	hatchery inventory	117,549
Cook Inlet	Homer Spit	Ninilchik River	hatchery inventory	224,053
Cook Inlet	Seldovia	Ninilchik River	hatchery inventory	113,974
Cook Inlet	Ninilchik River	Ninilchik River	tagging inventory	57,537
Resurrection Bay	Seward Lagoon	Deception / Crooked Creeks	hatchery inventory	116,826
Resurrection Bay	Seward Lagoon	Ship Creek	hatchery inventory	109,795
Prince William Sound	Fleming Spit	Ship Creek	hatchery inventory	113,576
Prince William Sound	Valdez, Old Town Site	Ship Creek	hatchery inventory	112,221
<u>Coho Salmon</u>				
Cook Inlet	Bird Creek	Ship Cr (Little Susitna River)	hatchery inventory	104,974
Cook Inlet	Campbell Creek	Ship Cr (Little Susitna River)	hatchery inventory	78,405
Cook Inlet	Eklutna Tailrace	Eklutna Tailrace (Jim Creek)	hatchery inventory	132,212
Cook Inlet	Homer Spit	Ship Cr (Little Susitna River)	hatchery inventory	125,216
Cook Inlet	Ship Creek	Ship Cr (Little Susitna River)	hatchery inventory	252,775
Resurrection Bay	Lowell Creek	Bear Lake	hatchery inventory	131,261
Resurrection Bay	Seward Lagoon	Bear Lake	hatchery inventory	131,326
Total				2,473,136

counted and recorded. Short-term retention rates were estimated daily by passing a random sample of 200 fish through the QCD. Daily tag retention rate (D_i) of surviving smolt was estimated as a binomial proportion:

$$\hat{D}_i = \frac{n_i}{n_{ti}}, \quad (1)$$

where:

n_i = number of live smolt in the sample tagged on day i that retained the tag, and

n_{ti} = total number of live smolt in the sample tagged on day i ,

and a variance of:

$$Var(\hat{D}_i) = \frac{\hat{D}_i(1 - \hat{D}_i)}{n_{ti} - 1}. \quad (2)$$

Table 2.-Summary of coded wire tagging data and release estimates for Chinook salmon smolt stocked at three locations in Cook Inlet, 2006.

Release site Parameter	Deception Creek	Ninilchik River	Crooked Creek	Totals
Tag Codes	31-03-55 31-03-27	31-03-58	31-03-56 31-03-57 31-03-51	
Initial number of fish with adipose finclip and CWT	50,751	57,751	112,144	220,646
Mortalities	325	214	439	978
Acceptable adipose clip ^a	99.9%	100.0%	100.0%	
Adipose-clipped fish released ^a	50,388	57,537	111,662	219,587
Tag retention sample size ^a	1,327	1,486	2,586	
Tag retention at release ^a	99.9%	100.0%	100.0%	100.0%
Tag retention variance ^a	5.67882E-07	0	0	
Tagged fish released ^a	50,376	57,537	111,705	219,618
Tagged fish variance ^a	1,442	0	0	
Total fish released	50,426	57,537	111,705	219,668
Tagging dates	2/21/2006 2/28/2006	3/20/2006 3/30/2006	2/28/2006 3/16/2006	

^a Based on short-term tag retention and adipose finclip quality information

Fish checked for overnight tag retention were also examined for adipose-clip quality. At least 80% fin removal was required for the clip to be acceptable.

Tagged smolt were returned to the rearing unit following overnight mortality checks and held until release. Fish mortality was monitored daily and all mortalities were recorded.

In March 2006, pathology tests revealed that the Chinook salmon in the outdoor raceways were infected with Bacterial Kidney Disease (BKD). Pre-release sampling for long-term CWT retention, adipose-clip quality, and length and weight distributions was not done to avoid spreading the disease to other fish in the hatchery.

Thermal Marking

Thermal marks were applied to all coho and Chinook salmon embryos before hatching. Thermal mark patterns were assigned by the Mark, Tag, and Age Laboratory operated by ADF&G Division of Commercial Fisheries (Table 3). At approximately 310 centigrade temperature units (CTUs) for coho salmon and 360 CTUs for Chinook salmon, otoliths were developed enough to accept a mark, as verified by the Mark, Tag, and Age Laboratory. Embryos were exposed to a series of 4-5°C water temperature changes (both increases and decreases), with each temperature decrease resulting in the deposit of a dark protein ring on the developing otolith (Monk *Unpublished*). Water temperature changes were scheduled every 24 hours, with a 72-hour warmwater exposure occurring between bands of rings for Chinook salmon. The assigned patterns of dark protein rings applied to the otoliths (Figure 2) are used to identify the area of

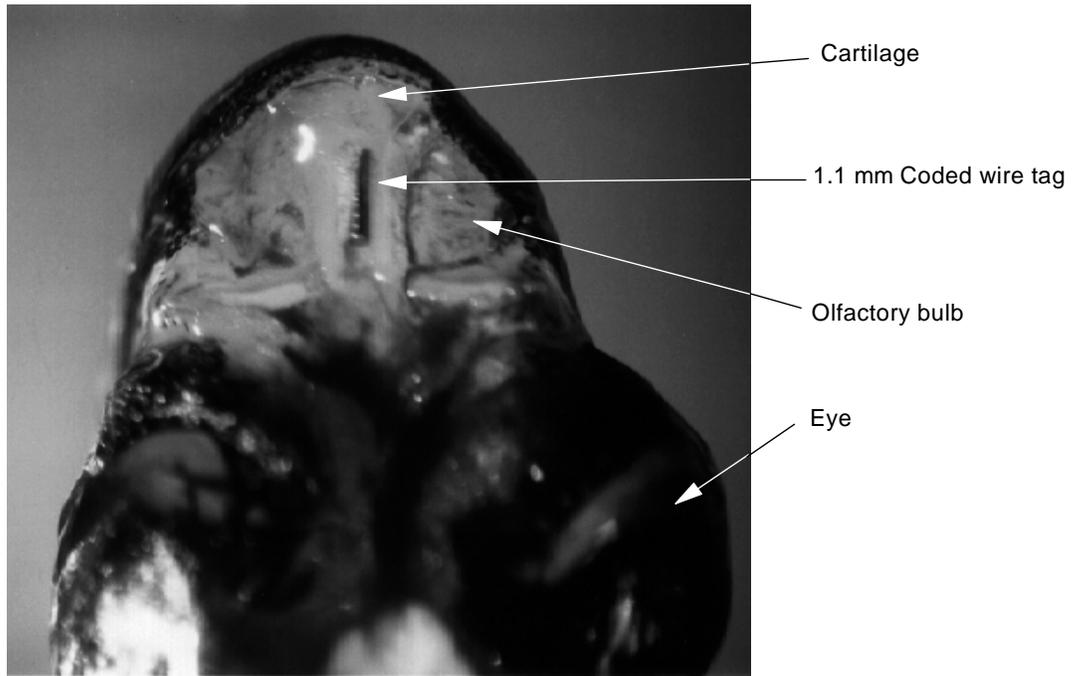
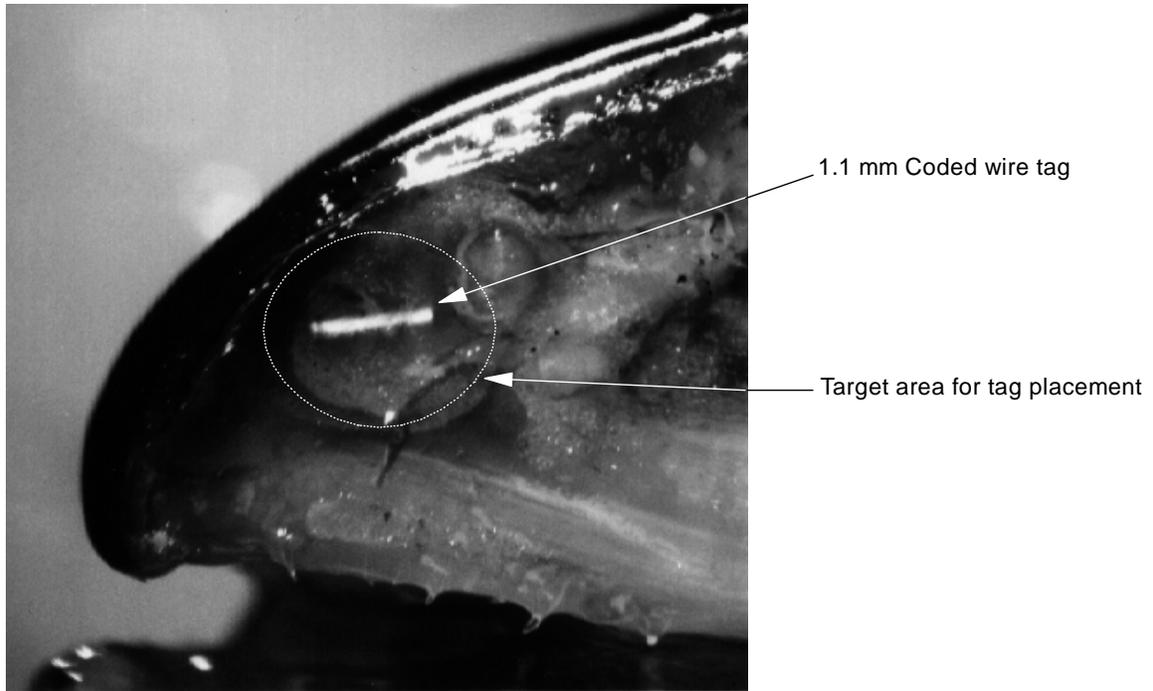


Figure 1.-Proper placement of a coded wire tag in a small fish.

Table 3.-Summary of Chinook and coho salmon thermal marks (hatch codes) applied at Fort Richardson Hatchery for smolt stocked at 10 locations in Cook Inlet, 2 locations in Prince William Sound, and 2 locations in Resurrection Bay in 2006.

Release Area	Mark Group(s)	Release Location	Hatch code
<u>Chinook salmon</u>			
Cook Inlet		Ship Creek	2,3H
Cook Inlet		Seward Lagoon ^a	2,3H
Cook Inlet		Eklutna Tailrace	2,3H
Cook Inlet		Ninilchik River	2,3H
Cook Inlet		Halibut Cove	2,3H
Cook Inlet		Seldovia	2,3H
Cook Inlet		Homer Spit	2,3H
Cook Inlet		Deception Creek	2,3H
Cook Inlet		Crooked Creek	2,3H
Cook Inlet		Fleming Spit ^a	2,3H
Prince William Sound		Valdez	2,4H
Prince William Sound		Ship Creek ^b	2,4H
Resurrection Bay		Seward Lagoon	2,5H
<u>Coho salmon</u>			
Cook Inlet		Ship Creek	5H
Cook Inlet		Campbell Creek	5H
Cook Inlet		Bird Creek	5H
Cook Inlet		Homer Spit	5H
Cook Inlet		Eklutna Tailrace	5H
Resurrection Bay		Lowell Creek	4H
Resurrection Bay		Seward Lagoon	4H

^a These fish were thermally marked (Cook Inlet TM) for release at Ship Creek.

^b These fish were thermally marked (Prince William Sound TM) for release at Fleming Spit.

release from returning adult salmon. Onset Stowaway XTI data loggers recorded incubation water temperature every 15 minutes throughout the marking period to generate thermal profiles for each mark type (Figure 3).

Voucher samples containing approximately 50 fish from each egg lot were collected before moving fish to the raceways (ponding) and submitted to the Mark, Tag, and Age Laboratory for mark verification.

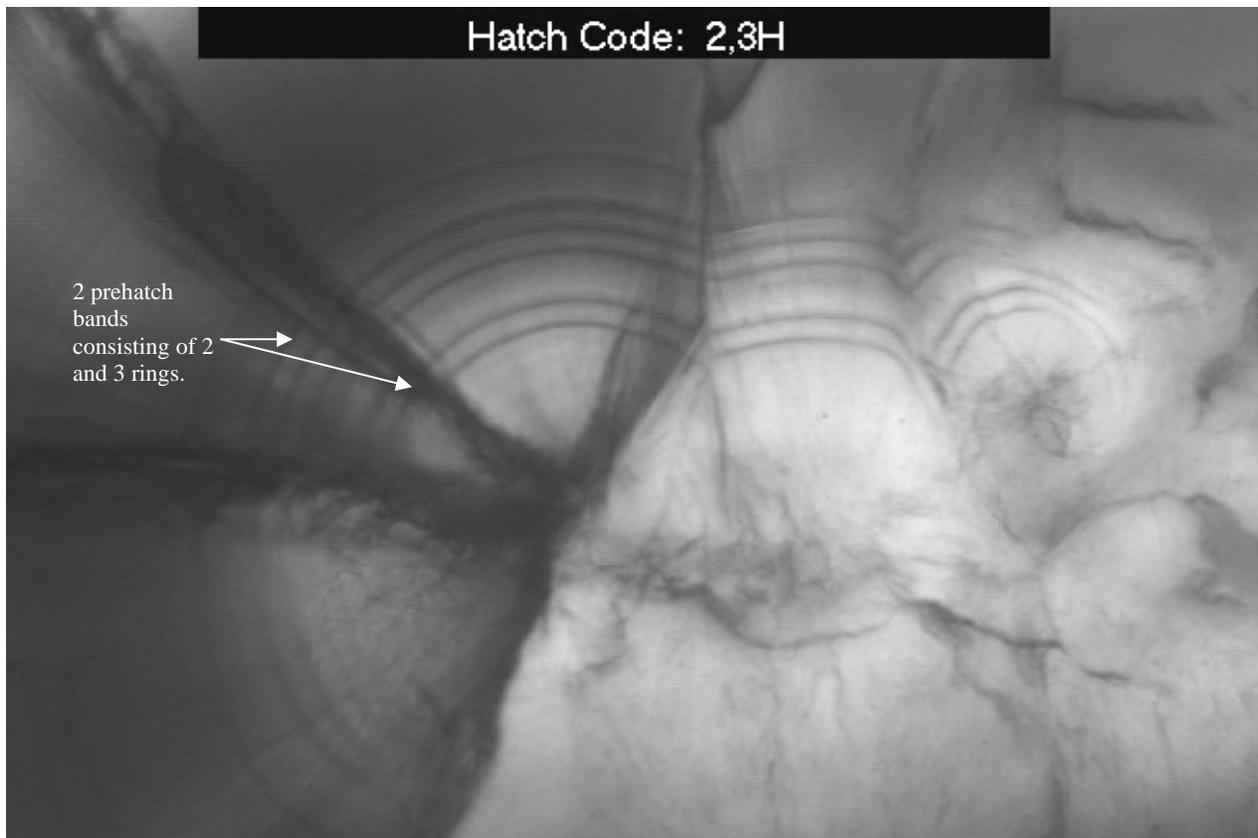


Figure 2.-Image of a thermal mark with hatch code 2,3H applied to Chinook salmon released in 2006.

Coho Salmon

Coho salmon were thermally marked in 2004. Different TMs were applied to identify the fish as belonging to a Cook Inlet release group (1 band of 5 rings, or 5H) or to a Resurrection Bay release group (1 band of 4 rings, or 4H) (Table 3). These two TMs have been used to identify FRH coho salmon since the 2002 releases.

Chinook Salmon

Chinook salmon were thermally marked in 2004 (Table 3). Different TMs consisting of two bands were applied to identify the fish as belonging to a Cook Inlet (2,3H), Prince William Sound (2,4H), or Resurrection Bay (2,5H) release group. The first band consisted of 2 rings for all Chinook salmon release groups, and the second band consisted of 3 rings for Cook Inlet, 4 for Prince William Sound, and 5 for Resurrection Bay. These three TMs have been used to identify FRH Chinook salmon since the 2003 releases.

SMOLT ENUMERATION

The number of fish in all 19 release groups was estimated (before release) using either the TI counts, the HI abundance estimates, and/or the WV abundance estimates. The TI counts were compared to the HI and WV estimates to determine the precision of the HI and WV estimates. If the HI or WV estimates differed more than 10% from the TI count, then the estimates were reviewed.

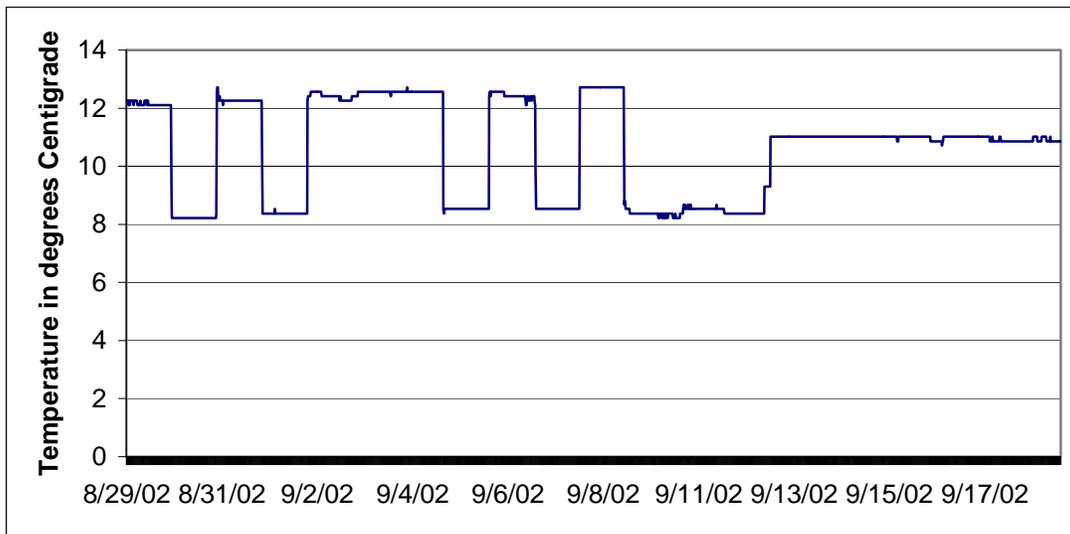


Figure 3.-Thermal marking temperature profile for Chinook salmon with a thermal mark hatch code of 2,3H.

Tagging Inventory

A TI count was obtained from the tag counter on the Mark IV CWT injector for the three Chinook salmon release groups 100% injected with CWTs. Thus, the number of injected tags equaled the number of fish in a release group. For these release groups, fish mortality was monitored daily and subtracted from the original TI count to yield a final fish count for each release group.

Hatchery Inventory Estimates

The HI abundance technique used at FRH was based on the weight of fish in a raceway. These estimates were obtained when fry were moved from small indoor raceways to large outdoor raceways. Approximately 10 randomly selected net loads of fish were used to estimate mean fish weight. Because a net full of fish was too large to enumerate (approximately 600-800 fish), the net was manually halved numerous times until 50-100 fish remained in the net. These fish were weighed and hand counted from a bucket to determine mean fish weight. The total weight of fish, obtained using the accumulative weight feature on the electronic scale, was then divided by the mean fish weight to establish the HI abundance estimate in that raceway. The number of fish released from an outdoor raceway equaled the original outdoor raceway estimate minus the fish stocked or transferred, minus the mortality from date of loading into the outdoor raceway to the date of release, and minus transport and holding mortality if applicable.

Volumetric Estimates

Fish abundance (number or weight) was also estimated volumetrically using a transport tank when transporting fish to the release location. This estimate is a function of the tank volume (gallons), the ratio of the volume of water displaced in the tank sight gauge to the volume of water placed in the tank (mm/gallon), and the ratio of the number (or weight) of fish which displace a volume of water in the tank sight gauge (fish/mm or kg/mm).

For fish transport, each tank was filled with water and the water level on the tank sight gauge recorded to the nearest millimeter. Fish were then pumped from the raceway into each of the transport tanks. The water level on the tank gauge was recorded again after fish were loaded into each of the tanks. The millimeters of water displaced for each tank was determined, and using a known displacement value of kilograms of fish per millimeter, the total weight of fish in the tank was estimated. Total number of fish was estimated by dividing the total fish weight by the mean fish weight.

FRH estimated mean weight by obtaining fish samples from five nets of fish before loading the tanks. Each net of fish was split in half several times until the desired sample size (50-100 fish) was achieved. The fish were poured into a pre-weighed bucket of water, weighed to the nearest gram, and counted out of the bucket. Mean weight was calculated for each of the five samples, and an overall mean weight was calculated by summing the five sample mean weights and dividing by the sum of the five fish counts.

RESULTS

SMOLT MARKING

Coded Wire Tagging

There were 219,668 Chinook salmon smolt with an adipose clip and a CWT released in Cook Inlet in 2006 (Table 2). The goal of marking all Chinook salmon in three release groups was achieved. Overnight retention rates ranged from 99.9 to 100% (Table 2). The percentage of acceptable adipose finclips for the release groups ranged from 99.9 to 100%.

Thermal Marking

TM digital images and thermal profiles indicated that all Chinook and coho salmon release groups were marked with their assigned TM (Table 3). The BKD infection levels in four of the five Chinook salmon raceways scheduled for release at two broodstock collection release sites (Ship Creek and Deception Creek) exceeded the allowable infection level set forth by ADF&G's pathology section for stocking at those locations (Meyers 2003). The BKD infection levels in these four raceways did allow for their release at terminal fishery release sites. Therefore, the fish scheduled for stocking into Ship Creek (Cook Inlet TM) were stocked at Eklutna Tailrace (Cook Inlet release site), Fleming Spit (Prince William Sound release site), and Seward Lagoon (Resurrection Bay release site). Ship Creek received Ship Creek broodstock fish that were originally scheduled for stocking at Eklutna Tailrace (Cook Inlet TM) and Fleming Spit (Prince William Sound TM).

SMOLT RELEASES

All 18 coho and Chinook salmon release groups were stocked in 2006. FRH released an estimated 956,169 coho salmon smolt at seven locations and an estimated 1,516,967 Chinook salmon smolt at 11 locations in Cook Inlet, Prince William Sound, and Resurrection Bay. The BKD infection levels necessitated reassigning release locations for six raceways of Chinook salmon, and altering the numbers released at four release sites. Ship Creek received 176,055 smolt instead of 315,000, Eklutna Tailrace received 213,250 smolt instead of 150,000, Seward Lagoon received 223,379 smolt instead of 105,000, and Deception Creek received 50,426 smolt instead of 150,000. The BKD infection level in one rearing unit of Deception Creek Chinook salmon (an estimated 102,696 smolt) exceeded the allowable level for stocking into a brood source release site. Because these fish had CWTs with the same code as fish that were released

into Deception Creek, they could not be released into another open system. These fish were stocked into landlocked lakes.

SMOLT ENUMERATION

HI estimates were reported for all seven coho salmon release groups (956,169 smolt) and nine Chinook salmon release groups (1,297,299 smolt) (Tables 1 and 2). TI counts were reported and compared to the results of HI and WV estimation techniques for the three TI Chinook salmon release groups (219,668 smolt) (Table 4). HI estimates for the three Chinook salmon rearing units were within 5.9% of the TI counts, and the WV estimates were within 6.9% of the TI counts (Table 4).

Table 4.-A comparison of hatchery inventory and water volume population estimates to a tagging inventory count for four units of Chinook salmon reared at Fort Richardson Hatchery.

Estimation Technique	Deception Cr	Ninilchik R	Crooked Cr
Tagging Inventory	50,426	57,537	111,848 ^a
Hatchery Inventory (weight)	52,478	54,323	114,551
Displacement	53,536	61,833	117,642
Difference TI to HI	3.9%	-5.9%	2.4%
Difference TI to WV	5.8%	6.9%	4.9%
Difference HI (weight) to WV	2.0%	12.1%	2.6%

^a The Crooked Creek release group was transferred from Fort Richardson Hatchery to Crooked Creek Hatchery where they were held for several days to facilitate imprinting; 143 of the 111,848 transferred fish died during imprinting resulting in a final TI of 111,705 for that release group.

DISCUSSION

SMOLT MARKING

To minimize the risk of spreading BKD to unaffected parts of the hatchery and minimize fish stress, release groups were not sampled for long-term CWT retention, adipose-clip quality, and size distribution at release.

Overnight CWT retention rates in 2006 (99.9 to 100%) are comparable to those achieved in 2005 (99.7 to 100%) (Loopstra and Hansen *In prep*). Because tagging personnel were the same in both years, long-term CWT retention rates are likely comparable to those achieved in 2005 (99.4 to 99.9%).

Chinook salmon originally scheduled for release into Ship Creek (Cook Inlet TM) were released at other Cook Inlet, Prince William Sound, and Resurrection Bay terminal fishery locations permitted for Ship Creek broodstock Chinook salmon. In exchange, Ship Creek was stocked with Ship Creek broodstock fish marked with either a Cook Inlet or Prince William Sound TM. No TM recovery programs are planned for these fish. If a TM from one of these fish is recovered elsewhere, the mark can identify the fish as a hatchery fish, but not the area of release.

SMOLT ENUMERATION

Peltz and Hansen (1994) reported that numerous sources of error associated with water displacement values make the water volume displacement method of estimating populations unreliable. They recommended that this method be used only when other estimation techniques cannot be used or when accuracy is not important.

For each of the three Chinook salmon rearing units, the HI estimates were within 5.9% of the TI counts, and the TI counts and the WV estimates were within 6.9% of each other. Improved techniques based on the weight of fish in each release group since 1997 have made the HI inventory method as reliable as the mark-recapture method at FRH (Starkey et al. 1999). Improved transport tank loading techniques such as avoiding the addition of unmeasured water when loading fish in the tanks and obtaining accurate sight gauge readings likely account for the increased reliability of WV estimates at FRH.

SIZE ESTIMATION

To maximize ocean survival and maintain the age composition of the population, Peltz and Starkey (1993) recommended that 80% of hatchery coho salmon smolt weigh between 15.1 and 25.0 g, and hatchery Chinook salmon smolt weigh between 5.1 and 15.0 g at release. Because size distributions were not obtained at release, smolt quality (in terms of size) could not be determined.

RECOMMENDATIONS

1. All fish should be graded and tagged using the appropriate head mold sizes.
2. Continue proper tag placement to increase or maintain acceptable (>97%) long-term retention rates.
3. Continue to monitor adipose-clip quality during tagging and at release.
4. Temperature changes of 4–5°C should occur every 24 hours between rings, and every 72 hours between bands of rings during thermal marking.
5. Follow the production goal size at release recommendations that 80% of coho salmon weigh between 15.1 g and 25.0 g, and 80% of Chinook salmon weigh between 5.1 g and 15.0 g.
6. Continue to record individual bucket weights when performing hatchery inventory procedures in case of electronic scale failure.

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APPENDIX A

Appendix A1.-Historical releases of coho salmon that were adipose-clipped and tagged with coded wire tags, and/or thermally marked.

Brood Year	Broodstock	Hatchery	Release		Total Released		Coded Wire Tagged			Thermal Marking	
			Year	CWT Code	Estimate	Type of Estimate ^a	Clipped Fish Released	Tagged Fish Released	Percent Tagged	Mark Group	Hatch Code
Anchorage Urban Streams^b											
1994	Little Susitna	Ft Richardson	1996	31-25-06	302,857	M-R	93,975	92,565	30.56%		
Bird Creek											
1990	Little Susitna	Ft Richardson	1992	31-20-02 31-20-03	95,377	M-R	44,903	37,629	39.50%		
1991	Little Susitna	Ft Richardson	1993	31-21-39	140,382	M-R	43,441	42,350	30.20%		
1992	Little Susitna	Ft Richardson	1994	31-23-02	84,643	M-R	45,220	44,686	52.80%		
1993	Little Susitna	Ft Richardson	1995	31-23-37	154,753	M-R	45,666	45,490	29.40%		
1994	Little Susitna	Ft Richardson	1996	31-25-04	147,618	M-R	46,528	45,411	30.80%		
1995	Little Susitna	Ft Richardson	1997	31-26-01	146,612	HI	45,901	45,488	31.03%		
1995	Little Susitna	Ft Richardson	1997	31-26-27	147,953	HI	45,836	45,469	30.73%		
1996	Little Susitna	Ft Richardson	1998	31-26-25	164,211	HI	46,140	46,094	28.07%		
1997	Ship Cr (Little Susitna)	Ft Richardson	1999	31-26-15	111,430	EC	37,344	36,746	32.98%		
1998	Ship Cr (Little Susitna)	Ft Richardson	2000	31-01-43	97,409	EC	40,114	39,392	40.44%		
2002	Ship Cr (Little Susitna)	Ft Richardson	2004		109,949	HI				Cook Inlet	5H
2003	Ship Cr (Little Susitna)	Ft Richardson	2005 ^c		100,605	HI					
2004	Ship Cr (Little Susitna)	Ft Richardson	2006		104,974	HI				Cook Inlet	5H
Campbell Creek^b											
1990	Little Susitna	Ft Richardson	1992	31-20-04 31-20-05	97,076	M-R	43,681	39,444	40.60%		
1991	Little Susitna	Ft Richardson	1993	31-21-38	140,797	M-R	43,440	42,916	30.50%		
1992	Little Susitna	Ft Richardson	1994	31-23-03	87,686	M-R	44,144	42,963	49.00%		
1993	Little Susitna	Ft Richardson	1995	31-23-36	157,241	M-R	45,655	44,995	28.60%		
1995	Little Susitna	Ft Richardson	1997	31-25-62	71,519	TI	45,840	45,290	63.33%		
1996	Little Susitna	Ft Richardson	1998	31-26-52	83,317	HI	22,453	22,296	26.76%		
1997	Ship Cr (Little Susitna)	Ft Richardson	1999	31-01-30	42,046	EC	20,879	20,378	48.47%		
1998	Ship Cr (Little Susitna)	Ft Richardson	2000	31-02-30	63,730	EC	19,948	19,549	30.67%		
1999	Ship Cr (Little Susitna)	Ft Richardson	2001	31-02-32	69,836	HI	21,568	20,813	29.80%		

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Appendix A1.-Page 2 of 5.

Brood Year	Broodstock	Hatchery	Release Year	CWT Code	Total Released		Coded Wire Tagged			Thermal Marking	
					Estimate	Type of Estimate ^a	Clipped Fish Released	Tagged Fish Released	Percent Tagged	Mark Group	Hatch Code
Campbell Creek^b (continued)											
2000	Ship Cr (Little Susitna)	Ft Richardson	2002	31-01-97	61,323	HI	22,789	21,672	35.34%	Cook Inlet	5H
2001	Ship Cr (Little Susitna)	Ft Richardson	2003		78,576	HI				Cook Inlet	5H
2002	Ship Cr (Little Susitna)	Ft Richardson	2004		85,790	HI				Cook Inlet	5H
2003	Ship Cr (Little Susitna)	Ft Richardson	2005 ^c		60,387	HI					
2004	Ship Cr (Little Susitna)	Ft Richardson	2006		78,405	HI				Cook Inlet	5H
Cottonwood Creek											
1990	Fish Creek	Big Lake	1992	31-20-08 31-21-09	53,900	M-R	35,341	32,938	61.10%		
1991	Fish Creek	Big Lake	1993	31-21-41	74,198	M-R	43,117	40,875	55.10%		
Eklutna Tailrace											
1996	Jim Creek	Ft Richardson	1998	31-26-27 31-26-54, 55,56	112,219	TI	112,219	111,882	99.70%		
1997	Jim Creek	Ft Richardson	1999	31-26-16	126,602	EC	44,073	42,663	33.70%		
1998	Jim Creek	Ft Richardson	2000	31-01-46	76,851	EC	40,514	40,149	52.24%		
1999	Eklutna Tailrace	Ft Richardson	2001	31-02-47	124,838	HI	43,713	43,494	34.84%		
2000	Eklutna Tailrace	Ft Richardson	2002	31-02-46	120,629	HI	44,518	44,295	36.72%	Cook Inlet	5H
2001	Eklutna Tailrace	Ft Richardson	2003		120,736	HI				Cook Inlet	5H
2002	Eklutna Tailrace	Ft Richardson	2004		131,979	HI				Cook Inlet	5H
2003	Eklutna Tailrace	Ft Richardson	2005 ^c		132,149	HI					
2004	Eklutna Tailrace	Ft Richardson	2006		132,212	HI				Cook Inlet	5H

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Appendix A1.-Page 3 of 5.

Brood Year	Broodstock	Hatchery	Release Year	CWT Code	Total Released		Coded Wire Tagged			Thermal Marking	
					Estimate	Type of Estimate ^a	Clipped Fish Released	Tagged Fish Released	Percent Tagged	Mark Group	Hatch Code
Fish Creek											
1990	Fish Creek	Big Lake	1992	31-20-12 31-20-13	74,953	M-R	45,538	43,625	58.20%		
1991	Fish Creek	Big Lake	1993	31-21-40	67,934	M-R	44,050	43,257	63.70%		
Homer Spit											
1996	Bear Lake	Elmendorf	1998	31-26-28	130,219	M-R	42,057	41,926	32.20%		
1997	Bear Lake	Elmendorf	1999	31-01-40	129,602	M-R	44,405	43,020	33.19%		
	Bear Lake	Elmendorf	2000-01 ^c								
		Ft Richardson									
1999	Ship Cr (Little Susitna)	Ft Richardson	2001	31-01-36	100,280	HI	44,992	44,812	44.69%		
2000	Ship Cr (Little Susitna)	Ft Richardson	2002	31-01-98	95,648	HI	45,498	44,179	46.19%	Cook Inlet	5H
2000	Bear Lake	Ft Richardson	2002		120,707	HI				Cook Inlet	5H
2001	Ship Cr (Little Susitna)	Ft Richardson	2003		222,935	HI				Cook Inlet	5H
2002	Ship Cr (Little Susitna)	Ft Richardson	2004		130,243	HI				Cook Inlet	5H
2003	Ship Cr (Little Susitna)	Ft Richardson	2005 ^c		125,707	HI					
2004	Ship Cr (Little Susitna)	Ft Richardson	2006		125,216	HI				Cook Inlet	5H
Little Susitna at Houston											
1990	Little Susitna	Ft Richardson	1992	31-20-07	154,466	M-R	21,884	19,564	12.70%		
1991	Little Susitna	Ft Richardson	1993	31-21-37	148,282	M-R	21,404	20,312	13.70%		
Lowell Creek											
2000	Bear Lake	Ft Richardson	2002		119,512	HI				Resurrection Bay	4H
2001	Bear Lake	Ft Richardson	2003		124,389	HI				Resurrection Bay	4H
2002	Bear Lake	Ft Richardson	2004		131,989	HI				Resurrection Bay	4H
2003	Bear Lake	Ft Richardson	2005 ^c		132,276	HI					
2004	Bear Lake	Ft Richardson	2006		131,261	HI				Resurrection Bay	4H

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Appendix A1.-Page 4 of 5.

Brood Year	Broodstock	Hatchery	Release		Total Released		Coded Wire Tagged			Thermal Marking	
			Year	CWT Code	Estimate	Type of Estimate ^a	Clipped Fish Released	Tagged Fish Released	Percent Tagged	Mark Group	Hatch Code
Nancy Lake											
1990	Little Susitna	Ft Richardson	1992	31-20-06	158,459	M-R	21,598	19,222	12.10%		
1991	Little Susitna	Ft Richardson	1993	31-21-37	131,591	M-R	21,001	19,930	15.20%		
1992	Little Susitna	Ft Richardson	1994	31-23-01	126,694	M-R	44,489	43,818	34.60%		
1993	Little Susitna	Ft Richardson	1995	31-23-39	151,985	M-R	46,261	45,245	29.80%		
Seward Lagoon											
2000	Bear Lake	Ft Richardson	2002		121,743	HI				Resurrection Bay	4H
2001	Bear Lake	Ft Richardson	2003		123,718	HI				Resurrection Bay	4H
2002	Bear Lake	Ft Richardson	2004		131,798	HI				Resurrection Bay	4H
2003	Bear Lake	Ft Richardson	2005 ^c		132,229	HI					
2004	Bear Lake	Ft Richardson	2006		131,326	HI				Resurrection Bay	4H
Ship Creek^b											
1990	Ship Creek	Elmendorf	1992	31-19-63 31-20-01	67,178	TI	44,086	38,443	57.20%		
1991	Ship Creek	Elmendorf	1993	31-21-36	54,764	PC	42,112	41,322	75.50%		
1992	Ship Creek	Elmendorf	1994	31-23-04	75,779	PC	44,031	41,722	55.10%		
1993	Little Susitna	Ft Richardson	1995	31-23-38	158,981	M-R	45,491	44,654	28.10%		
1995	Little Susitna	Ft Richardson	1997	31-25-63	232,066	TI,HI	45,925	45,741	19.71%		
1996	Little Susitna	Ft Richardson	1998	31-26-53 31-26-26	232,765	HI	67,812	66,997	28.78%		
1997	Ship Cr (Little Susitna)	Ft Richardson	1999	31-26-14 31-01-29	165,388	EC	48,299	45,380	27.44%		
1998	Ship Cr (Little Susitna)	Ft Richardson	2000	31-01-32 31-01-33	260,070	EC	61,640	58,989	22.68%		
1999	Ship Cr (Little Susitna)	Ft Richardson	2001	31-02-61	233,563	HI	64,165	61,663	26.40%		
2000	Ship Cr (Little Susitna)	Ft Richardson	2002	31-02-83	212,639	HI	67,959	63,678	29.95%	Cook Inlet	5H
2001	Ship Cr (Little Susitna)	Ft Richardson	2003	31-02-74, 31-02-69	234,716	HI	64,234	64,125	27.32%	Cook Inlet	5H

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Appendix A1.-Page 5 of 5.

Brood Year	Broodstock	Hatchery	Release Year	CWT Code	Total Released		Coded Wire Tagged			Thermal Marking	
					Estimate	Type of Estimate ^a	Clipped Fish Released	Tagged Fish Released	Percent Tagged	Mark Group	Hatch Code
Ship Creek^b (continued)											
2002	Ship Cr (Little Susitna)	Ft Richardson	2004	31-02-81, 31-03-15	241,066	HI	63,222	62,906	26.09%	Cook Inlet	5H
2003	Ship Cr (Little Susitna)	Ft Richardson	2005 ^c		251,446	HI					
2004	Ship Cr (Little Susitna)	Ft Richardson	2006		252,775	HI				Cook Inlet	5H
Wasilla Creek											
1990	Fish Cr	Big Lake	1992	31-20-10 31-20-11	76,315	M-R	44,148	41,985	55.00%		
1991	Fish Cr	Big Lake	1992	31-21-42	77,174	M-R	43,001	41,711	54.10%		
1994	Little Susitna	Ft Richardson	1996	31-25-05	145,923	M-R	46,980	46,839	32.10%		

^a M-R is mark-recapture; TI is tagging inventory count; HI is hatchery inventory count; EC is electronic count;

^b Campbell and Ship creeks were combined and termed "Anchorage Urban Streams" in 1996.

^c Stocking continued, but releases did not contain tagged or thermally marked fish.

Appendix A2.-Historical releases of Chinook salmon that were adipose-clipped and tagged with coded wire tags, and/or thermally marked.

Brood Year	Broodstock	Hatchery	Release Year	CWT Code	Total Released		Coded Wire Tagging			Thermal Marking	
					Estimate	Type of Estimate ^a	Clipped Fish Released ^b	Tagged Fish Released	Percent Tagged	Mark Group	Hatch Code
Buskin River											
1994	Deception Cr	Elmendorf	1995	31-24-31	84,349	M-R	41,572	41,078	48.70%		
1995	Deception Cr	Elmendorf	1996	31-25-09	113,220	M-R	41,259	40,681	35.90%		
Crooked Creek											
1993	Crooked Cr	Elmendorf	1994	31-23-14	224,784	M-R	43,609	43,034	19.10%		
1994	Homer (Crooked Cr)	Elmendorf	1995	31-24-27	184,049	M-R	40,903	38,420	20.90%		
1995	Homer (Crooked Cr)	Elmendorf	1996	31-25-12	193,180	M-R	40,827	40,196	20.80%		
1996	Homer (Crooked Cr)	Elmendorf	1997	31-25-55	223,200	M-R	41,049	39,038	17.49%		
1997	Homer (Crooked Cr)	Elmendorf	1998	31-26-29	137,338	M-R	42,874	42,610	31.03%		
1998	Homer (Crooked Cr) ^c	Elmendorf	1999	31-01-41	192,304	M-R	43,431	42,649	22.17%		
1999	Crooked Cr	Elmendorf	2000	31-02-31, 31-01-34,35	108,507	TI	108,507	105,578	97.30%		
2000	Crooked Cr	Elmendorf	2001	31-01-95, 31-02-36,37	109,201	TI	109,201	107,454	98.40%		
2001	Crooked Cr	Elmendorf	2002	31-02-51,31-01-96,99	99,547	TI	99,547	98,452	98.90%	Crooked Cr	2,4H ^{4d}
2002	Crooked Cr	Ft Richardson	2003	31-02-72, 73, 68	98,800	TI	98,800	94,058	95.20%	Cook Inlet	2,3H
2002	Crooked Cr	Ft.Richardson	2004	31-02-79, 80	80,601	TI	80,601	75,120	93.20%	Cook Inlet	2,3H
2003	Crooked Cr	Ft.Richardson	2005	31-03-39, 40, 17	113,613	TI	113,071	113,499	99.90%	Cook Inlet	2,3H ^c
2004	Crooked Cr ^f	Ft.Richardson	2006	31-03-56, 57, 51	111,705	TI	111,705	111,705	100.0%	Cook Inlet	2,3H

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Appendix A2.-Page 2 of 6.

Brood Year	Broodstock	Hatchery	Release Year	CWT Code	Total Released		Coded Wire Tagging			Thermal Marking	
					Estimate	Type of Estimate ^a	Clipped Fish Released ^b	Tagged Fish Released	Percent Tagged	Mark Group	Hatch Code
Deception Creek											
1991	Deception Cr	Ft Richardson	1992	31-21-03	179,724	M-R	44,089	33,464	18.60%		
1992	Deception Cr	Ft Richardson	1993	31-21-60	160,194	M-R	42,782	39,420	24.60%		
1993	Deception Cr	Ft Richardson	1994	31-23-17	177,913	M-R	46,289	45,921	25.80%		
1994	Deception Cr	Ft Richardson	1995	31-24-34	184,740	M-R	46,807	46,256	25.00%		
1995	Deception Cr	Ft Richardson	1996	31-25-14	186,918	M-R	47,700	47,145	25.20%		
1996	Deception Cr	Ft Richardson	1997	31-26-03,04,05,06,07	209,644	TI	209,644	207,973	99.20%		
1997	Deception Cr	Ft Richardson	1998	31-25-32	197,392	TI	197,392	195,615	99.10%		
1998	Deception Cr	Ft Richardson	1999	31-26-17,18,19, 20 31-01-31	201,586	TI	201,586	199,722	99.08%		
1999	Deception Cr	Ft Richardson	2000	31-26-21, 31-01-44,31-02-33,34,35	206,496	TI	206,496	205,051	99.30%		
2000	Deception Cr	Ft Richardson	2001	31-02-41,42,43,44,45	207,465	TI	207,465	204,560	98.60%		
2001	Deception Cr	Ft Richardson	2002	31-01-92,31-02-52, 53,54,55	197,277	TI	197,277	196,608	99.66%	Deception Cr	2,5H
2002	Deception Cr	Ft Richardson	2003	31-02-70, 71, 31-01-94	101,181	TI	101,181	99,562	98.40%	Cook Inlet	2,3H
2002	Deception Cr	Ft Richardson	2004	31-02-77, 78, 31-03-16	113,523	TI	113,523	104,101	91.70%	Cook Inlet	2,3H ^g
2003	Deception Cr	Elmendorf	2004	31-02-75, 76, 31-01-27	99,047	TI	99,047	97,660	98.60%	Cook Inlet	2,3H
2003	Deception Cr	Ft Richardson	2005	31-03-28,29,30,31	163,016	TI	161,991	162,415	99.63%	Cook Inlet	2,3H ^c
2004	Deception Cr ^f	Ft Richardson	2006	31-03-53,54,55,27	50,426	TI	50,426	50,376	99.90%	Cook Inlet	2,3H
Eagle River											
1993	Ship Creek	Elmendorf	1994	31-23-13	98,872	M-R	43,612	41,669	42.10%		
Eklutna Tailrace											
2001	Ship Creek	Elmendorf	2002		106,991	VOL				Eklutna Tailrace	2,3H3
2002	Ship Creek	Ft Richardson	2003		218,492	HI				Cook Inlet	2,3H
2002	Ship Creek	Ft Richardson	2004		215,165	HI				Cook Inlet	2,3H ^g
2003	Ship Creek	Ft Richardson	2005		164,586	HI				Cook Inlet	2,3H ^c
2004	Ship Creek	Ft Richardson	2006		213,250	HI				Cook Inlet	2,3H

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Appendix A2.-Page 3 of 6.

Brood Year	Broodstock	Hatchery	Release Year	CWT Code	Total Released		Coded Wire Tagging			Thermal Marking	
					Estimate	Type of Estimate ^a	Clipped Fish Released ^b	Tagged Fish	Percent Tagged	Mark Group	Hatch Code
Fleming Spit											
1998	Deception Cr	Ft. Richardson	1999	31-26-23	49,773	TI	45,705	45,385	91.18%		
1999	Deception Cr	Elmendorf	2000	31-01-38	45,000	VIS	17,358	17,236	38.30%		
2000	Deception Cr	Elmendorf	2001	31-02-38	94,812	HI	40,659	40,415	42.63%		
2001	Deception Cr	Ft. Richardson	2002	31-02-57	109,656	HI	40,054	39,573	36.09%	Prince William Sound	2,4H
2002	Deception Cr	Ft. Richardson	2003		109,757	HI				Prince William Sound	2,4H
2003	Deception Cr	Ft. Richardson	2004		58,000	HI				Prince William Sound	2,4H
2003	Deception Cr	Ft. Richardson	2005		87,591	HI				Prince William Sound	2,4H ^c
2004	Ship Creek ^h	Ft. Richardson	2006		113,576	HI				Cook Inlet	2,3H ^h
Halibut Cove											
1993	Crooked Creek	Elmendorf	1994	31-23-15	98,872	M-R	21,205	21,038	21.30%		
1994	Ninilchik River	Elmendorf	1995	31-24-30	37,577	M-R	36,944	36,700	97.70%		
1995	Ninilchik River	Elmendorf	1996	31-25-11	97,729	M-R	40,688	39,345	40.30%		
1996	Ninilchik River	Elmendorf	1997	31-25-58	78,133	M-R	40,919	39,487	50.54%		
1997	Ninilchik River	Elmendorf	1998	31-26-32	65,893	M-R	38,476	38,041	57.73%		
	Ninilchik River	Elmendorf	1999-01 ⁱ								
2001	Ninilchik River	Elmendorf	2002		106,279	VOL				Kachemak Bay	2,4H3
2002	Ninilchik River	Ft Richardson	2003		106,844	HI				Cook Inlet	2,3H
2002	Ninilchik River	Ft Richardson	2004		103,771	HI				Cook Inlet	2,3H
2003	Ninilchik River	Ft Richardson	2005		112,521	HI				Cook Inlet	2,3H ^e
2004	Ninilchik River	Ft Richardson	2006		117,549	HI				Cook Inlet	2,3H
Homer Spit (early run)											
1993	Crooked Creek	Elmendorf	1994	31-23-16	163,963	M-R	26,003	25,615	15.60%		
1994	Homer (Crooked Cr)	Elmendorf	1995	31-24-32	216,026	M-R	41,650	40,291	18.70%		
1995	Homer (Crooked Cr)	Elmendorf	1996	31-25-07	204,085	M-R	40,868	39,017	19.10%		
1996	Homer (Crooked Cr)	Elmendorf	1997	31-25-60	217,773	M-R	41,112	38,810	17.82%		
1997	Homer (Crooked Cr)	Elmendorf	1998	31-26-33	177,730	M-R	40,012	39,652	22.31%		
1998	Homer (Crooked Cr)	Elmendorf	1999	31-01-45	163,170	M-R	42,561	40,423	24.77%		
	Ninilchik River	Elmendorf	2000-01 ⁱ								
2001	Ninilchik River	Elmendorf	2002		190,026	VOL				Kachemak Bay	2,5H3
2002	Ninilchik River	Ft Richardson	2003		206,292	HI				Cook Inlet	2,3H
2002	Ninilchik River	Ft Richardson	2004		143,037	HI				Cook Inlet	2,3H
2003	Ninilchik River	Elmendorf	2004		25,706	VOL				Cook Inlet	2,3H

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Appendix A2.-Page 4 of 6.

Brood Year	Broodstock	Hatchery	Release Year	CWT Code	Total Released		Coded Wire Tagging			Thermal Marking		
					Estimate	Type of Estimate ^a	Clipped Fish Released ^b	Tagged Fish Released	Percent Tagged	Mark Group	Hatch Code	
Homer Spit (early run) continued												
2003	Ninilchik River	Ft Richardson	2005		220,822	HI					Cook Inlet	2,3H ^e
2004	Ninilchik River	Ft Richardson	2006		224,053	HI					Cook Inlet	2,3H
Homer Spit (late run)												
1992	Kasilof River	Crooked Creek	1994	31-23-19	56,920	M-R	22,612	22,383	39.30%			
1994	Homer (Kasilof R)	Elmendorf	1995	31-24-33	123,048	M-R	41,054	40,466	32.90%			
1995	Homer (Kasilof R)	Elmendorf	1996	31-25-13	108,204	M-R	40,615	38,787	35.80%			
1996	Homer (Kasilof R)	Elmendorf	1997	31-25-61	100,933	M-R	41,028	39,264	38.90%			
1997	Homer (Kasilof R)	Elmendorf	1998	31-26-34	112,100	HI	40,158	39,997	35.68%			
	Homer (Kasilof R)	Elmendorf	1999 ⁱ									
Lowell Creek												
1996	Deception Cr	Elmendorf	1997	31-25-59	102,147	M-R	40,906	40,497	39.65%			
	Deception Cr	Elmendorf	1998-99 ⁱ									
	Crooked Creek	Elmendorf	2000-01 ⁱ									
2001	Crooked Creek	Elmendorf	2002		93,296	VOL					Resurrection Bay	2,5H3
2002	Crooked Creek	Ft Richardson	2003		110,331	HI					Resurrection Bay	2,5H
2002	Crooked Creek	Ft Richardson	2004		89,388	HI					Resurrection Bay	2,5H
2003	Crooked Creek	Ft Richardson	2005		100,088	HI					Resurrection Bay	2,5H ^e
Ninilchik River												
1991	Ninilchik River	Ft Richardson	1992	31-21-04	132,387	M-R	43,648	41,335	31.20%			
1992	Ninilchik River	Ft Richardson	1993	31-21-59	184,585	M-R	44,487	42,960	23.30%			
1993	Ninilchik River	Ft Richardson	1994	31-23-18	201,513	M-R	46,193	45,535	22.60%			
1994	Ninilchik River	Ft Richardson	1995	31-24-35	54,902	TI	54,902	54,353	99.00%			
1995	Ninilchik River	Ft Richardson	1996	31-25-15	51,688	TI	51,588	50,866	98.60%			
1996	Ninilchik River	Ft Richardson	1997	31-26-08	50,698	TI	50,698	50,292	99.20%			
1997	Ninilchik River	Ft Richardson	1998	31-26-35	48,798	TI	48,798	47,480	97.30%			
1998	Ninilchik River	Ft Richardson	1999	31-01-47	49,853	TI	49,853	48,906	98.10%			
1999	Ninilchik River	Ft Richardson	2000	31-02-48	51,298	TI	51,298	50,016	97.50%			
2000	Ninilchik River	Ft Richardson	2001	31-02-60	54,770	TI	54,770	54,441	99.40%			
2001	Ninilchik River	Ft Richardson	2002	31-02-82	54,631	TI	54,631	54,139	99.10%		Ninilchik River	2,3H
2002	Ninilchik River	Ft Richardson	2003	31-02-56, 31-01-83	47,997	TI	47,997	44,349	92.40%		Cook Inlet	2,3H
2002	Ninilchik River	Ft Richardson	2004	31-03-18	51,303	TI	51,303	51,252	99.90%		Cook Inlet	2,3H
2003	Ninilchik River	Ft Richardson	2005	31-03-41	55,229	TI	54,806	54,898	99.40%		Cook Inlet	2,3H ^e
2004	Ninilchik River ^f	Ft Richardson	2006	31-03-58	57,537	TI	57,537	57,537	100.00%		Cook Inlet	2,3H

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Appendix A2.-Page 5 of 6.

Brood			Total Released			Coded Wire Tagging			Thermal Marking		
Year	Broodstock	Hatchery	Release Year	CWT Code	Estimate	Type of Estimate ^a	Clipped Fish Released ^b	Tagged Fish Released	Percent Tagged	Mark Group	Hatch Code
Seldovia											
1993	Crooked Creek	Elmendorf	1994	31-23-11	107,246	M-R	46,754	45,439	42.40%		
1994	Homer (Crooked Cr)	Elmendorf	1995	31-24-29	116,165	M-R	41,609	40,678	35.00%		
1995	Ninilchik River	Elmendorf	1996	31-25-10	118,274	M-R	40,667	39,610	33.50%		
1996	Ninilchik River	Elmendorf	1997	31-25-57	103,757	M-R	41,279	39,834	38.39%		
1997	Ninilchik River	Elmendorf	1998	31-26-31	69,461	M-R	40,654	40,125	57.77%		
	Ninilchik River	Elmendorf	1999-01 ⁱ								
2001	Ninilchik River	Elmendorf	2002		83,045	VOL				Kachemak Bay	2,4H3
2002	Ninilchik River	Ft Richardson	2003		107,521	HI				Cook Inlet	2,3H
2003	Ninilchik River	Elmendorf	2004		88,682	VOL				Cook Inlet	2,3H
2003	Ninilchik River	Ft Richardson	2005		114,984	HI				Cook Inlet	2,3H ^e
2004	Ninilchik River	Ft Richardson	2006		113,974	HI				Cook Inlet	2,3H
Seward Lagoon											
2001	Crooked Creek	Elmendorf	2002		100,314	VOL				Resurrection Bay	2,5H3
2002	Crooked Creek	Ft. Richardson	2003		109,976	HI				Resurrection Bay	2,5H
2003	Crooked Creek	Elmendorf	2004		109,600	VOL				Resurrection Bay	2,5H
2003	Crooked Creek	Ft. Richardson	2005		114,847	HI				Resurrection Bay	2,5H ^e
2004	Deception/Crooked Crs	Ft. Richardson	2006		116,826	HI				Resurrection Bay	2,5H
2004	Ship Creek ^h	Ft. Richardson	2006		109,795	HI				Cook Inlet	2,3H ^h
Ship Creek											
1993	Ship Creek	Elmendorf	1994	31-23-12	199,830	M-R	44,138	42,864	21.50%		
1994	Ship Creek	Elmendorf	1995	31-24-28	218,487	M-R	40,764	38,570	17.70%		
1995	Ship Creek	Elmendorf	1996	31-25-08	231,444	M-R	41,221	40,109	17.30%		
1996	Ship Creek	Elmendorf	1997	31-25-56	326,371	M-R	40,522	40,319	12.36%		
1997	Ship Creek	Elmendorf	1998	31-26-30	204,741	M-R	42,073	41,565	20.30%		
1998	Ship Creek	Elmendorf	1999	31-01-42	197,168	M-R	44,265	42,262	21.44%		
	Ship Creek	Elmendorf	2000-01 ⁱ								
2001	Ship Creek	Elmendorf	2002		290,501	VOL				Ship Creek	2,4H4
2002	Ship Creek	Ft Richardson	2003		329,416	HI				Cook Inlet	2,3H
2002	Ship Creek	Ft Richardson	2004		209,060	HI				Cook Inlet	2,3H ^g
2003	Ship Creek	Elmendorf	2004		111,166	HI				Cook Inlet	2,3H
2003	Ship Creek	Ft Richardson	2005		344,191	HI				Cook Inlet	2,3H ^e
2004	Ship Creek	Elmendorf	2005		13,838	VOL					
2004	Ship Creek	Ft Richardson	2006		60,412	HI				Cook Inlet	2,3H
2004	Ship Creek ^h	Ft Richardson	2006		115,643	HI				Prince William Sound	2,4H ^h

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Appendix A2.-Page 6 of 6.

Brood Year	Broodstock	Hatchery	Release Year	CWT Code	Total Released		Coded Wire Tagging			Thermal Marking	
					Estimate	Type of Estimate ^a	Clipped Fish Released ^b	Tagged Fish Released	Percent Tagged	Mark Group	Hatch Code
Valdez Area											
1998	Deception Cr	Ft Richardson	1999	31-26-22	49,353	TI	46,528	45,923	93.05%		
1999	Deception Cr	Elmendorf	2000	31-01-37	115,582	M-R	41,728	41,060	35.52%		
2000	Deception Cr	Elmendorf	2001	31-02-39	94,701	HI	44,418	43,974	46.43%		
2001	Deception Cr	Ft Richardson	2002	31-02-58	107,861	HI	43,833	42,650	39.54%	Prince William Sound	2,4H
2002	Deception Cr	Ft Richardson	2003		109,661	HI				Prince William Sound	2,4H
2002	Deception Cr	Ft Richardson	2004		99,464	HI				Prince William Sound	2,4H ^g
2003	Deception Cr	Ft Richardson	2005		143,209	HI				Prince William Sound	2,4H ^c
2004	Ship Creek	Ft Richardson	2006		112,221	HI				Prince William Sound	2,4H
Whittier Area											
1998	Deception Cr	Ft Richardson	1999	31-26-24	49,797	TI	45,023	43,897	88.21%		
1999	Deception Cr	Elmendorf	2000	31-01-39	119,389	M-R	43,551	42,898	35.93%		
2000	Deception Cr	Elmendorf	2001	31-02-40	95,823	HI	42,800	42,458	44.31%		
2001	Deception Cr	Ft Richardson	2002	31-02-59	109,763	HI	45,854	44,799	40.81%	Prince William Sound	2,4H
2002	Deception Cr	Ft Richardson	2003		109,700	HI				Prince William Sound	2,4H
2002	Deception Cr	Ft Richardson	2004		107,705	HI				Prince William Sound	2,4H ^g
2003	Deception Cr	Elmendorf	2004		20,906	VOL				Prince William Sound	2,4H
2003	Deception Cr	Ft Richardson	2005		118,059	HI				Prince William Sound	2,4H ^c

^a M-R is mark-recapture; TI is tagging inventory count; HI is hatchery inventory count; VIS is a visual estimate; VOL is volumetric estimate.

^b Beginning in 2005, number of adipose clipped fish released is adjusted to reflect percentage of acceptable fin clips observed at release.

^c Corrections for release numbers reported in the 1999 report.

^d See 2001 - 2003 marking report for altered mark details.

^e See 2005 marking report for altered mark details.

^f Not sampled for long-term CWT retention or finclip quality at release. CWT data are based on overnight tag retention and acceptable finclip rates.

^g See 2004 marking report for altered mark details.

^h Because of a BKD infection, release groups were switched at release in order to stock healthier fish at brood source release sites.

ⁱ Stocking continued, but releases did not contain tagged or thermally marked fish.