

Annual Report 2006

Project No. 1982-013-03  
Annual Stock Assessment - CWT (USFWS)

By  
Stephen M. Pastor

U.S. Fish and Wildlife Service  
Columbia River Fisheries Program Office  
1211 SE Cardinal Court, Suite 100  
Vancouver, WA 98683  
January 2008

Funded By  
Bonneville Power Administration

## INTRODUCTION

In 1989 the Bonneville Power Administration (BPA) began funding the evaluation of production groups of juvenile anadromous fish not being coded-wire tagged for other programs. These groups were the "Missing Production Groups". Production fish released by the U.S. Fish and Wildlife Service (USFWS) without representative coded-wire tags during the 1980s are indicated as blank spaces on the survival graphs in this report. This program is now referred to as "Annual Stock Assessment - CWT"

The objectives of the "Annual Stock Assessment" program are to:

- estimate the total survival of each production group,
- estimate the contribution of each production group to fisheries, and
- prepare an annual report for USFWS hatcheries in the Columbia River basin.

Coded-wire tag recovery information will be used to evaluate the relative success of individual brood stocks. This information can also be used by salmon harvest managers to develop plans to allow the harvest of excess hatchery fish while protecting threatened, endangered, or other stocks of concern.

All fish release information, including marked/unmarked ratios, is reported to the Pacific States Marine Fisheries Commission (PSMFC). Fish recovered in the various fisheries or at the hatcheries are sampled to recover coded-wire tags. This recovery information is also reported to PSMFC.

This report has been prepared annually starting with the report labeled "Annual Report 1994". Although the current report has the title "Annual Report 2006", it was written in January 2008 using data available from RMIS that same year. The main objective of the report is to evaluate survival of groups which have been tagged under this ongoing project.

## METHODS

The Annual Stock Assessment Report reports coded-wire tagging for the most recently completed contract period, and evaluates the survival and contribution of fish tagged, raised and released at National Fish Hatcheries in the Columbia River Basin.

Release information used in this report is collected with the U.S. Fish and Wildlife Service Columbia River (information) System (CRiS). Information prior to the Columbia River Basin wide implementation of CRiS, and from USFWS hatcheries in Idaho, is obtained from the interagency Regional Mark Information System.

Lists of coded-wire tags are obtained from the CRiS sr80s file by use of the CWTetc program. Recovery information is obtained from the PSMFC Regional Mark Information System (RMIS) coded-wire tag database web site. This database is continuously being updated by the contributing agencies, and the updates are reflected annually in this report. Coded-wire tag recovery information is retrieved in the TS1 format. The TS1 report contains both the observed number of recoveries, and the estimated number of recoveries based on the sampling rate.

TS1 reports were downloaded from RMIS in Fall of 2007. These TS1 reports are downloaded in ASCII format. A dBASE V program transforms these ASCII files into a single dbf file.

A Stock Assessment Reference Document is prepared for each hatchery, brood year, and species. Because many fish were released without representative coded-wire tags before the Annual Stock Assessment program began, a single Production Expansion Factor (PEF - the total number of fish released divided by the total number of tagged fish released) is calculated for each hatchery, brood year, species, and stage of fish released. This PEF is used to expand estimated recovery information for non coded-wire tagged fish released along with tagged fish, and to determine the overall contribution and survival rate for each facility.

Until the late 1990s, the adipose fin was removed from all fish receiving a coded-wire tag. The missing adipose fin facilitated the recovery of tags from returning or harvested jacks and adults.

In the late 1990s the goal of protecting weak, threatened, or endangered populations of fish, while maintaining fisheries on healthy populations, led to the removal of the adipose fin from most hatchery fish. The "mass marking" of hatchery steelhead, coho, and Chinook makes it possible to harvest only hatchery fish. Wild fish with adipose fins are not harvested in "selective fisheries". In order to assess the success of selective fisheries, some hatchery fish are given a coded-wire tag and the adipose fin is not removed. Fish without adipose fins may be harvested at different rates than fish with adipose fins. A new program that expands the recoveries for each coded-wire tag, rather than as an aggregate, was written. This program is used for most of the most recent brood years, and has now been used for many older brood years beginning with brood year 1990.

Stock Assessment Reference Summary printouts list the following information for each brood year, species, hatchery, and stage released at the hatchery: release information, the total number of observed recoveries, where recoveries occurred, the number of expanded recoveries from the PSMFC TS1 report, the number of recoveries expanded to include unmarked fish released, and a summary of where fish were recovered. The most recent brood years have been reprocessed, and all brood years for all hatcheries and species are included in this report. Text describing the major attributes of the contribution for each hatchery, species, and brood year is prepared and included in the report. Graphs of survival and relative proportion of recoveries in major areas are prepared and included in the report.

"Residualized" fish, or "mini-jacks" from yearling releases, are not included in estimates of survival.

## **RESULTS**

In calendar year 2004 the USFWS Columbia River Fisheries Program Office marked 279,197 fish under the "Annual Stock Assessment" program. Over 400 returning fish with "Annual Stock Assessment" coded-wire tags were recovered at USFWS hatcheries in 2004, and processed at USFWS fisheries offices.

In calendar year 2005 226,202 fish were coded-wire tagged under the "Annual Stock Assessment" program. That same year, over 403 returning fish with "Annual Stock Assessment" coded-wire tags were recovered at USFWS hatcheries.

Four hundred six "Annual Stock Assessment" tags were recovered at National Fish Hatcheries in 2006, while the number of fish tagged under this program was 200,289.

A brief description of the estimated survival and contribution for each species raised and released at national fish hatcheries follows. These descriptions are followed by graphs for each hatchery and species.

## Carson National Fish Hatchery

Carson National Fish Hatchery (NFH) is located 13 miles northwest of Carson, Washington, at the confluence of the Wind River and Tyee Springs (River Mile 18), at 1,180 feet above sea level. Carson NFH began operation in 1938 by rearing and releasing fall Chinook salmon and trout.

In 1956, the hatchery was remodeled under the Mitchell Act. Construction of a fish ladder at Shipperd Falls (River Mile 2.1) in 1955 made it possible for spring Chinook to pass upstream to the hatchery. Trapping of spring Chinook at Bonneville Dam began in 1955, after Washington shore trapping facilities were completed, and continued through 1961. Those trapped fish were used to establish the Carson run of spring Chinook in the Wind River. Other species such as steelhead, brook trout, rainbow trout, kokanee, and coho have also been raised at Carson. Coho were raised as late as 1981. Current production involves adult collection, egg incubation and rearing of spring Chinook salmon.

Brood year 1982 to 1985 spring Chinook from Carson were marked with coded-wire tags for a density study. The average total survival of these brood years is 0.22%. The majority of off station recoveries were in the freshwater sport fishery. There were an estimated 20 recoveries of brood year 1982 and 1983 fish in Canadian waters. An estimated 43 recoveries of brood year 1985 fish occurred in ocean fisheries in Alaska, Canada, and Washington.

Because of a WDFW fish marking study at Carson, WDFW sampled returning adults and originally reported recoveries for return years 1993 through 1996. During the change over from format 3.2 to 4.0, USFWS reported these recoveries.

The survival rate for Carson brood year 1988 is 0.4044% using the rd2 program which expands each coded-wire tag, rather than using a PEF, and including one additional expanded freshwater sport recovery reported by WDFW. The majority of contribution to fisheries was in the Columbia River freshwater sport, expanded to 5,339. Recoveries in the treaty ceremonial fisheries were expanded to a catch of 1,023.

Brood year 1989 was also part of the fish marking study conducted by WDFW. The estimated survival for this brood year is 0.1368%, less than a third of the previous brood year. The majority of fish taken off station (2,095) were taken in the freshwater sport fishery reported by WDFW. Two observed recoveries in the Washington ocean troll fishery were expanded to a total of 12 fish caught.

The survival rate for brood year 1990 is 0.0778%, a total of 1,801 fish from a release of over 2 million. A third of the fish entering the Columbia River were harvested before reaching Carson. Most of these recoveries, estimated at 125, were freshwater sport reported by WDFW. Treaty ceremonial fishery recoveries reported by ODFW show 32 fish taken, followed by 27 in the Columbia River sport fishery.

Brood year 1991 survival is now estimated to be 0.0239%. This is less than brood year 1990 and the lowest to date. The largest off station take of fish was the ODFW reported treaty ceremonial harvest of 69 fish. Four fish were recovered in WDFW spawning ground surveys, expanded to 12. This was the last brood year for the WDFW mark study.

Survival for brood year 1992 is 0.6145%, the highest since brood year 1988. An estimated 82 fish were harvested in the California ocean troll fishery, an unusual event. Since all of the coded-wire tags released with brood year 1992 were used for a density study, none of the tag codes represents the majority of fish released. Recoveries for this brood year at Carson NFH were originally reported by WDFW.

The 1993 brood year now has the fifth highest survival for this hatchery at 0.4371%. An estimated 42 fish were harvested in the California ocean troll fishery as jacks. The harvest of these fish off of California occurred the

same year as the harvest of 82 fish from brood year 1992. WDFW freshwater sport fishery recoveries are expanded to a harvest of 4,494 fish, nearly as many as returned to the hatchery. Since all of the coded-wire tags released with brood year 1993 were used for a new density study, none of the tag codes represents the majority of the fish released.

Brood year 1994 survival is now estimated at 0.1243%. There are an expanded 882 fresh water sport recoveries, 1,082 expanded returns to hatcheries, and 165 expanded spawning ground recoveries. This equals a total of 2,141 expanded recoveries for the 1994 brood year.

There are an additional 4 PSC expanded WDFW freshwater sport recoveries this year, increasing the estimated survival for brood year 1995 to 0.3770%, in the upper third of successful brood years for Carson NFH. There have been an estimated 997 expanded off station recoveries from these fish, all in the Columbia Basin.

The estimated survival for brood year 1996 is 1.1039% with an estimated 9,097 off station recoveries, and 10,047 returns to the hatchery. This brood year is one of the most successful yet for Carson NFH. Over seventy-five hundred fish were harvested in the WDFW reported freshwater sport fishery. The second greatest harvest was for treaty ceremonial (859).

Brood year 1997 has one of the highest survival rates yet for Carson NFH spring Chinook at 1.2826%. Over ten thousand fish were harvested in the Columbia River, including eighty two hundred in sport fisheries, and 1,353 in the Columbia River gill net fishery, and 259 for treaty ceremonial. Fourteen fish were also harvested in British Columbia.

Brood year 1998 total survival is estimated to be 1.3635%. Nearly twelve thousand fish were harvested in the Columbia River Basin. The majority of the harvest was sport - over ten thousand - followed by a gill net harvest of 1,960.

The estimated survival for brood year 1999 is 1.446%, which is nearly equal to that of the 1998 brood year. Nearly thirteen thousand four hundred fish were harvested in the Columbia River with a sport harvest of 9,450

With additional Age5 FWS and WDFW recoveries brood year 2000 Carson fish have an overall survival of 0.6900%. This brood year contributed seven thousand one hundred twenty-two to Columbia River fisheries: 1,200 in the gill net fishery, nearly six thousand to fisheries within the Columbia Basin. An additional 26 fish were taken in both the Treaty Ceremonial, and Ocean Troll fishery in Canada. Coded-wire tag recoveries expand to a return of 2,949 fish to Carson NFH, close to the Age Composition derived estimate of 3,044.

Survival for brood year 2001 is currently estimated at about 1/3 of that of the previous brood year at 0.2462%. Approximately two thirds of this return was harvested within the Columbia Basin.

## **Dworshak National Fish Hatchery**

Dworshak NFH is located at the confluence of the North Fork Clearwater River and the main stem Clearwater River about three miles west of Orofino, Idaho, at 1,000 feet above sea level. Dworshak NFH first began operations in 1969 rearing summer steelhead and resident trout to mitigate for fish lost by construction and operation of Dworshak Dam. The facility was expanded in 1982 under the Lower Snake River Compensation Program (LSRCP) to rear spring Chinook salmon. The hatchery is now used to produce spring Chinook and summer steelhead.

### **Spring Chinook**

Total recoveries for brood year 1985 were 0.0201%, the first release of 100% Rapid River stock. The brood year 1986 yearling release resulted in an estimated 2,595 fish, or 0.2306%.

Twelve different coded-wire tag groups were released with brood year 1987. Only three were in yearling fish released at the hatchery. Coded-wire tag release information was obtained from the StreamNet Distributed System. Total survival is estimated at 0.0041%. The ODFW reported freshwater sport harvest took an estimated 13 fish.

Overall survival for brood year 1988 is now 0.0605%. This brood year contributed mainly to the treaty ceremonial fishery in the Columbia River.

Yearlings from brood year 1989 survived only half as well as brood year 1988. A total of 70 fish were harvested in the Columbia basin, and 3 were recovered at WDFW hatcheries. Fifty-two fish were taken in the treaty ceremonial fishery. Overall survival is 0.0353%.

Coded-wire tag information for brood year 1990 was obtained from the StreamNet Distributed System. Total estimated survival for this brood year was 0.0027%, or 26 fish from a release of almost 960,000. The treaty ceremonial fishery reported by ODFW took two fish from this brood year.

Brood year 1991 has an estimated overall survival rate of 0.0021%, the lowest of tagged brood years in this report. There was only one off station recovery from this brood year.

All brood year 1992 spring Chinook released at Dworshak were represented by coded-wire tags, so the rd2 program was used to estimate the total survival of 0.0584%. An estimated 78 fish, or 10% of the total, were recovered at a variety of Columbia River Basin sites other than Dworshak.

Two additional recoveries increase brood year 1993 survival to an estimated 0.0721%, or 945 fish. The rd program was used since fish unrepresented by coded-wire tags were released. There were an estimated 725 recoveries off station, with 4 in Alaska and 4 in British Columbia ocean fisheries. This brood year also provided an estimated 177 fish for treaty fisheries.

Estimated survival for brood year 1994 is 0.0369% using the rd2 program. This is only an estimated 38 total recoveries from a low egg take, and the subsequent release of 100,775 fish. Nevertheless, to date this survival is in the middle of survivals for Dworshak spring Chinook. The largest number of recoveries was in the IDFG reported freshwater sport category. There were also 3 expanded recoveries in the Alaska ocean troll fishery. There was only 1 FWS reported recovery from this brood year, and it occurred at Warm Springs NFH. Four age-2 recoveries at Dworshak are not included in the report.

The record high 0.9985% estimated survival for brood year 1995 is somewhat mitigated by the low number of fish released from this brood year - 53,078. This is a reflection of the fact that only 125 spring Chinook returned to Dworshak in 1995. Only an estimated 530 fish were recovered from this brood

year.

The estimation of survival for brood year 1996 is 0.0979%. Columbia River sport (429), treaty ceremonial (228) and gill net (147) fisheries took more fish than are currently in the RMIS database for recoveries at FWS hatcheries.

Brood year 1997 has an estimated survival of 0.5363% even with only 5 estimated recoveries of coded-wire tagged fish at National Fish Hatcheries, a record. The contribution to freshwater fisheries was over fifty-five hundred fish. Fish from this brood year (29) were even caught by ocean trollers as reported by ODFW.

Brood year 1998 has the highest survival rate to date at 0.8582%, and a total of 8,711 fish. Columbia River sport and gill net fisheries took over forty-seven hundred fish in 2004 and 2005. Fish (24) were also caught by Alaskan ocean troll fishers.

With the addition of FWS hatchery recoveries from 2003, brood year 1999 survival is higher than average at 0.1009%. Gill net and sport recoveries in the Columbia River Basin account for all off station recoveries.

Survival increases again for brood year 2000, even without any reported FWS recoveries for 2004.

### **Summer Steelhead**

Total survivals for brood years 1980, 1981, and 1982 were 2.9305%, 1.2033%, and 0.3813% respectively. Although the Stock Assessment printout shows 0 Escapement to NFH, this results from the fact that Idaho Department of Fish and Game (IDFG) reported hatchery recoveries at Dworshak NFH in the early 1980s.

Tagged fish from brood year 1983 (release year 1984 with CWTs 051335, 102516, and 102517) are listed as "Off-site direct hatchery release" in the StreamNet database.

No coded-wire tagged fish were released on site in brood year 1983 or 1984.

Survival for brood year 1985 has stabilized at 1.1867%. Over 5,400 fish were taken in the Columbia River gill net fishery, and over 4,100 were taken in the freshwater sport fishery reported by Idaho.

Brood year 1986 has an overall recovery rate of 1.9046%. This brood year contributed mainly to the freshwater sport fishery in Idaho. Many of these steelhead were also recovered in the Columbia River gill net fishery.

Total survival rate for brood year 1987 is 1.0603%. Six fish were taken in British Columbia ocean trolling, but the great majority of fish (8,324) were recovered in the Columbia River basin. The majority of "Columbia River" harvest was in the ODFW reported gill net fishery (4,124), and the IDFG reported freshwater sport fishery (3,816).

Brood year 1988 summer steelhead yielded 492 observed recoveries with an overall estimated survival rate of 0.5579%. The vast majority of fish recovered off station were taken in the Columbia River gill net fishery (2,696), followed by the Columbia River sport fishery (576). IDFG reported freshwater sport recoveries expanded to 184 fish. There was 1 observed recovery of an age-2 fish in the squid gill net by-catch and foreign research vessel records reported by National Marine Fisheries Service (NMFS)

Overall survival for brood year 1989 is 0.8264%. Most fish were taken in the Columbia River gill net fishery (3,714) out of a total of 4,907 fish taken in the various Columbia freshwater and estuary fisheries. Sixty-three fish were taken off the coast of British Columbia. IDFG recoveries are expanded to 244.



Brood year 1990 release data were obtained from the StreamNet database. Except for one different date, 90 additional fish, and a significant difference in the total weight of fish released, StreamNet records are similar to those originally reported for releases at the hatchery. The total survival rate is 0.4821% or 5,750 fish. Most of the harvested fish were taken in the Columbia River gill net fishery (2,575). Twenty-five fish were also taken in the Oregon ocean sport fishery.

Total survival for brood 1991 is 0.2388%, near the bottom of survival rates for Dworshak steelhead. A total of 2,923 fish survived from this brood year. Seventy-five fish were harvested in the Quinault reported coastal gill net fishery. ODFW reports Columbia River gill net and sport harvest of 984 and 149 fish, and another 328 fish as freshwater sport.

Survival for brood year 1992 is now estimated to be 0.2259%, using the rd2 program. Twenty-nine percent of the fish were recovered before returning to the hatchery. Off station recoveries occurred in the Columbia River gill net and freshwater sport fisheries of all three Northwestern states, with Washington reporting the largest share.

The current estimated survival for brood year 1993 is 0.218%, the third lowest to date. All reported off station recoveries were within the Columbia River basin, and 643 fish were harvested there, mostly in sport fisheries.

Observed recoveries for brood year 1994 are expanded to a total of 1,065 estimated recoveries or 0.0878% by the rd2 program. More fish were recovered off station (769) than returned to the hatchery, according to coded-wire tag recoveries.

Survival for brood year 1995 is about half that of the previous brood year, or 0.0441%.

With no reported FWS hatchery recoveries, brood year 1996 has a total estimated survival of 0.0744 from 0.0808% in the previous report. Nine observed fresh water sport recoveries previously reported by IDFG are no longer in RMIS.

When this report was prepared last year there were no age 5 recoveries in RMIS, and, more importantly, there were no reported recoveries at any hatchery of any age, including Dworshak. Age 3, 4, and 5 recoveries are now in database, and allow a more accurate estimation of total survival for brood year 1997, a total of 4,325 fish. WDFW reported fresh water sport fisheries recoveries are equivalent to 772 fish. Next in magnitude is the Columbia River gill net fishery with 438, all at age 3. Recoveries in other within basin sport fisheries equaled 268.

Due to continuing irreconcilable differences between original and RMIS reporting, original CRiS records for all subsequent brood years will be stored in the CRiS data file srDwor, and replaced with records from RMIS.

FWS recoveries for brood year 1998 at Dworshak are in now in RMIS giving an above average survival of 0.8582%. Columbia River gill net (2,282) and sport fisheries (2,440) harvested the great majority of fish from this brood year. Alaska ocean trollers also took 24 fish.

Survival for brood year 1999 is 0.1009%, equal to 336 fish out of 125,452 released. Approximately one third of recoveries were in sport fisheries in the basin and the gill net fishery.

The absence of any age 4 recoveries at Dworshak makes it impossible to accurately estimate survival of brood year 2000. The initial estimate is 0.2960%.

## **Eagle Creek National Fish Hatchery**

Eagle Creek National Fish Hatchery is located about seven miles from Estacada, Oregon, on Eagle Creek, approximately ten miles above its confluence with the Clackamas River at an elevation of 950 feet. The hatchery was authorized by the Mitchell Act of 1938 (52 Stat. 345), as amended in 1946.<sup>4</sup> The hatchery was constructed in 1956, and is currently operated as part of the Columbia River Fishery Development Program administered by NOAA - Fisheries. Two ladders enable fish to ascend Eagle Creek. The lower or Dywer Falls, 6 feet high and 5 miles above the mouth, was laddered by USFWS in 1958. An inadequate ladder on the 10 foot high middle falls, 9 miles above the mouth, was replaced with a new ladder in 1956.<sup>11</sup>

Although Eagle Creek NFH has raised fall and spring Chinook in past years, production is now limited to coho and winter steelhead. Steelhead are no longer being coded-wire tagged to assess contribution because of the low rate of recovery sampling in Eagle Creek and the Clackamas and Willamette Rivers; however, coded-wire tagging of steelhead occurred recently for brood years 2004-2006 as part of a USFWS rearing density study.

### **Coho**

Coded-wire tags were used in a multiple year density study including brood years 1979, 1980 and 1981. Brood year 1980 survival rate was 1.3546%, and brood year 1981 survival was 1.0413%. Oregon ocean fisheries took nearly four times more fish than Washington ocean fisheries in brood year 1980. Brood year 1981 had an almost even split between the two fisheries.

No coded-wire tags were released in brood years 1982 through 1987.

The estimated total recovery from brood year 1988 was 42,345 fish, or 4.181% when using a PEF. Nearly three hundred thousand of the coho released were from the Sandy Hatchery, and these fish did not have a unique coded-wire tag. This is highest survival rate on record for Eagle Creek coho. This brood year contributed 11,340 fish to the Oregon ocean fisheries, and 8,930 were harvested in the Columbia River fisheries.

The 1989 brood year coho survival rate was 0.9446%, about one quarter of the very high 4.181% survival rate of brood year 1988 coho. Over 3,800 of the coho from this brood year were caught off the Oregon coast in the sport and commercial fisheries. Eighteen hundred were harvested in the ocean off Washington, and 200 off California. Over 200 fish were taken in British Columbia. Eight hundred twenty were also harvested in the Columbia River.

Brood year 1990 coho has only 31 observed recoveries and an overall survival rate of 0.1228% making this the lowest survival rate since coded-wire tagging has been done consistently. Fish from Big Creek and Sandy were released along with Eagle Creek fish this year. Fewer than 600 fish were taken in the ocean, and 310 in the Columbia River. Five hundred of the ocean recoveries were reported by WDFW. The remaining 96 were split evenly between Oregon and California. Coded-wire tagged returns to the hatchery were estimated to be less than the ocean harvest of this brood year.

Total survival rate for brood year 1991 coho is estimated to be 0.3402%. Fish from the ODFW Sandy hatchery were released this year, so even though all fish were assigned to a coded-wire tag, they are not truly representative. Only 137 fish were harvested in the ocean (91 by British Columbia and 46 by Washington), and 205 in the Columbia River. Escapement to the hatchery was about 3,300 fish. Although this brood year did better than the 1990 fish, it was much less successful than 1980, 1981, 1988 or 1989.

Brood year 1992 survival rate is estimated at 0.4758%, an improvement over the previous two broods, but still below average for broods in the 1980s. Escapement to the hatchery made up the largest segment of fish recovered, as was also the case for brood year 1991. Washington ocean fisheries took 750

fish and Oregon ocean fisheries harvested 277 fish. An additional 197 fish were taken in the Columbia River.

Brood year 1993 releases included both forced and volitional releases of Eagle Creek stock and Toutle stock coho. Expansion of individual coded-wire tags rather than using a PEF yields a total survival of 0.2375%, placing this brood year in the lower third of survival rates. There were an estimated 121 recoveries in the Columbia River, and 358 in the ocean off of British Columbia and Washington.

Total survival for brood year 1994 was even lower at 0.1758%. WDFW reported ocean recoveries result in an ocean harvest of 263 fish, with 66 fish harvested in the Columbia River estuary sport fishery.

Brood year 1995 was the first brood year at Eagle Creek in which coho production was "mass marked" with an adipose fin clip. A small number of fish were not adipose fin clipped, but received a coded-wire tag. Since externally marked fish may be harvested at a different rate than the unmarked fish, recoveries have been expanded for each coded-wire tag, rather than with a PEF. WDFW Columbia River estuary sport now has an additional 4 expanded recoveries. Survival is now estimated to be 2.1002%, in the upper third of brood years.

A doubling of ODFW reported Columbia River gill net fishery recoveries increases total survival for Eagle Creek brood year 1996 coho to 1.7191%, putting this brood year in the upper half when ranked by survival. Two thousand five hundred forty-nine fish were harvested in the ocean and 1,586 in the Columbia River.

A recalculated expansion for recoveries at the hatchery, plus other changes in reporting results in an estimated survival of 3.9776% for Eagle Creek brood year 1997 coho. Only brood years 1998 and 1988 are higher. Over fifty-two hundred fish were harvested in the ocean, almost equally divided between Oregon and Washington with an additional 95 recoveries estimated for California ocean sport fisheries.

An adjustment to the expansion rate of NFH recovered tags increases the estimate of survival for brood year 1998 to a record 4.9126%. This new hatchery return rate is closer to the rate determined with the Age Composition Analysis of the two return years. Over eighty-five hundred fish were taken in WDFW ocean fisheries, and over fourteen hundred in ODFW reported ocean fisheries. This gives a total of 9,965 fish harvested in the ocean. Additionally, ODFW had reported that an additional eighty-five hundred fish were taken in the Columbia River.

The survival rate for brood year 1999 is a very respectable 1.9272%. Ocean recoveries (883) were almost evenly split between Oregon and Washington, but most of the harvest occurred in the Columbia River (1,380). Expansion of CWT recoveries shows a return to the hatchery of 11,457 fish.

There were 511 observed recoveries of coded-wire tags from brood year 2000, which when expanded give a total survival rate of 1.5508%, a small reduction since last year. This is about average for Eagle Creek NFH coho. Most of hatchery recoveries were in the Columbia River gill net and estuary (472). Ocean fishery reports account for 524 expanded recoveries: 301 in Oregon, and 223 in Washington. Over seven thousand fish returned to the hatchery.

Eagle Creek had been releasing around one million coho per year since at least the early 1980s. Because of limited harvest opportunities, however, the production goal was reduced to 500,000. The 2000 brood year was the first year this new goal was implemented.

Brood year 2001 survival is estimated to be 1.2103, which is about average. Ocean harvest was split 374 to 256 for Washington and Oregon respectively.

An estimated survival of 1.5391% means that brood year 2002 was slightly below

average. This brood year contributed nearly 600 fish to ocean fisheries, and about five hundred to Columbia River harvest. Meanwhile the expanded recoveries at Eagle Creek were 7,480, while actual counts at the hatchery give a return of ninety-five hundred.

## Entiat National Fish Hatchery

Entiat NFH is located on the Entiat River, west of Entiat, Washington. Elevation is 980 feet above sea level. Construction began in 1940 under the Grand Coulee Fish Maintenance Project and operations began a year later. Present production at the hatchery consists of adult collection, egg incubation, and rearing of spring Chinook salmon. As of 2005 Entiat NFH is in the fourth year of spawning and incubating Coho eggs for the Yakama Nation.

Yearling spring Chinook at Entiat were coded-wire tagged beginning with brood year 1988. Expanded off station recoveries include 57 in the treaty ceremonial fishery and 6 in the Columbia River sport fishery. Expanding CWT recoveries for brood year 1988 gave an estimated survival of 0.1023%, about average for this hatchery and species. Eggs from Winthrop NFH were raised and released at Entiat as part of this brood year.

There were 56 observed recoveries of the 111,207 tagged fish released with brood year 1989. Expansion of these recoveries yields an overall survival rate of 0.0519%. Seven fish were taken in the Columbia River sport fishery. Production for this brood year included fish raised from eggs transferred from Leavenworth NFH.

There were only four observed recoveries from the 95,682 tagged fish released with brood year 1990. Using the rd2 program yields an estimated total survival of 0.0047% for this brood year, the worst survival on record for Entiat spring Chinook. All recoveries were at the hatchery.

Brood year 1991 was a bit more successful than the previous brood year with a total survival rate of 0.0279%, using the rd2 program. Nine fish were taken in the Columbia River treaty ceremonial fishery. All observed (28) recoveries were of age-4 fish.

A total recovery rate of 0.0346% puts brood year 1992 third from last when ranked by survival rate for yearling releases at Entiat. The freshwater fish trap category accounts for most of the off station recoveries, although there were also a few treaty ceremonial and WDFW hatchery recoveries.

Total survival for brood year 1993 was 0.0383%, better than the previous two brood years, but still ranking as fourth worst. Five coded-wire tagged fish were recovered in fish traps. While most returned to the Entiat, an estimated 19 total fish were recovered at WDFW hatcheries.

The yearling release for brood year 1994 included fish received as eggs from Leavenworth NFH. Total survival was estimated to be 0.0667% with an estimated 10 non-hatchery recoveries. This survival rate is in the middle of Entiat yearling spring Chinook survivals.

The estimated total survival for brood year 1995 is 0.3282%. There were 3 ODFW reported ocean troll recoveries and 8 recoveries in the Columbia Basin. WDFW hatchery recoveries were at Wells. Brood year 1995 is in the top fourth of survivals

Brood year 1996 has provided a high estimated survival for Entiat NFH spring Chinook, now at 0.5855%. This was in spite of the use of a blank coded-wire tag for 16,053 of 124,536 yearling fish released. This blank wire could yield no off station recoveries. There were three expanded ocean recoveries, this time reported by British Columbia. Treaty ceremonial and sport recoveries were the next two highest off station recovery categories with an estimated 54 and 36 recoveries respectively. As usual the lion's share of recoveries (91%) was at Entiat NFH.

Entiat brood year 1997 currently has yielded an estimated total survival of 0.7732%, the highest to date for Entiat. Off station recoveries were mostly in the ODFW reported Columbia River sport (211) and gill net (211) fisheries. There were also an estimated 11 treaty ceremonial recoveries.

The third highest number of recoveries now comes from brood year 1998: an estimated 2,067 recoveries and a survival rate of 0.5747%. Most non station recoveries were in the ODFW reported Columbia River gill net fishery (357), followed by the Columbia River sport fishery (94).

Brood year 1998's survival of 0.5747% puts it in third place for overall survival of Entiat brood years. Four hundred ninety-three fish were harvested in the Columbia River with 357 in the gill net fishery and 94 in sport fisheries.

Survival falls to less than one fifth of the previous year for brood year 1999 at 0.089%. An estimated 33 fish were recovered off station: 11 in spawning ground surveys, 13 in the Columbia River gill nets, and 19 in sport fisheries.

Although survival for brood year 2000 rises to 0.1591, it is still below the average of 0.17%. Gill net and sport fisheries were responsible for recovery of 95 fish: 55 and 40 respectively. An estimated 12 fish were found in spawning ground surveys.

Fish from brood year 2001 had a survival of 0.2050%, which is above average. An estimated 637 fish returned to the hatchery, another 109 were taken in Columbia Basin sport fisheries, and another 54 in gill nets.

## **Kooskia National Fish Hatchery**

Kooskia NFH is situated along Clear Creek, just upstream of the confluence with the Middle Fork Clearwater River, approximately 75 miles southeast of Lewiston, Idaho, at an altitude of 1,295 feet. The hatchery was authorized in 1961, first operated in 1969, and is currently used for adult collection and rearing of spring Chinook salmon.

Only two broods during the 1980s received tag codes at Kooskia. An age-0 release of brood year 1980 fish contained an IDFG tag code. Fish raised at Kooskia were released at Dworshak NFH with an IDFG tag code. Fish from Hagerman NFH were released at Kooskia in 1983.

Brood year 1988 fish at Kooskia were the first fish to be marked under the Missing Production Group program. Total survival for brood year 1988 was 1,083 fish, or 0.2683%. Treaty ceremonial fishing took most of the fish harvested off station (156). Nineteen fish were also taken in the ODFW test fishery net.

No tagged fish were released with brood year 1989.

An estimated 77 fish were recovered from brood year 1990, resulting in a survival rate of 0.0106%. Eleven of those fish were taken in the Columbia River sport fishery in 1994.

Total fish released for Kooskia NFH brood year 1991 was 343,437, including coded-wire tag 052925 with 60,585 fish. Current RMIS records show 50,585 fish released with this tag code, making a total release of 333,437. Total recoveries for this brood year consist of a jack and an adult recovered at a national fish hatchery for a survival of 0.0006%.

Fish traps and non-USFWS hatcheries reported the majority of off station recoveries for brood year 1992. An estimated 4 fish were taken in the treaty ceremonial fishery. With 86 recoveries reported by USFWS, total estimated survival rate is 0.0317% using the rd2 program, better than the previous two brood years.

Survival for brood year 1993 is estimated to be 0.0327%, right in the middle of survivals. Nine fish were taken in the California ocean sport fishery, an unusual occurrence. Thirty-two fish were harvested in the treaty ceremonial fishery. Fish without coded-wire tags, but with right ventral fin clips, were also released eight miles above the hatchery.

There were an unusual number of recoveries of spring Chinook in California ocean sport and troll fisheries in 1996. Spring Chinook from Carson, Little White, and Warm Springs were also taken, as were tule fall Chinook from Spring Creek.

There were 8 observed recoveries from the release of 271,681 tagged fish in brood year 1994. The estimated number of recoveries in the ODFW fish trap is 521 from one observed recovery, a very high ratio. No recoveries have been reported from FWS hatcheries. A group of fish was released without a representative coded-wire tag. The PEF for this brood year is 1.23, and leads to a total survival of 0.0027%.

Fewer than 16,500 tagged fish were released in brood year 1995 in a total of 16,598 fish. There is now 1 reported recovery by an IDFG hatchery for a survival of 0.0060%.

With 15 observed recoveries, brood year 1996 total survival is estimated to be 0.0649%, or 28 fish. Ten fish were harvested in the gill net fishery, 8 for treaty ceremonial purposes, and 7 in Columbia River sport fisheries.

Brood year 1997 coded-wire tag release information was obtained from the RMIS database. It is substantially different than numbers reported through CRiS, as noted on the Stock Assessment Reference Summary. Previous numbers will be

replaced with the numbers in RMIS next year.

The survival rates for coded-wire tags in this release are expanded to a record 0.8767% survival for Kooskia NFH, without any FWS reported recoveries. Contributions were made in the following fisheries: Columbia River gill net and sport (1,000 and 865), freshwater sport (109), treaty ceremonial (66). There were 4 PSC expanded recoveries in the Oregon reported non-treaty ocean troll in 2001.

Release numbers in RMIS differ from those reported to CRiS for brood year 1998. Numbers in CRiS have been edited to conform to numbers reported to RMIS. Brood year 1998 has the second highest survival rate for Kooskia NFH spring Chinook at 0.5652%. This is in spite of the fact that there are no FWS recoveries in RMIS. Over eighteen hundred of the 2,064 estimated recoveries occurred in Columbia River gill net (1,085) and sport fisheries (751).

RMIS records for brood year 1999 total 82,974 fish vs 80,430 previously recorded in the CRiS database. Estimated survival for this brood year is 0.1181% with FWS recoveries of jacks and age4 fish now in the RMIS database. The Columbia River gill net took the largest number of fish at 22, and the estimated take in the sport fishery was seven fish.

Brood year 2000 RMIS release records for CWT 054516 appear to include fish released off station, but in Clear Creek (CRiS sr80s Dist-KK). The current survival for this brood year is 0.1828%, with no reported recoveries after 2003 from FWS. Columbia River sport fisheries reported the highest number of recoveries for this brood year, estimated at a total of 432 fish, followed by gill net (365), then freshwater sport at 130.

A similar pattern appears to be emerging for brood year 2001, but at about a tenth of the numbers with 47 in sport and 32 in gill nets. Again, there are no recoveries reported by FWS.



## Leavenworth National Fish Hatchery

Leavenworth NFH is located about four miles south of Leavenworth, Washington, along Icicle Creek, a tributary to the Wenatchee River. Elevation is 1,155 feet. The hatchery was originally authorized in 1937 by the Grand Coulee Fish Maintenance Project and was re-authorized in 1938 by the Mitchell Act. The facility began operations in 1942 and is currently used for producing spring Chinook salmon.

Fish from brood year 1985 were released at Leavenworth with two different tag codes. Fish with those same tag codes were also inadvertently released in the Yakima River, and are therefore not included in this report.

Fish from brood year 1986 were harvested mainly in the freshwater sport (757) and treaty ceremonial fisheries (402). One recovery from the ODFW treaty ceremonial fishery is no longer in the PSMFC database. Total estimated survival is estimated at 0.1174%.

Brood year 1987 spring Chinook salmon released as yearlings have an estimated total survival of 0.2785%. Off station recoveries were mainly in the freshwater sport fishery and treaty ceremonial fishery. Nearly 3,000 fish were taken in the Columbia River. One tag, which was expanded to 28 fish, was recovered in the British Columbia ocean troll fishery. The 1987 brood year spring Chinook released as sub-yearling fingerlings survived at a rate of only 0.0030%. This release of 939,426 fish yielded a freshwater sport catch of 12 fish, and a hatchery escapement of 16 fish.

Brood year 1988 spring Chinook fared quite a bit better than brood year 1987 with an estimated survival rate of 0.4751%. Most fish were taken in the freshwater sport fishery (3,469). In addition, ODFW reported a treaty ceremonial harvest of 1,315. Twenty-five fish were harvested in the WDFW reported treaty troll fishery. Fingerling releases from this brood year survived at an overall rate of only 0.0034%. There were only seven observed recoveries from a release of nearly 300,000 tagged fish.

An agency 63 tag code was released with brood year 1989 age-0 Leavenworth fish raised at Wells State Fish Hatchery (SFH) and returned to Leavenworth for further rearing. These fish survived at a rate of 0.0889%. Using the calculated PEF of 4.41, 13 fish were harvested in the British Columbia ocean troll fishery, 163 in the freshwater sport fishery, and 66 in the treaty ceremonial fishery. However, this PEF includes 400,000 fish released at one-third the size of the fish with the coded-wire tags.

Yearling fish from brood year 1989 survived at a rate of 0.1946%, more than twice the rate for fish released at age-0. The great majority of off station recoveries occurred in the Columbia River sport fishery (1,585). An additional 360 fish were taken in the treaty ceremonial fishery.

Using the rd2 program, rather than the PEF method, the estimated number of fish surviving from brood year 1990 yearlings was only 78 fish from a total release of over 2 million fish, a very low survival rate of 0.0034%. Treaty ceremonial harvest of this brood year is estimated to have been only 23 fish. Age-0 fish released from this brood year had no representative coded-wire tag.

Survival of brood year 1991 is now estimated at 0.0213%, a total of 374 fish, using the rd2 program. This survival is over six times greater than brood year 1990. Fourteen age-4 fish were taken in the ODFW reported treaty ceremonial fishery. Age-0 fish released from this brood year had no representative coded-wire tag. Observed recoveries include age-2 fish recovered at the hatchery, 89. There are fewer PSC expanded recoveries, 82, which does not include these fish.

Survival was up again with a 0.0754% rate for brood year 1992 using the rd2 program. Other than 987 hatchery recoveries, there were 124 fresh water sport recoveries, in addition to treaty ceremonial (32) and Columbia River gill net

harvest (5).

Brood year 1993 survival is now at 0.2748% using the rd2 program, still increasing from the low point of brood year 1990. Only the last three brood years in the 80s had higher survivals. There was a freshwater sport harvest of 1,067, followed by treaty ceremonial (61), and freshwater net (60).

The estimated survival for brood year 1994 is 0.0580%. An estimated 34 fish were recovered in treaty ceremonial fisheries, and 50 in freshwater sport fisheries.

Survival for brood year 1995 is estimated to be 0.1232% with over three hundred fish being harvested off station. Fish were taken in gill net, freshwater sport, and treaty ceremonial fisheries.

Estimated survival for brood year 1996 is 0.3747% in the upper third of survivals. There were 2 recoveries in Alaska, expanded to a total estimated 26. There were also a total of 388 estimated recoveries in the WDFW reported freshwater sport recoveries, and over two hundred each in gill net, spawning ground, and treaty ceremonial fisheries.

Brood year 1997 shows an estimated total survival of 0.7675%, a record setting brood year. The greatest number of fish recovered off station was in the Columbia River sport fishery (2,140). The gill net fishery took an estimated 2,100 fish, followed by recoveries in spawning ground surveys (750), and treaty ceremonial (127).

Slightly lower than the previous brood year at 0.7190%, but still the second highest on file, brood year 1998 contributed about thirty-seven hundred fish to Columbia River fisheries. Thirty-nine fish were harvested in the ocean. A downward adjustment of a CDFO expansion factor reduced this survival in 2006.

The first estimate of survival for brood year 1999 is 0.0718%. This is in the lower third of recorded survivals. Gill net and sport recoveries totaled over 270 fish, and there were an estimated 89 recoveries in spawning ground surveys.

Age 5 returns to Leavenworth from brood year 2000 have appeared in data downloaded from RMIS. Therefore, the total number of fish that were caught or returned to the hatchery is 4,701, equivalent to a survival of 0.3024%. Sixteen hundred fish were taken in the Columbia Basin, in both sport and gill net fisheries. WDFW spawning ground surveys reported an estimated 292 fish. Alaska accounts for 2 observed troll recoveries, equivalent to 5 total fish.

Although age 5 recoveries are not in RMIS, the preliminary estimate of survival is 0.2509% for brood year 2001.

Summer steelhead at Leavenworth have never been marked with coded-wire tags.

## **Little White Salmon National Fish Hatchery**

Little White Salmon NFH is located on the Little White Salmon River, 12 miles east of Stevenson, Washington, at an elevation of 90 feet. The hatchery began operations in 1898 and was remodeled and expanded in 1958 as part of the Columbia River Fishery Development Program (Mitchell Act) administered by NOAA - Fisheries. Current production consists of rearing upriver bright fall and spring Chinook salmon. Coho are raised, but no longer released at Willard NFH, which is administered by Little White Salmon. Willard is listed separately in this document.

### **Spring Chinook**

Both age-0 and yearling spring Chinook have been released from the hatchery. Brood years 1982 through 1984 were coded-wire tagged to evaluate age-0 and yearling releases. Average survival for age-0 fish was 0.11%, compared with an average survival of 0.39% for yearling releases. Columbia River gill nets took a greater proportion of age-0 fish than yearlings (9.7% vs. 3.2%) for these three broods. Release of coded-wire tagged age-0 fish was resumed with brood year 1991.

Marking of spring Chinook resumed for brood year 1988 under the Missing Production Group program. Brood year 1988 fish released at age-0 were not marked. The overall survival rate for yearling fish from this brood year was 1.0457%. Nearly 2,400 yearling release fish were harvested in the Columbia River, with over 1,500 in the WDFW reported freshwater sport fishery alone. Another 730 fish were taken in the treaty ceremonial fishery.

Brood year 1989 shows a total survival of 2,270 fish, or 0.2230%, down from last year with the elimination of an age-2 recovery. Nearly 1,200 fish were taken in the freshwater sport fishery, and 85 in the treaty ceremonial fishery. Age-0 fish were released, but without a coded-wire tag.

The survival rate for brood year 1990 is 0.0155% with no reported off station recoveries. Coded-wire tagged fish from this brood year were released from the Willard NFH facility, (a sub-station located upstream from Little White Salmon NFH) along with a total of 869,952 fish. Another 807,742 untagged, unmarked fish were released at Little White Salmon NFH. There was no age-0 release from this brood year.

Only 232 fish survived out of 809,079 yearling fish released from brood year 1991 (0.0287%), using the rd2 program. There were only 7 recoveries, identical to brood year 1990. There were no recoveries from 94,295 tagged fish released at age-0.

Brood year 1992 yearlings now have a survival rate of 0.5456% and an estimated total survival of 5,426 fish. Over one thousand fish were caught in the WDFW freshwater sport fishery, and another 790 in the freshwater net fishery.

Fingerlings from brood year 1992 now have an estimated survival rate of 0.0121%, or only 61 fish from a release of 503,458.

The rd2 program estimates total survival as 0.2175% for brood year 1993. Recoveries from 1997 are expanded to 330 freshwater net, and 709 freshwater sport recoveries. There were an additional estimated 16 fish harvested in the treaty ceremonial fishery. This brood year has a below average survival rate. Estimated survival for brood year 1994 is 0.0385%, the third lowest percentage on record. Only 18 fish were estimated to have been taken in the treaty ceremonial fishery with just 352 returning to the hatchery.

Survival for brood year 1995 is estimated to be 0.4042%, which places it in the mid-range of survivals. Recoveries occurred in freshwater sport (257), treaty ceremonial (34), gill net (26), and on spawning grounds (12) in addition to 2,381 returns to the hatchery.

The estimated total survival for brood year 1996 is 0.4352%, in the top half of survivals. Freshwater sport (723) and treaty ceremonial (285) fisheries were responsible for the majority of off station recoveries with an estimated 131 fish also being taken in the Columbia River gill net fishery.

Brood year 1997 is in the middle of survivals with 0.3685%. More than twenty-three hundred fish were harvested in Columbia River sport fisheries. Seven hundred twenty fish were taken in the Columbia River gill net fishery and 96 as treaty ceremonial.

A survival rate of 0.6306 puts brood year 1998 third best of all Little White spring Chinook releases. This brood year contributed over twenty-five hundred fish to sport fisheries, eleven hundred to the gill net fishery, and 174 to treaty ceremonial harvest.

The estimated 0.1446% survival rate for brood year 1999 is in the middle of completed brood years. Nearly one thousand fish were harvested in the Columbia River in sport (705) and gill net (225) fisheries.

The release of one million plus brood year fish resulted in a total contribution of 1,517 and a calculated return to the hatchery of 1,138. Percent survival is 0.2559. (It should be noted that a preliminary, incorrect Stock Assessment Reference Summary form was included in last year's report.)

#### **Upriver Bright Fall Chinook**

Brood year 1983 through 1985 upriver brights were marked for both a normal age-0 release and an extended rearing release. Average percent survival for the fingerling release from these three brood years was 1.1%, compared to the survival of 0.3882% for the extended rearing fish. The extended rearing program strategy is no longer being used. The survival rates for two of the three brood years with extended rearing are ranked fourth and fifth of eighteen releases for this program.

Brood year 1989 was the first upriver bright brood year to be marked under the Missing Production Group program. Fifty-eight observed recoveries were expanded to a total of 3,530 for an overall survival rate of 0.2454%. Most of the harvested fish were taken in the ocean (1,733), with 931 in Alaska, 577 in British Columbia and 225 in California. An additional 160 fish were harvested in the Columbia River gill net fishery, and 642 were recovered in spawning ground surveys.

Current recovery information and use of the new rd2 program shows a 0.3285% recovery rate for brood year 1990, higher than that for brood year 1989. Little White Salmon upriver bright fall Chinook appear to be the only group of fish in this report which had a higher rate of survival for brood year 1990 than brood year 1989. Unlike Spring Creek tule fall Chinook, where fish were released in March, April, and May, these fish were released in June. These upriver bright fish are also recovered farther north than Spring Creek tules. Alaska ocean troll and ocean sport took most of these brood year 1990 fish (2,161), followed by Canadian troll and ocean sport fishers (1,844), and the Columbia River gill net fishery (1,041). Spawning ground surveys account for an additional 1,047 fish.

Survival for brood year 1991 is 0.2039%, approximately 60% of brood year 1990. Alaskan troll (856) and British Columbian fishers (570) harvested fish in the ocean, and the Columbia River gill net fishery took 920 fish. Although brood years 1990 and 1991 had very low survival rates basin wide, these releases are in the middle, and fifth from the lowest.

The estimate of survival for brood year 1992 is now 0.3623% with a total survival of 6,763 fish. WDFW added 6 observed spawning ground recoveries in 1998. Alaska and British Columbia ocean fisheries took 787 and 118 fish

respectively. Columbia River gill nets took 1,140 fish, and the river sport fishery accounted for 275. Survival for this brood year is average.

Survival from brood year 1993 is now 13,540 fish or 0.7531%, more than double the survival for brood year 1992. This is the second best survival for this hatchery and species. Alaska and Canada took nearly equal shares in the ocean catch (1,545 and 1,222), and over thirty-five hundred fish were harvested in various Columbia River fisheries.

Brood year 1994 is now estimated to have survived at a rate of 0.0826%, only about one ninth the rate of the previous brood year, and the next to lowest for this hatchery and species. Alaskan fishers took 229 fish from a total of 309 estimated recoveries in the ocean. An estimated 299 fish were recovered in Columbia Basin spawning ground surveys.

The estimated survival for brood year 1995 is 0.2422%, with over nine hundred recoveries in Alaskan waters, from a total 5,079 estimated recoveries. This survival is in the lower half of survivals for this hatchery and species.

Brood year 1996 is in the lower third for Little White Salmon upriver bright fall Chinook at 0.1388%. Even so, fish were recovered in Alaska (764) and California (44) ocean fisheries.

Brood year 1997 is in the upper third of the survivals at 0.4139%. Nearly eleven hundred fish were harvested in Alaskan waters. The five thousand plus fish recovered in the Columbia River are particularly noteworthy. Over three thousand of those resulted from WDFW conducted spawning ground surveys. This high number of estimated spawning ground recoveries is undoubtedly due to the hatchery restricting the number of fish entering the adult holding pond during spawning season. This practice was begun in 2000. This brood year contributed fifteen hundred fish to the Columbia River gill net fishery.

Overall survival for brood year 1998 is now 0.3617%, a bit lower than the previous brood year. The expansion factor for eighteen 2003 recoveries observed in the Columbia River Gill net fishery by ODFW has been reduced, lowering the resultant expanded recoveries from 111 to 42.

Twelve hundred fish were harvested in Columbia River gill nets. Over twenty-six hundred fish from brood year 1998 are estimated to have been recovered on spawning grounds. Spawning ground recoveries were no doubt higher than usual due to the fact that all returning fish were not allowed to enter the Little White Salmon adult holding building.

Intermittent ladder operations occurred at Little White Salmon NFH during 2002-2004.<sup>444</sup>

Spawning ground recoveries expand to nearly seven thousand fish for brood year 1999. This is a result of restriction adult returns to the hatchery. The estimated total survival is 16,473 fish or 0.8359%, the second highest survival to date. Close to four thousand fish were taken in Alaska non-treaty troll fisheries, and about twenty-five hundred in Columbia River gill nets.

The current estimate of survival for brood year 2000 is 0.3194% and a total survival of 6,189 fish. Alaskan fisheries took the lion's share of this brood year with 1,480 being caught mostly by trollers. Eighteen hundred fish found on spawning grounds are again the result of the hatchery preventing a large part of the returns from entering the hatchery.

Brood year 2001 is in the bottom third of successful years with an estimated survival of 0.1950%. Harvest was split roughly equally between ocean and fresh water (1,430 vs 1,803). In the ocean Alaska harvested the greatest number by far (1,169) followed by 230 by BC, and 31 in WA. Intermittent ladder operations sent an estimated 917 fish onto spawning grounds while another nine hundred fish were harvested in river with 636 taken in gill nets.



## Spring Creek National Fish Hatchery

Spring Creek NFH is located on the Columbia River at Underwood, Washington, about 30 miles upstream of Bonneville Dam. Elevation at the hatchery is 93 feet above sea level. The hatchery was constructed in 1900 and began operations a year later. Fish were trapped in the Big White Salmon River from 1901 through the 1950s. Spring Creek NFH was remodeled in 1955 under the Mitchell Act (NOAA Fisheries), and redone again in 1970 under the John Day Mitigation Act (U.S. Army Corps of Engineers). Spring Creek NFH currently produces tule fall Chinook.

The survival rate for brood year 1984 was 0.0462%, and was 0.1294% for brood year 1985. Even with the low survival rate of these two brood years, thousands of fish were harvested in both the ocean and the Columbia River.

Survival for brood year 1986 is estimated at 0.4328%, 46,050 fish from a release of 10,640,406. Over 22,000 fish were harvested in the ocean and 14,288 were taken in the Columbia River gill net fishery.

Brood year 1987 fish were recovered primarily in commercial fisheries off the coasts of Canada and Washington, as well as in the Columbia River gill net fishery. Total survival for the 1987 brood year is 0.3087%, or 27,326 fish from a release of 8,850,757.

Brood year 1988 fish were recovered primarily in the Columbia River gill net fishery (24,168). They also contributed to the ocean fisheries in Washington (17,417), Canada (11,671), and Oregon (6,319). Overall survival is estimated at 0.5168%.

Fish from brood year 1989 fared slightly worse than brood year 1988 with an overall survival rate of 0.4855% or 49,683 fish. The greatest number of recoveries was in the ocean off Washington (14,894), and in the Columbia River (12,548). The Columbia River gill net fishery took the great majority of fish harvested in the Columbia River. British Columbia took 9,984 fish, and ocean harvest off Oregon totaled 3,551 fish.

The estimated total survival for brood year 1990 drops to 0.1295%. This is one of the lower survival rates since brood year 1980. Most of the harvest of these fish occurred in the Columbia River, 5,017 fish, followed by the Washington ocean harvest of 4,811, and the Canadian harvest of 3,345.

Brood year 1991 survival rate, expanding for each coded-wire tag, is 0.1374%, only slightly better than brood year 1990. British Columbia ocean troll and ocean sport fisheries took the largest number of fish from this brood year at 7,787 fish. The Columbia River gill net fishery harvested 7,001 fish.

Survival for brood year 1992 is 0.1620%, or 23,488 fish. The Columbia River gill net fishery harvested 10,508 fish, and 3,119 were taken in the ocean. The great majority of fish harvested in the ocean were taken by Canadian fishers. Brood year 1992 was the first year of a three year fin clip study at Spring Creek, and the PEF method was used for this calculation.

Brood year 1993 survival was greater than 1992 at 0.2197%. This survival rate was calculated by the rd program. Oregon reported slightly more ocean recoveries than Canada, but the Columbia River gill net fishery harvested greater than three times more fish than the combined ocean harvest. This brood year contributed more than twenty-four thousand fish to fisheries. The 1993 brood year was the second of three years of a three year fin clip study at Spring Creek.

In the third year of the fin clip study (brood year 1994) fish were released which were not represented by any recoverable coded-wire tags. Therefore, the PEF method was used (rd.prg). Survival is now estimated to be 0.1038%. Nevertheless, 4,430 fish were harvested in the ocean, mostly in British Columbia. An additional 6,259 fish were harvested in the Columbia River.

The current total survival estimate for brood year 1995 is 0.0492%, the lowest since brood year 1984. Nevertheless, 3,586 fish were harvested in the Columbia River, and over eighteen hundred in the ocean fisheries, the majority of which were taken off the coast of Oregon.

The estimated survival for brood year 1996 is a greatly improved 0.4249, nearly ten times better than the previous brood year, and the best survival since brood year 1990. Over twenty-six thousand fish were harvested in the Columbia River and Estuary, and an estimated 16,111 were caught in West Coast ocean fisheries. Seventy-two hundred fish were harvested in WDFW reported ocean fisheries, fifty-five hundred in Oregon, and three thousand in British Columbia.

There are now over one thousand observed recoveries from brood year 1996, and the estimated survival is 0.4250%. Ocean harvest was highest for Washington (7,247), Oregon (5,492), and British Columbia (3,093). Over twenty-six thousand fish were harvested in the Columbia River fisheries, with 19,213 fish making it back to the hatchery (when calculated by expansion). Nevertheless, this return is near the median for Spring Creek tules.

Changed expansion factors and additional recoveries raise survival to 0.1145% for brood year 1997, now fourth from last for Spring Creek. Columbia River gill netters took the majority of fish off station (5,957). Canadian ocean sport and troll fishers harvested an additional 3,414. Washington and Oregon ocean fisheries took 744 and 1,129 fish respectively.

The addition of nearly six hundred observed recoveries increases the estimated survival for brood year 1998 to 1.3003%, yielding 137,732 returning or harvested fish. ODFW report the greatest number of ocean recoveries (19,361). 44,427 fish were taken in the Columbia River. WDFW reported ocean tag code recoveries that are equivalent to 12,843 fish, and CDFO catch was 8,593.

Brood year 1999 is now the most successful in the series represented in this report with a survival rate of 1.4381% and total of 83,258 fish. Columbia River contribution was 80,592, and ocean recoveries totaled 83,341.

The estimated survival is 1.1122% for brood year 2000. BC fisheries harvested over twenty thousand fish, nearly seventeen thousand by ocean trollers, and about thirty-five hundred in sport fishing. Ocean trollers were responsible for about three quarters of the 15,007 fish harvest in Washington ocean fisheries, with charter and sport fisheries taking the remaining fifty-two hundred. Intermittent ladder operations led to an estimated 4,192 on spawning grounds.<sup>iv</sup>

Survival drops to 1.0695% for brood year 2001 with another 4,502 on spawning grounds out of a total estimated survival of 172,386 fish. British Columbia fisheries harvested the greatest number of fish in the ocean (33,658), approximately the same number as was harvested by gill net in the Columbia River (33,064).



## Warm Springs National Fish Hatchery

Warm Springs NFH is located on the Warm Springs River, approximately 14 miles north of Warm Springs, Oregon at 1,525 feet above sea level. The hatchery was authorized in 1966 and began operations in 1978. The Confederated Tribes of the Warm Springs Indian Reservation of Oregon entered into an agreement with the USFWS to increase tribal fishing opportunities. Operations at the hatchery presently consist of adult collection, egg incubation and rearing of spring Chinook salmon.

Warm Springs has a unique fall release strategy that involves releasing the same coded-wire tags in the fall and in the spring. Therefore fall release and spring release fish are combined in this report.

The 1987 brood year is the first group of fish coded-wire tagged since the late 1970s. Since then, every fish released from the hatchery has been marked. The 1987 brood year had a 0.1272% survival and contributed mainly to the freshwater sport fishery on the Deschutes River. The number of fish released has previously been reported as 609,409 but the total released for this brood year is 661,019. The number of fish with unshed coded-wire tags is 514,633. Groups of Left Ventral (LV) and Right Ventral (RV) fin clipped fish without CWTs were also released. Ventral clipped fish are represented by CWTd fish that were raised in the same raceway. The use of either the PEF or "by tag code" method of estimating survival is problematic. The "by tag code" method was used.

As with the previous brood year, there were LV and RV fish released along with the coded-wire tagged fish and expansions were done for each CWT. Brood year 1988 survived at a rate of 0.1699%, better than brood year 1987. These fish contributed primarily to the freshwater sport fishery in Oregon and the treaty fisheries in both the Columbia River and Deschutes River.

LV and RV clipped fish were released again with brood year 1989, and the "by tag code" method was used to estimate survival. Total survival for brood year 1989 now stands at 209 fish, or 0.0195%. Sixty-three fish were taken in the freshwater sport fishery, 10 in treaty subsistence, and 4 in treaty ceremonial.

Only an estimated 30 fish survived from a release of 659,507 from the 1990 brood year, a survival rate of 0.0045%, using the rd2 program. There were 24 recoveries at the hatchery and 6 in the Oregon freshwater sport fishery.

The rd2 program for brood year 1991 yields a survival of 0.0169%, or only 94 fish. Treaty ceremonial and subsistence took a total of nine fish.

There was a big jump in survival for brood year 1992. Over eight hundred fish were recovered to give a survival rate of 0.1569%, when calculated by rd2 program, near the median of survivals. Treaty fisheries harvested 20 fish, while the freshwater sport harvest was 111.

The estimated total survival rate of 0.2564% for brood year 1993 is in the middle third of survivals. While treaty fisheries took only 3 fish, freshwater sport and fish traps recovered 57. An unusual harvest of 5 fish in California ocean fisheries was noted for this brood year. In all likelihood ODFW hatchery recoveries include the tags from 99 adults that were transferred to the ODFW Round Butte hatchery.

The brood year 1994 release at Warm Springs included fish raised from eggs received from the ODFW Round Butte Hatchery. Fish were also received from Round Butte as yearlings. Round Butte fish were coded-wire tagged and fin clipped by removing the adipose and left ventral fins. A total of 321,363 Round Butte fish were released. The total survival for this brood year is 0.1366%, near the median for this hatchery and species. Treaty fisheries reported taking 13 fish before they returned to the hatchery.

Brood year 1995 achieved a new record high survival rate in this series with an estimated survival of 0.4163%. Over nineteen hundred fish were recovered from this release. More than 95% of the fish returned to the hatchery, with 55 additional fish reported as ODFW hatchery recoveries, which are most likely from 50 adults transferred to the ODFW Round Butte hatchery. There were again recoveries reported in the California troll fishery. The treaty ceremonial fishery reported and estimated 15 recoveries.

Total estimated survival for brood year 1996 set a new record for Warm Springs spring Chinook at 0.6122%. Fish were available for both treaty fisheries (316) and freshwater sport fisheries (905) and, to a lesser extent the Columbia River gill net fishery (31).

Brood year 1997 survival continues an upward trend at 0.6641%. There were 11 expanded recoveries in the ODFW reported non-treaty ocean troll fishery from this brood year, the first time this has been observed. Most of the Columbia River Basin recoveries, which totaled 1,687, were in sport fisheries. There were an estimated 53 recoveries in tribal fisheries. This survival was adjusted due to a recalculation of the expansion rate for recoveries at Warm Spring NFH.

Brood year 1998 sets a record for Warm Springs spring Chinook with a survival of 1.4569%. There were recoveries again in the Oregon ocean troll fisheries (16). For the first time there were 3 recoveries in Alaska. Over two thousand fish were taken in freshwater sport fisheries, and nearly fifteen hundred were harvested by Columbia River gill netters. Treaty harvest was 77. This survival was adjusted due to a recalculation of the expansion rate for recoveries at Warm Spring NFH.

Although survival is only 63% of the previous brood year at 0.9837%, brood year 1999 survival is the third highest on record. (A slight adjustment in the Columbia River gill net recoveries since last year added one expanded recovery.) British Columbia and Oregon reported ocean recoveries, albeit a total contribution of 3 fish. Total freshwater sport harvest was 871 and 302 were taken in gill nets. Treaty harvest was 21 fish.

Additional recoveries from 2005 make the estimated survival for brood year 2000 1.2259%, the second most successful on record. Twenty-six fish were harvested in the ocean, the majority of those in Canada. Tribal fishers took 9 fish. Sport fisheries reported harvest of 681 fish, and 480 were taken in gill nets.

Survival dropped to a sixth of the previous brood year, 0.1993%, for brood year 2001. Gill net recoveries totaled 53, and freshwater sport recoveries totaled 192. Treaty subsistence took another 2 fish, and 7 fish were caught from BC through Oregon.

## Willard National Fish Hatchery

Willard NFH is situated four miles upstream of Little White Salmon NFH on the Little White Salmon River at an altitude of 900 feet. Willard is part of the Little White Salmon NFH complex. Willard NFH was constructed in 1952 under authorization of the Mitchell Act and was originally planned as a fall Chinook hatchery. The hatchery was switched to a coho facility because of cold water temperatures. Since the mid-1960s, the hatchery has been used primarily for coho production. Adult coho were trapped and spawned at Little White Salmon NFH. Coho are presently raised for the Yakama Nation's Wenatchee River program, but no longer released at Willard NFH.

Fish from brood year 1988 contributed mostly to ocean fisheries (27,996 fish) from British Columbia (1,473) to California (5,189). An additional 8,776 fish were harvested in the Columbia River. Fifty-five hundred of those were taken in the gill net fishery, and 3,200 in the estuary sport fishery. Total survival rate was estimated to be 1.6976%.

Brood year 1989 coho survived at a rate of 0.3247%. Total survival was estimated to be 8,355 fish from a release of 2,573,323. They contributed mainly in ocean sport and non-treaty troll fisheries of Oregon (3,126) and Washington (1,779).

Using the rd2 program, total survival for brood year 1990 was only 1,722 fish or 0.1097%. Fish were harvested primarily in sport fisheries off the coasts of Washington (795), Oregon (221) and California (63). One hundred twenty-six fish were taken in the Washington non-treaty troll fishery. One hundred twenty-nine fish were taken in the Columbia River sport fishery.

Survival of brood year 1991 was even lower than 1990 with an overall survival of 0.0720%, or 2,207 fish from a release of over 3 million, using the rd2 program. The only fish harvested from this brood year were 550 fish taken in the Columbia River, 489 in the gill net fishery and 61 in the freshwater sport fishery.

There was some improvement in brood year 1992 with a survival rate of 0.1007%. Washington ocean sport fisheries took 240 fish, and Oregon ocean sport 120. The Columbia River gill net fishery took an additional 161 fish for a total off station harvest of 521 fish from a release of nearly 2 million.

Brood year 1993 survival is in the same range as the previous three broods at 0.1219% when calculated by the rd2 program. Reporting by ODFW shows 85 fish taken in the Columbia River sport harvest, and 14 at an ODFW hatchery. All other recoveries were at Little White Salmon NFH.

The estimate of survival for brood year 1994 is 0.2379%, a total of 5,602 fish, most of which were adults returning to the hatchery. Coho from the WDFW Kalama River hatchery were released as part of this brood year, and did not have a unique coded-wire tag. Since there was no representative coded-wire tag for these fish, the rd program was used to estimate survival.

The survival for brood year 1995 is 0.5383%, now the third best during the 1990s. This higher survival rate is to a large extent due to the release at Little White (rather than Willard) of coho from the ODFW Klaskanine hatchery. CWT recoveries show that these fish survived at a rate over 3 times higher than the Willard fish. There were an estimated 928 recoveries in the ocean and 1,918 in the Columbia River. The Klaskanine fish were 100% adipose fin clipped, and, although there was a coded-wire tag only (no adipose fin clip) group released this brood year, Willard coho were not "mass marked" with an adipose fin clip.

Brood Year 1996 Bonneville coho, some raised at the ODFW Cascade hatchery, and eggs incubated at the Eagle Creek NFH, were released along with Willard fish to make up this brood year. Bonneville stock fish did not receive a unique coded-wire tag. A PEF was calculated for this brood year. The calculated total

survival of 0.156% was higher than only three other brood years. Only 72 fish from this brood year were caught in the ocean, and just 324 in the Columbia River.

The estimation of total survival for brood year 1997 is 0.8639%. This appears to be the first brood year that was mass marked by removing the adipose, except for one group with a coded-wire tag and no adipose fin clip. The brood year has the second highest rate of survival to date. Ocean fisheries reported by ODFW account for 1,286 adults harvested, compared to 724 reported by WDFW, and 1,450 in the Columbia River.

ODFW recoveries for brood year 1998 are once again in the RMIS database, and total survival is now estimated at 1.0344%. Nearly five thousand fish were harvested in Washington ocean fisheries, 1,853 in ODFW reported ocean fisheries, and 3,931 fish were taken in the Columbia River.

Both Little White and Eagle Creek stock were released for brood year 1999, and the two stocks did not receive separate coded-wire tags. Releases for brood year 1999 included two coded-wire tags, one of them a "double index" tag where fish were not adipose clipped; and with an adipose clip. This is now standard operating procedure. However, it appears that the DIT tag was put into fish from Eagle Creek which were raised and released at Willard. Estimated survival for brood year 1999 is 0.2821% with 385 ocean recoveries and a contribution of 818 in the Columbia River.

Brood year 2000 achieved a second best survival rate of 1.0652% with an ocean contribution of 4,398. The ocean harvest was split almost equally between Washington and Oregon reported fisheries. Another nine hundred fish were caught by Columbia River gill net and estuary sport fishers. An estimated 100 fish were found in spawning ground surveys.

The last production release of yearling coho at Willard NFH was of brood year 2002 fish. The estimated survival for this brood year is 0.7794%, which is in the top third of successful broods. Thirty-six hundred fish returned to the hatchery while 1,124 were harvested in the ocean, and 206 were taken in various Columbia River fisheries.

The release of fingerling brood year 2001 coho in January 2002 yielded a survival of 0.151% with an ocean harvest of 1,124 fish as reported by WDFW and ODFW.

## Winthrop National Fish Hatchery

Winthrop NFH is situated along the Methow River, near the town of Winthrop, Washington. Elevation is 1,760 feet above sea level. Nine dams separate Winthrop from the Pacific Ocean. The hatchery is authorized by both the Grand Coulee Fish Maintenance Project (1937), and the 1938 Mitchell Act.

The facility began operations in 1942 by trapping adult sockeye and steelhead at Rock Island Dam and transporting them to the hatchery. By 1951 the hatchery was rearing sockeye, spring Chinook, steelhead, kokanee, coho, and resident trout. Until 1996 the program had been simplified to spring Chinook only. Coho and steelhead now being raised at Winthrop have not been coded-wire tagged. Tagged summer Chinook were released in 1996.

Spring Chinook were coded-wire tagged beginning with brood year 1989. There were 16 observed recoveries from the 107,670 tagged fish released. Using the newer rd2 method of expanding for each tag code, these recoveries are expanded to a total of only 81 fish for an overall survival rate of 0.0077%. An estimated 27 fish were recovered in the freshwater sport fishery, and an estimated 10 fish were recovered by WDFW hatcheries.

All spring Chinook yearling fish released from Winthrop beginning with brood year 1990 have had representative coded-wire tags. Therefore, the rd2 program has been used for all subsequent brood years.

There is only one recovery from coded-wire tagged brood year 1990 Winthrop spring Chinook. That recovery was at a WDFW hatchery. This recovery is expanded to a total of 8 to include unmarked fish that were probably also killed at that hatchery. The overall survival rate is therefore estimated to be 0.0013%.

There are no brood year 1991 recoveries from the 189,187 tagged fish released. Brood year 1992 contributed an estimated 74 fish to a WDFW freshwater fish trap from the total estimated recovery of 94 fish, a survival rate of 0.0169%.

Survival for brood year 1993 has been reported as the highest on record to date for Winthrop at 0.0429%, up from last year. WDFW reported more hatchery recoveries than USFWS, and there were no other off station recoveries. It appears that 8 USFWS recoveries are missing from RMIS.

Brood year 1994 sets the new record for Winthrop Spring Chinook at 0.0543%. Fifty-eight of the hatchery recoveries were reported by WDFW. These adults were trapped at Wells Dam and taken to the WDFW Methow hatchery. There was also one spawning ground survey recovery at river mile 48 in the Methow River.

Brood year 1995 fish were raised and released at both Winthrop NFH and Methow SFH. Release records in the RMIS database (reported by WDFW) are somewhat different than records provided by Winthrop. Returning fish from this brood year were captured at Wells Dam and transported to Winthrop NFH. Thus, there were 117 WDFW reported hatchery recoveries vs. 3 FWS reported hatchery recoveries. Two fish were recovered in Canadian ocean fisheries, and the only other recoveries were in the WDFW spawning ground group. Total survival for this brood year is estimated at 0.8609%. Although this is by far the highest survival to date, the unusual circumstances must be noted.

The addition of four WDFW gill net fishery recoveries increases the estimated rate of survival to 0.3559% for brood year 1996 Winthrop spring Chinook. WDFW recoveries yield an estimated 139 fish recovered on spawning grounds, all age-4 fish in the year 2000. Three fish were reported caught by Alaska.

Survival for brood year 1997 is lower than for 1996 at 0.2836%. The half million release produced an estimated contribution of 1,546 jacks and adults. Gill net and sport fisheries intercepted the greatest number of fish: 507 and 378 respectively.

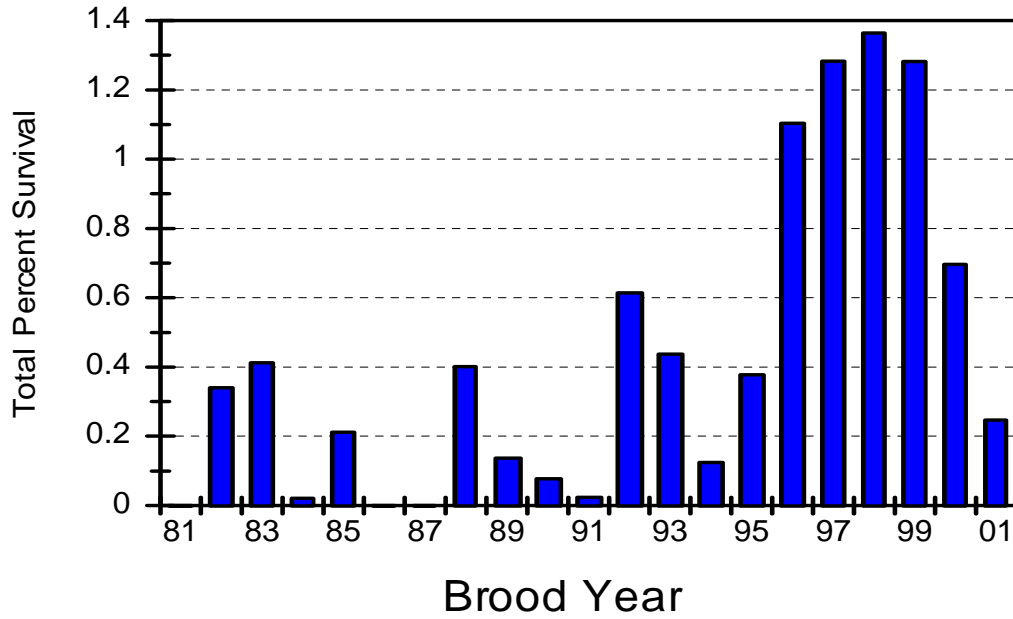
The brood year 1998 release of 364,632 fish yielded a contribution of 1,440 for a survival rate of 0.3813%. Columbia River harvest was split almost equally between gill net and sport fisheries. Returns to the hatchery were also split nearly equally between FWS and WDFW.

Survival for brood year 1999 is 0.0444%, in the middle of survivals for Winthrop, but still about one tenth of the previous brood year. Based on this accounting, only 48 fish returned to the hatchery, while another 30 were harvested or found elsewhere. However, it should be noted that the return to the hatchery by coded-wire tags is less than one tenth of the number by age composition.

The addition of fourteen new observed recoveries yields a total survival of 0.3041%, putting brood year 2000 in fourth place in Winthrop history. About one fourth of fish recovered at hatcheries were recovered at the nearby Methow Hatchery. Another 132 fish, more than recovered at the Methow Hatchery, were found in spawning ground surveys.

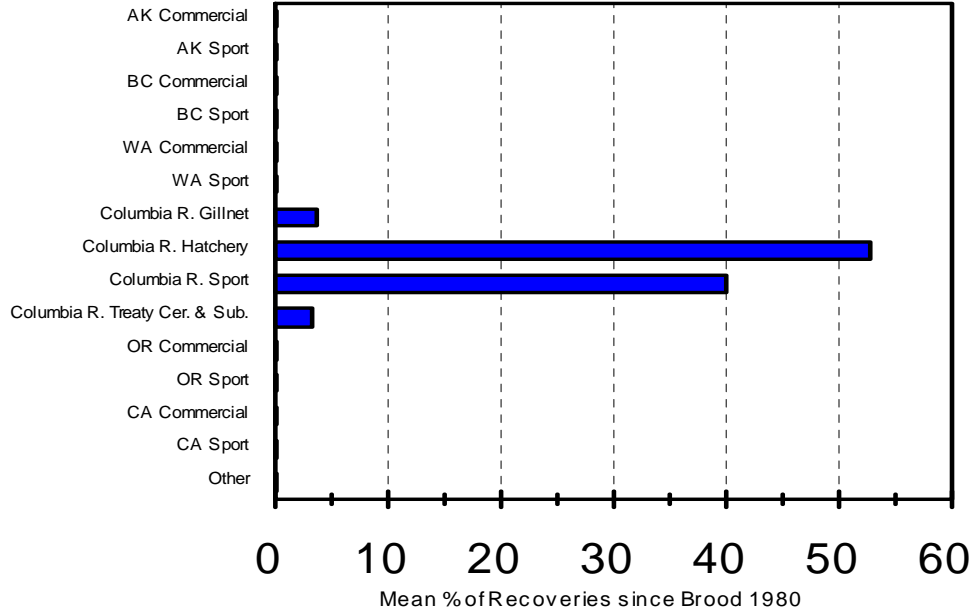
An examination of the relationship between hatchery recoveries and spawning ground recoveries shows that the proportion of Winthrop fish recovered on spawning grounds has increased dramatically from the early 1990s through the early 2000s. A combination of high survival rates for recent brood years, ESA issues, and co-manager agreements in the Methow Basin required hatchery staff to block returning fish from entering the hatchery after the hatchery escapement goal had been reached.

# Carson NFH Spring Chinook yearlings



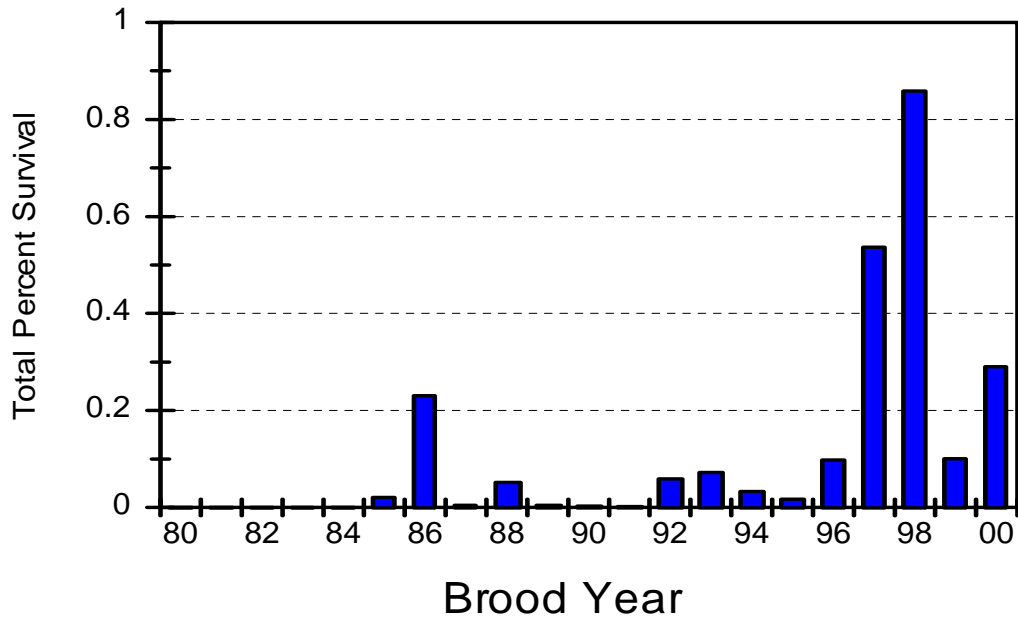
# Carson NFH

## Spring Chinook yearlings

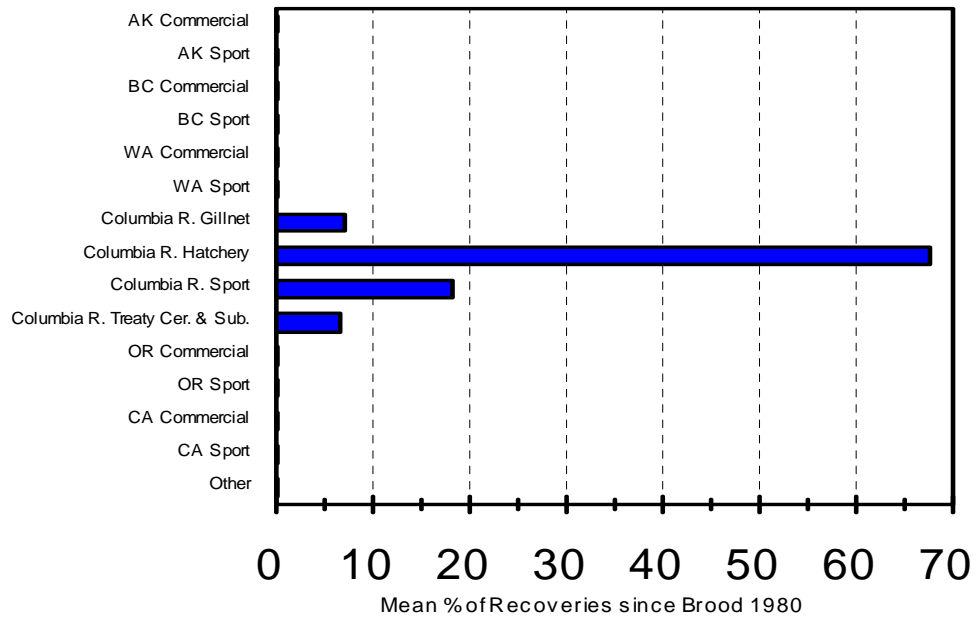




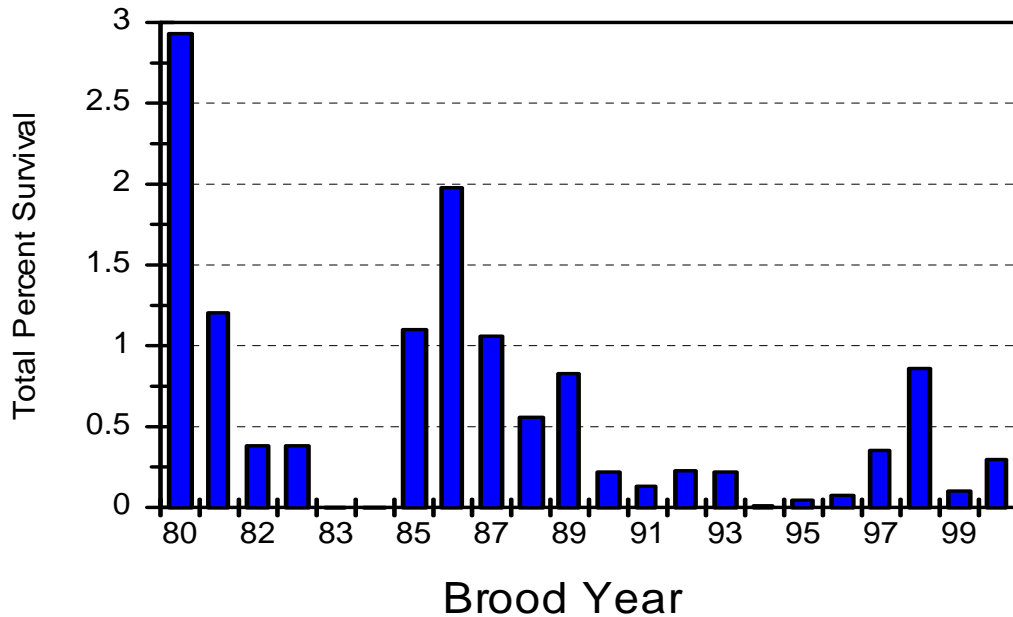
## Dworshak NFH Spring Chinook yearlings



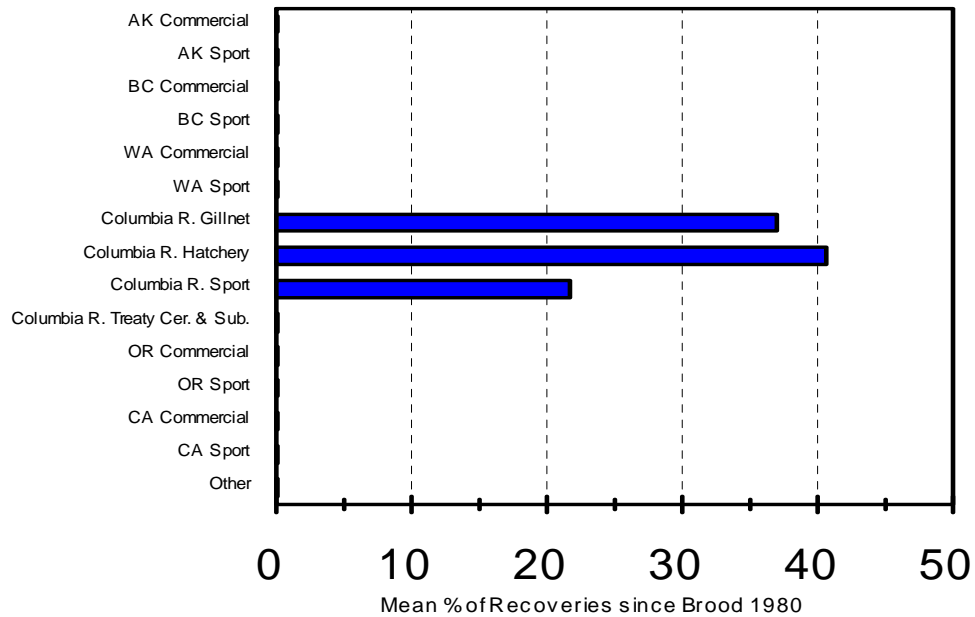
## Dworshak NFH Spring Chinook yearlings



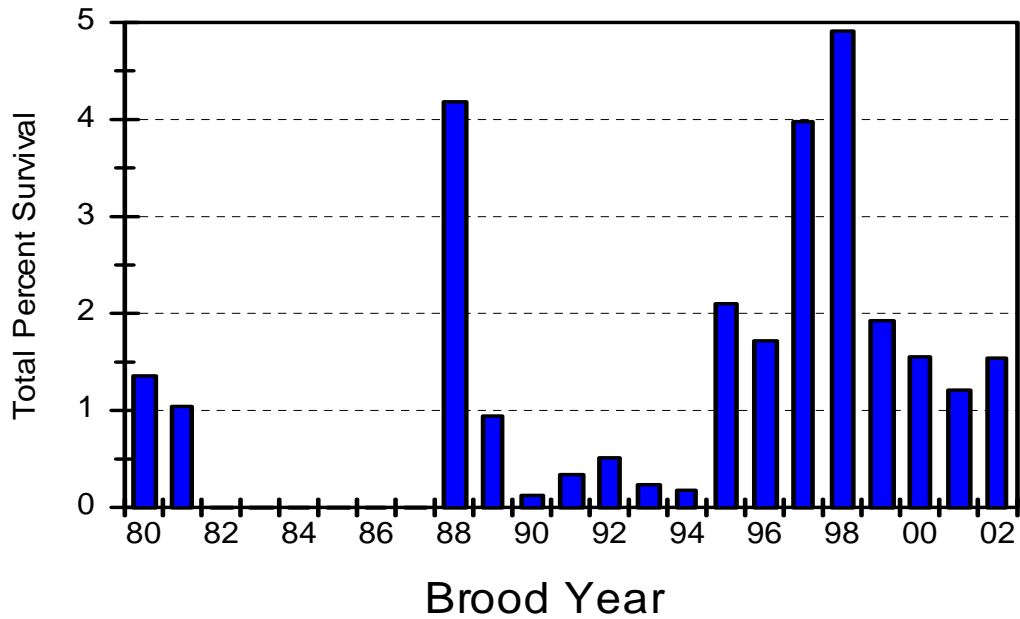
## Dworshak NFH Summer Steelhead yearlings



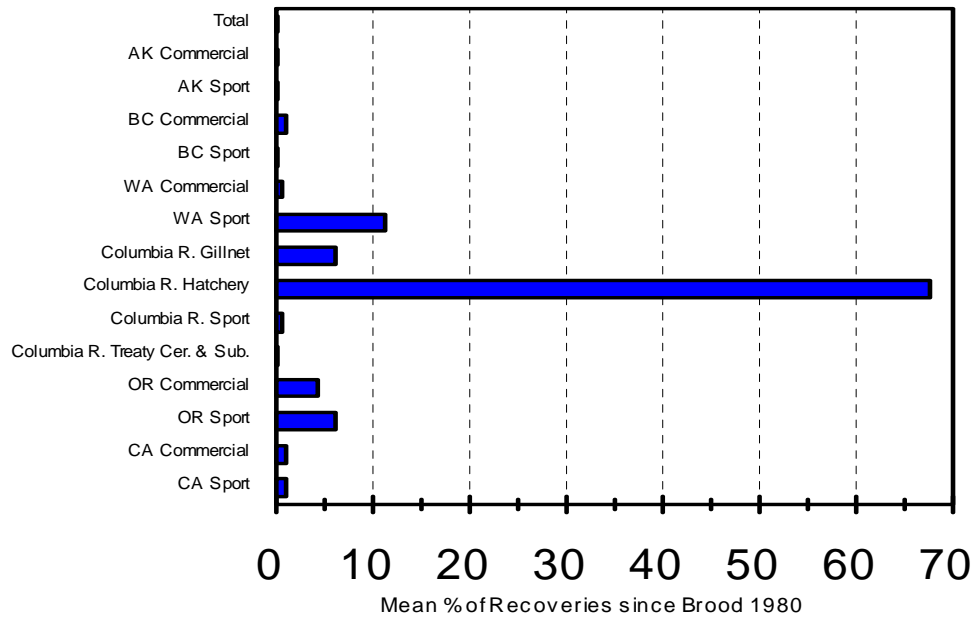
## Dworshak NFH Summer Steelhead yearlings



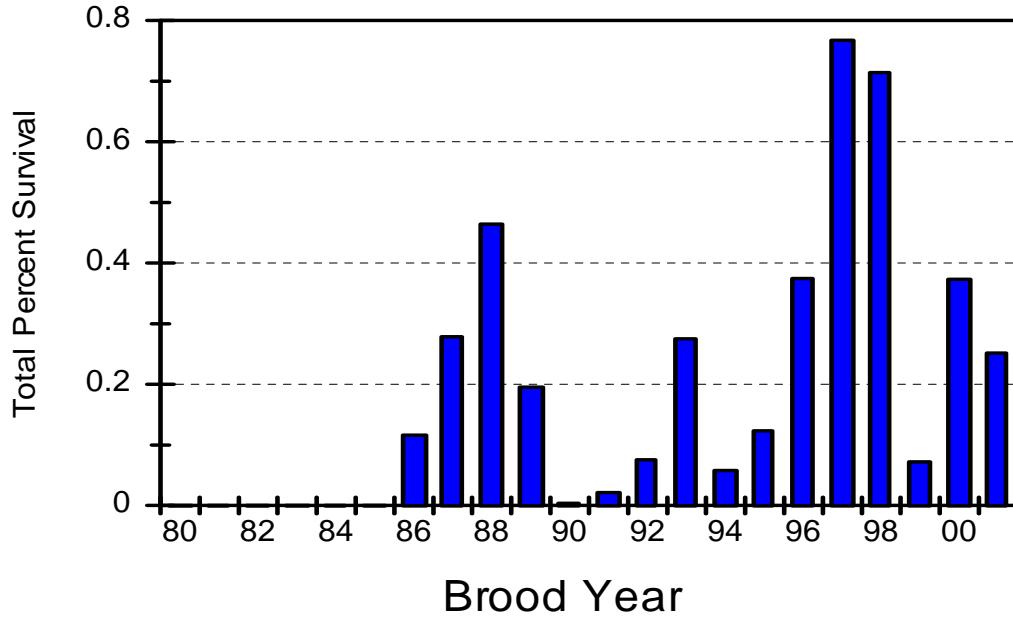
## Eagle Creek NFH Coho yearlings



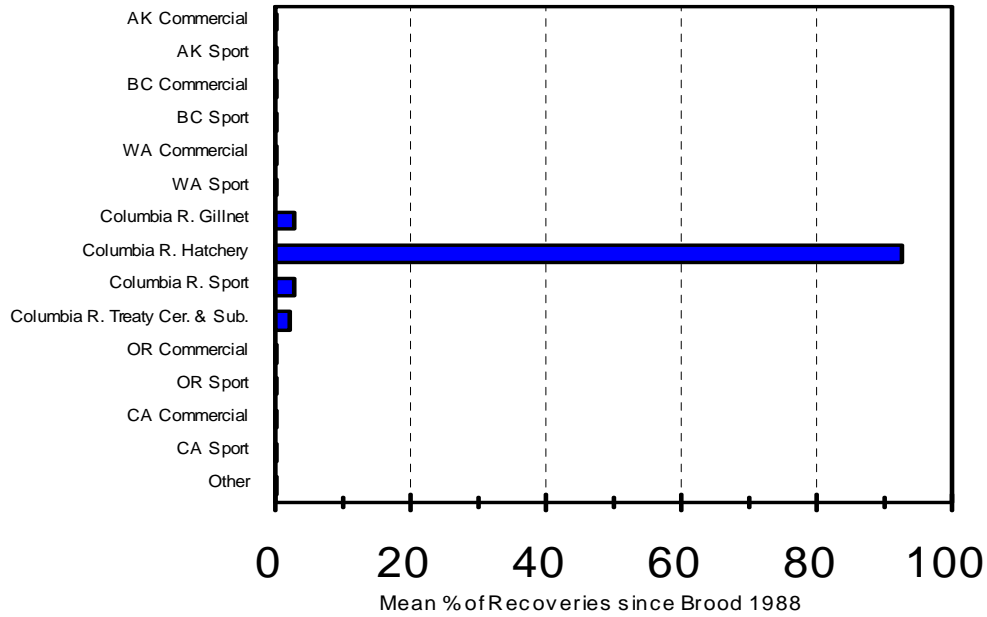
## Eagle Creek NFH Coho yearlings



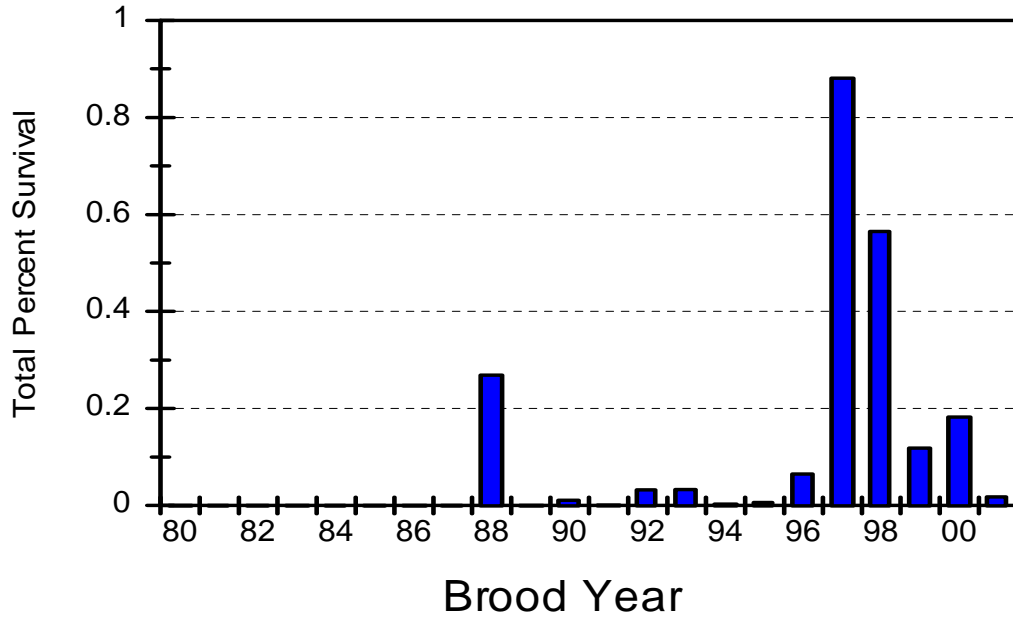
## Entiat NFH Spring Chinook yearlings



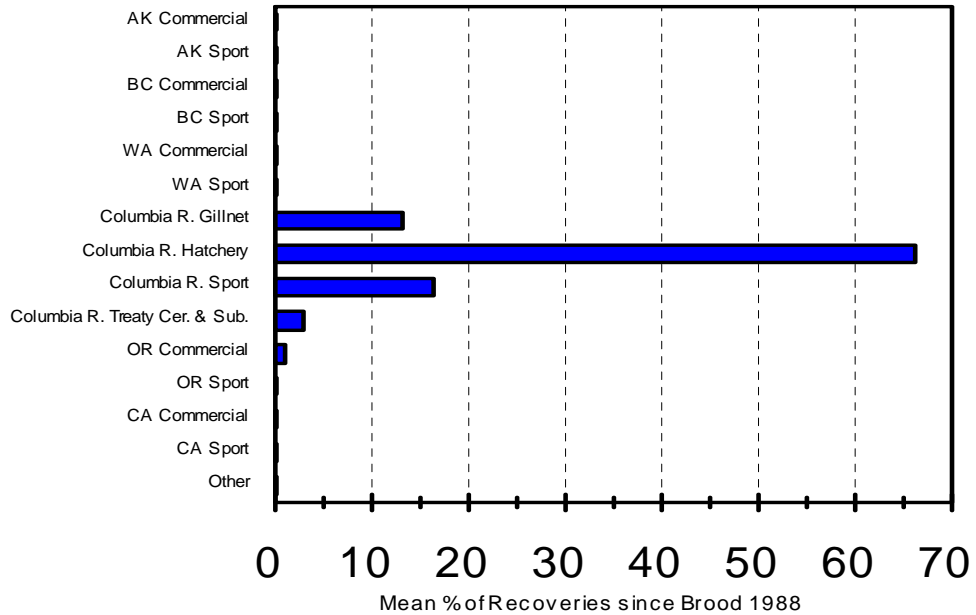
## Entiat NFH Spring Chinook yearlings



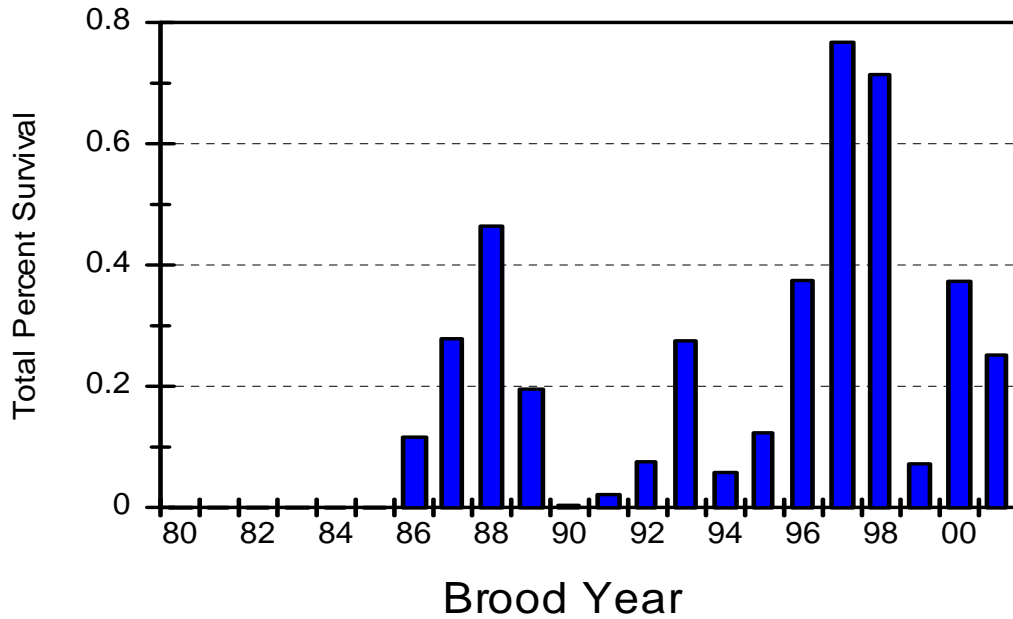
## Kooskia NFH Spring Chinook yearlings



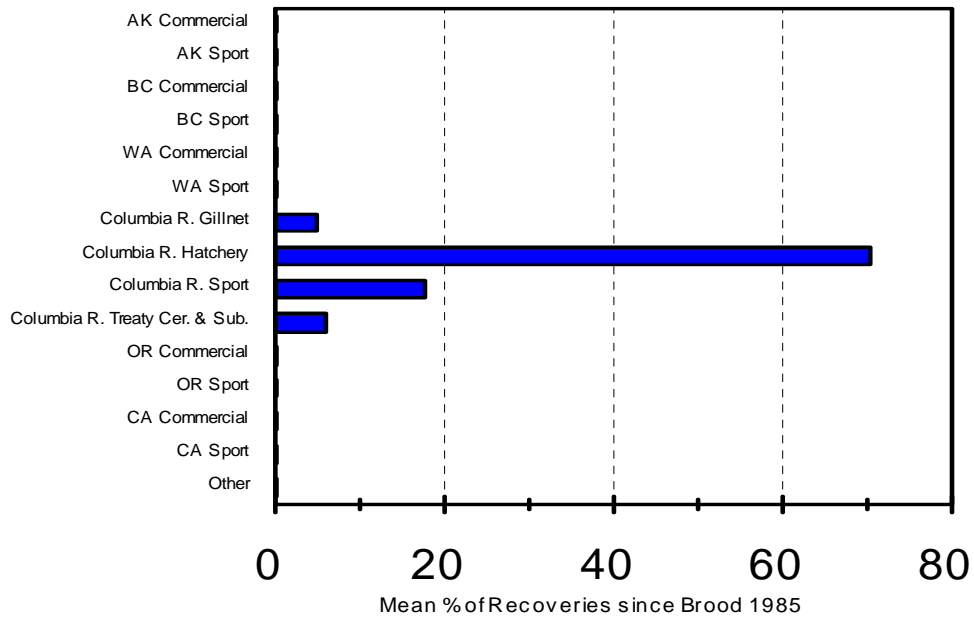
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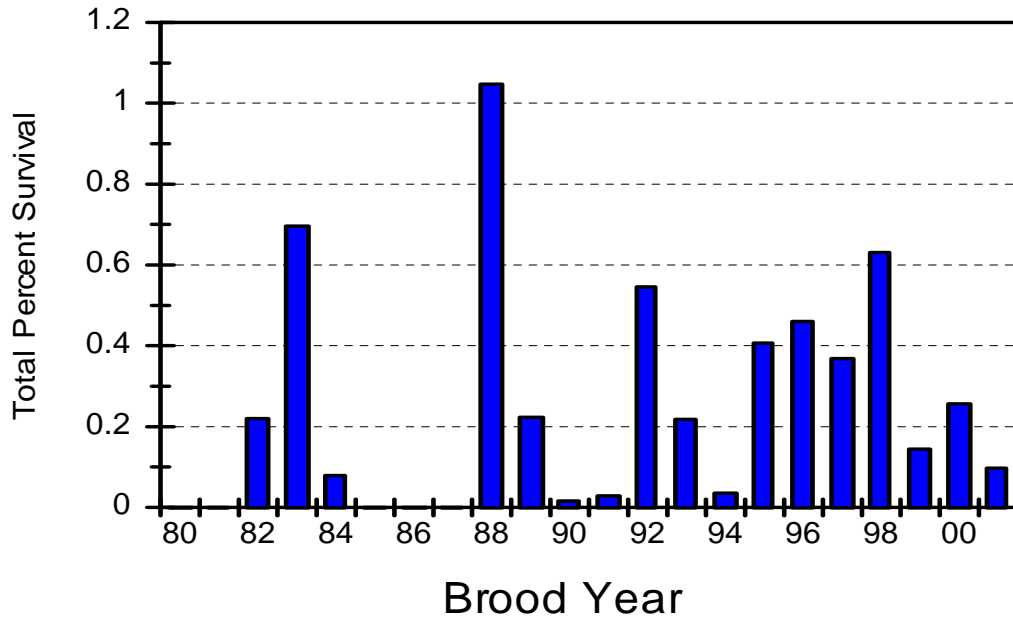
## Leavenworth NFH Spring Chinook yearlings



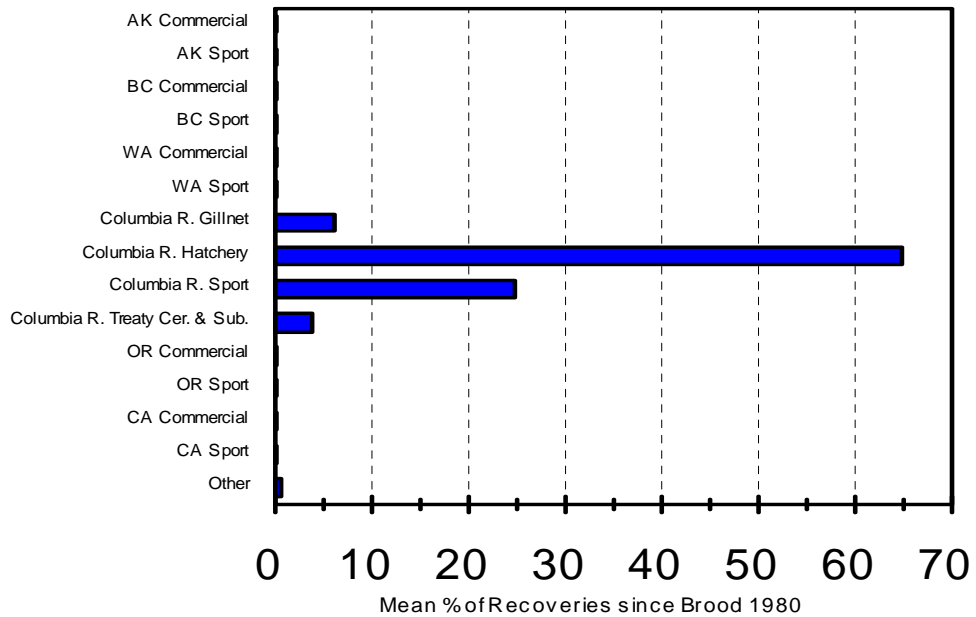
## Leavenworth NFH Spring Chinook yearlings



## Little White Salmon NFH Spring Chinook yearlings

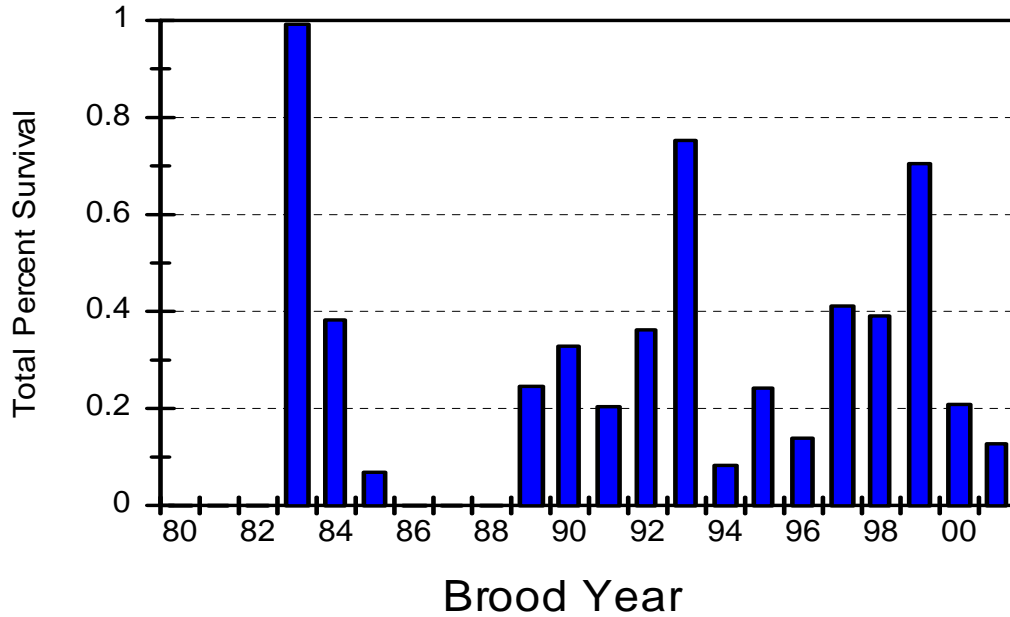


## Little White Salmon NFH Spring Chinook yearlings



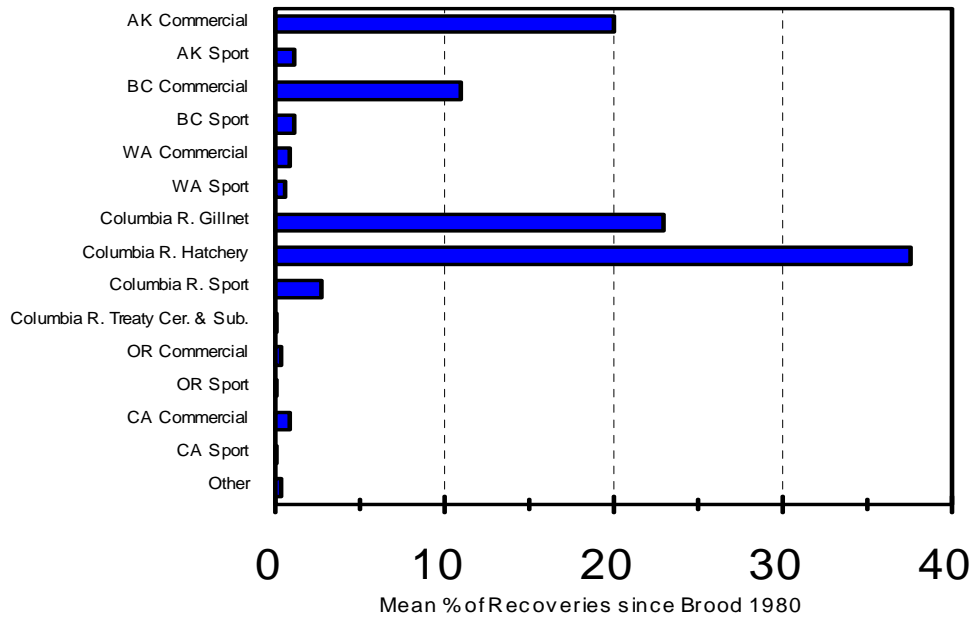
# Little White Salmon NFH

## Upriver Bright Fall Chinook fingerling



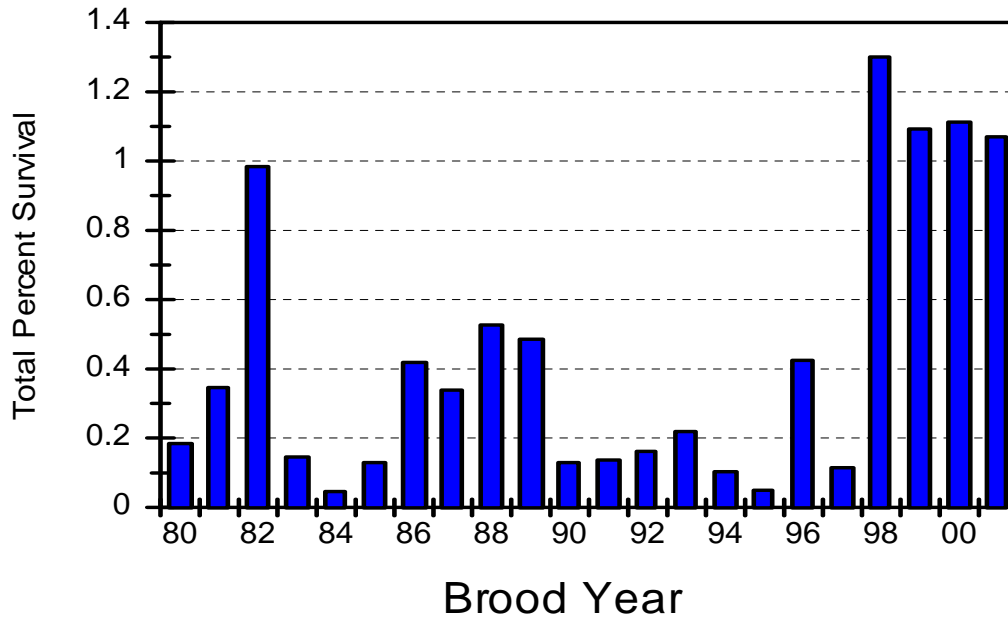
# Little White Salmon NFH

## Upriver Bright Fall Chinook fingerling

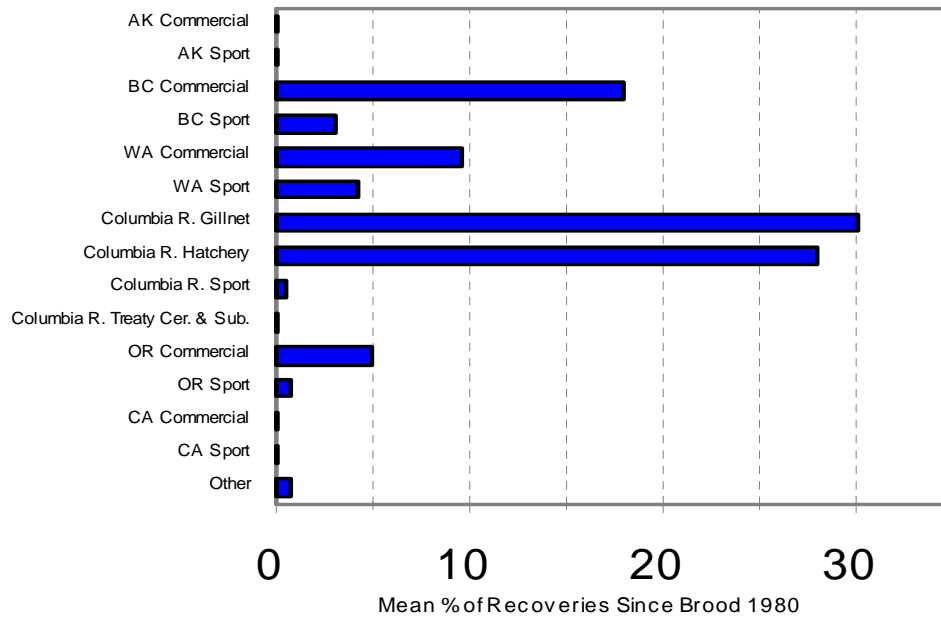




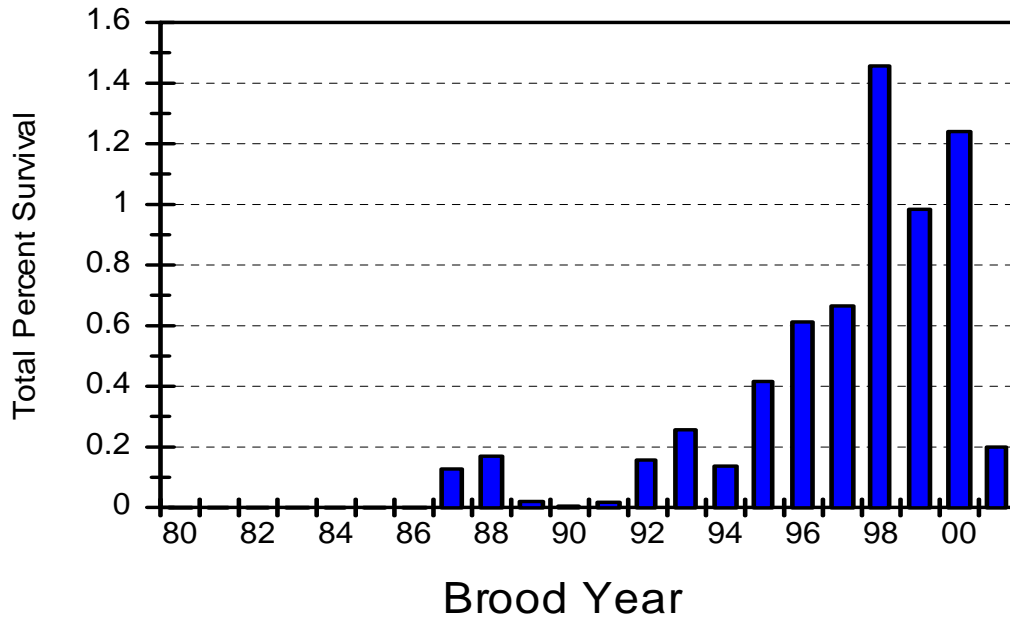
## Spring Creek NFH Tule Fall Chinook fingerlings



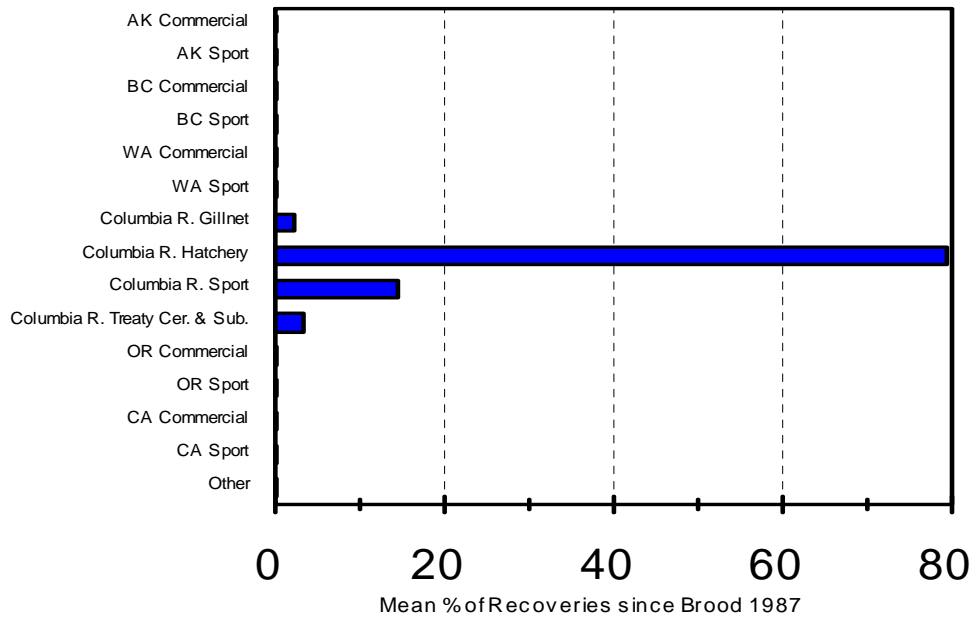
## Spring Creek NFH Tule Fall Chinook fingerlings



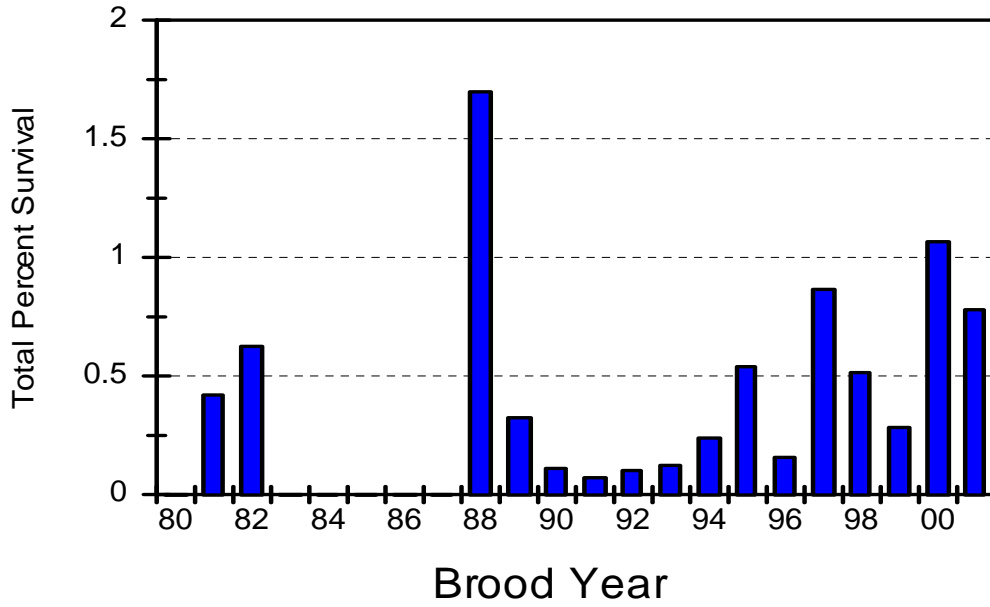
## Warm Springs NFH Spring Chinook



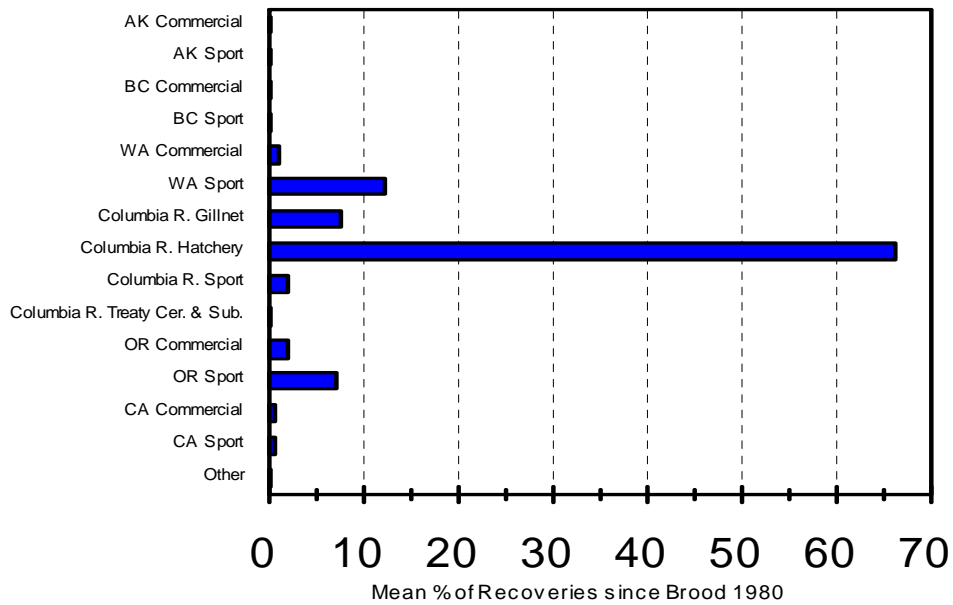
## Warm Springs NFH Spring Chinook yearlings



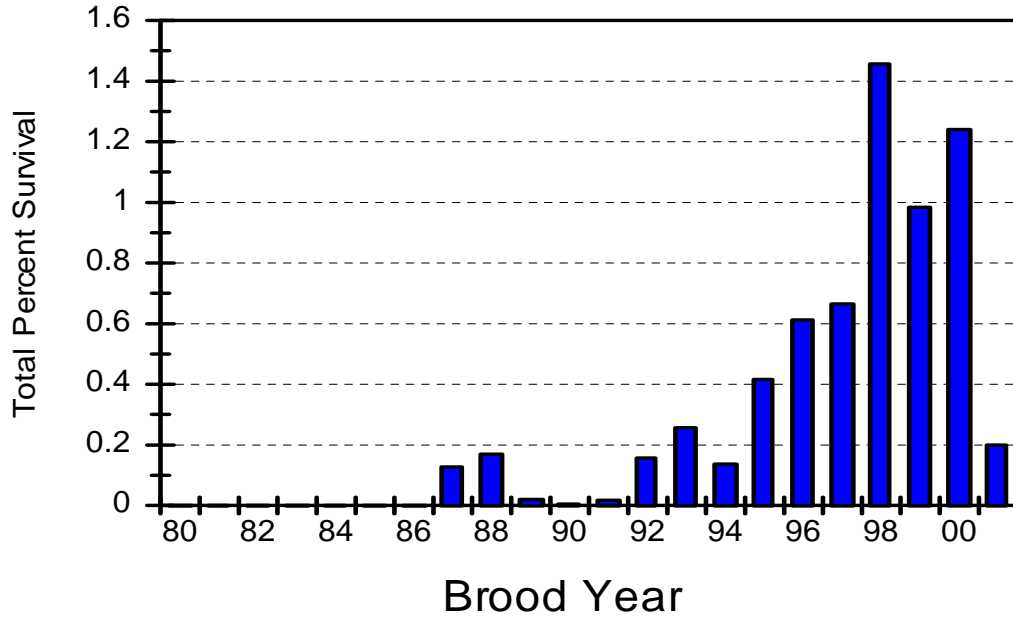
## Willard NFH Coho yearlings



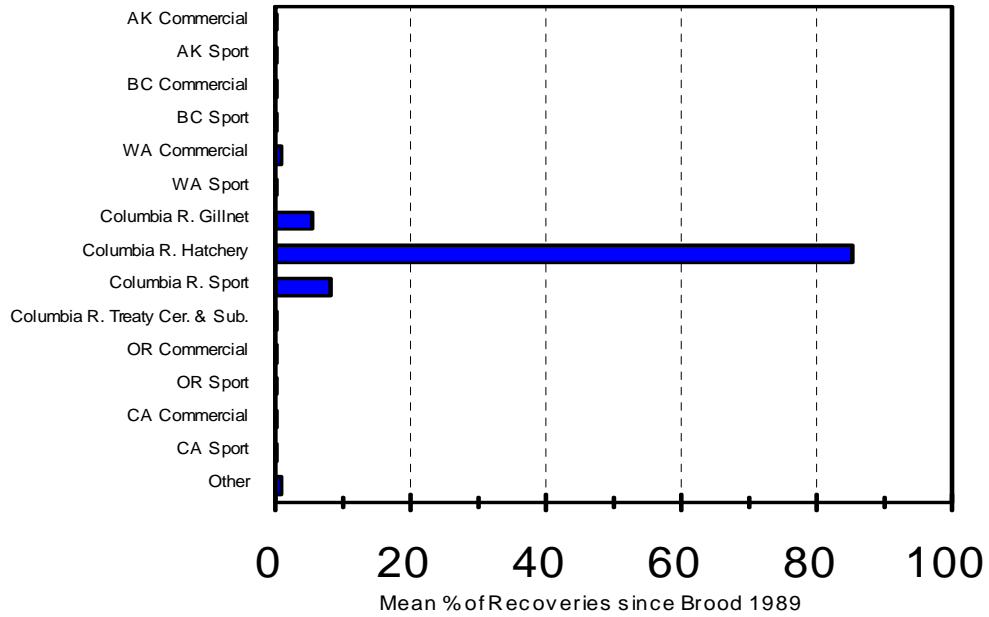
## Willard NFH Coho yearlings



## Winthrop NFH Spring Chinook yearlings



## Winthrop NFH Spring Chinook yearlings



## **Abernathy Fish Technology Center**

Abernathy Fish Technology Center (FTC) is located 14 miles west of Longview, Washington, on Abernathy Creek, approximately three miles upstream from its confluence with the Columbia River at an altitude of 175 feet above sea level. Abernathy FTC began operations in 1959. From 1980 through the 1990s, lower river tule fall Chinook were the only species reared on a production basis at Abernathy as part of Mitchell Act (NOAA Fisheries) funding.

Coded-wire tags were released in fish from brood years 1980 and 1981. Current estimated survival rates are 1.1511% and 0.2084%. Changes in reporting by the Canadian Department of Fisheries and Oceans (CDFO) were noted in the 1997 report. Nevertheless, the CDFO ocean troll fishery took most of these fish.

There were no releases of marked fish for brood years 1982 to 1988.

Marking fish with coded-wire tags was resumed for brood year 1989 under the Missing Production Group program. Brood year 1989 contributed mainly to troll and sport fisheries in Washington (1,628) and British Columbia (977). Overall survival was 0.1836% or 3,296 fish.

Fish from brood year 1990 had a low survival rate of 0.0746%. Approximately sixty thousand fish were released a month earlier and at one tenth the weight of fish represented by coded-wire tags. Therefore, the rd2 program was used to expand the contribution of each group of coded-wire tagged fish. An estimated 99 fish were taken in the ocean off Washington, and 130 in the Columbia River estuary sport fishery. An additional 645 fish were estimated to have been in Washington Department of Fish and Wildlife (WDFW) spawning ground surveys, based on 25 expanded recoveries.

Total survival is now estimated to be 0.2195% for brood year 1991. An estimated 1,156 fish were recovered in spawning ground surveys, nearly twice the number returning to Abernathy. Ocean harvest was 913 fish and 1,470 fish were harvested in the Columbia River.

Total survival for brood year 1992 is now 0.2455%. Hatcheries other than Abernathy recovered an additional 444 fish from the Columbia River contribution of 1,316. Of the 437 fish harvested in the ocean, 348 were in British Columbia.

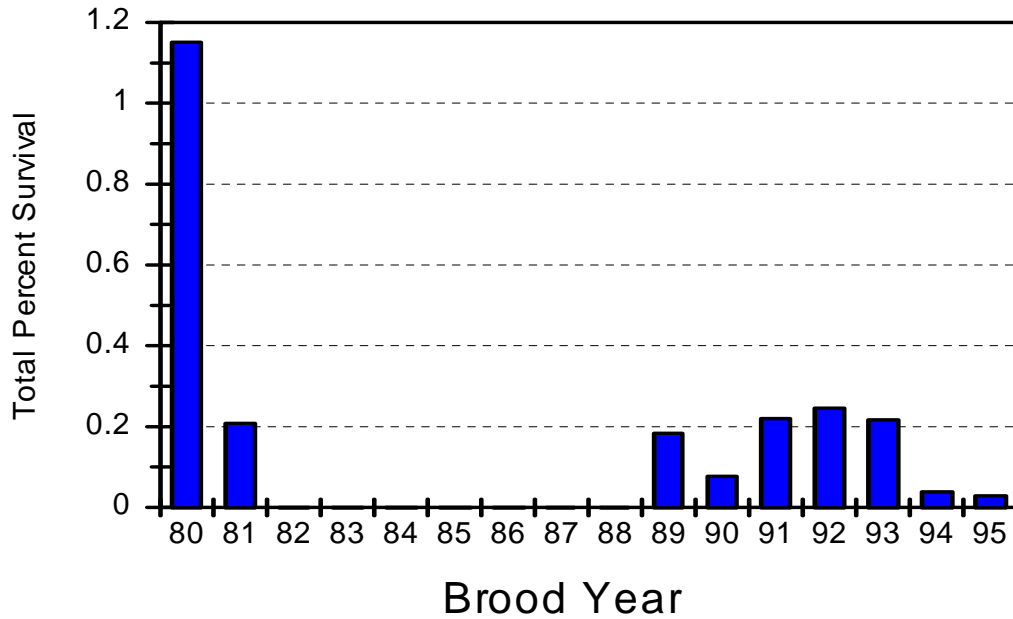
Total survival for brood year 1993 is 0.2169%. There were 165 recoveries in the ocean, 528 in the Columbia River and 285 at the hatchery.

Brood year 1994 survival fell to an estimated 548 fish, or 0.0381%. WDFW hatcheries reported more recoveries than FWS.

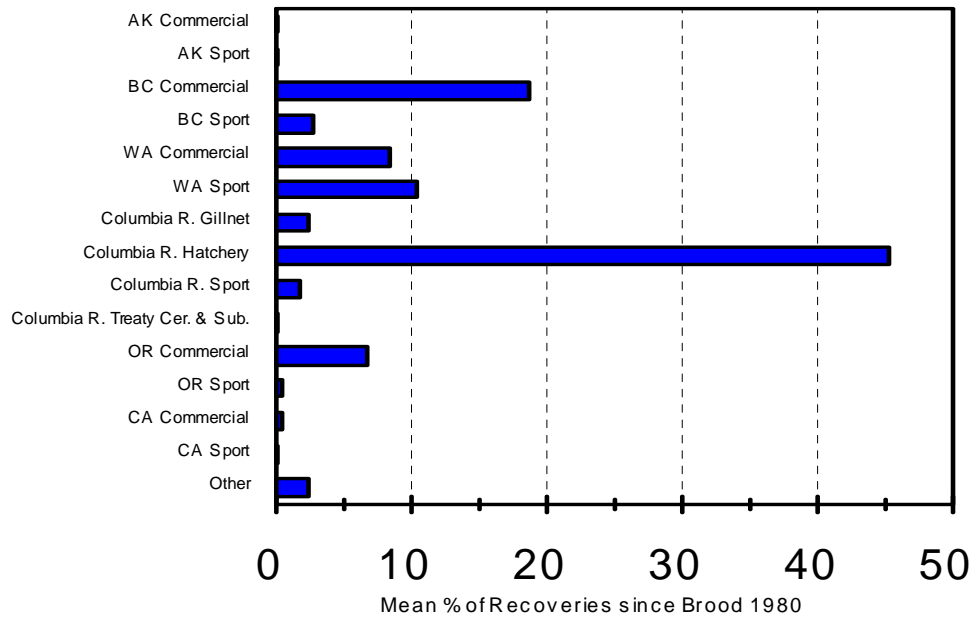
There were only 8 observed recoveries of CWTs released with brood year 1995 fish, but four more than for the previous brood year. These recoveries are expanded to a total estimated contribution of only 298 fish from a release of 1,037,507 for an estimated survival of 0.0224%. The low survival rates for these two brood years are consistent with the low survival for fish released from Spring Creek NFH.

Release of tule fall Chinook occurred through brood year 1998 without coded-wire tags. Brood year 1998 was the last year production tules were released.

## Abernathy FTC Tule Fall Chinook fingerlings



## Abernathy FTC Tule Fall Chinook fingerlings



<sup>ii</sup> Environmental survey report pertaining to salmon and steelhead in certain rivers of eastern Oregon and the Willamette River and its tributaries: Pt. II. Survey reports of the Willamette River and its tributaries. Fish Commission of Oregon, Research Division Willis, Raymond A, Melvin D Collins and Roy E Sams Oregon. Fish Commission. Research Division 1960

<sup>iii</sup> Assessments to Determine the Effect of Current and Alternate Ladder Operations on Brood Stock Collection and Behavior of Hatchery Fall Chinook Salmon at Little White Salmon National Fish Hatchery During 2004-05

Rod Engle and Doug Olson  
U.S. Fish and Wildlife Service  
Columbia River Fisheries Program Office  
1211 SE Cardinal Court, Suite 100  
Vancouver, WA 98683  
Speros Doulos and Jim Rockowski  
Little White Salmon National Fish Hatchery  
56961 State Route 14  
Cook, WA 98605  
August 14, 2006

<sup>iv</sup> Assessments to Determine the Effect of Current and Alternate Ladder Operations on Brood Stock Collection and Behavior of Hatchery Fall Chinook Salmon at Spring Creek National Fish Hatchery during 2003-2005

U.S. Fish and Wildlife Service  
Rod Engle and Doug Olson  
Columbia River Fisheries Program Office  
Larry Marchant and Mark Ahrens  
Spring Creek National Fish Hatchery  
2003-2005 ladder closures

Two closures were planned for the 2004 and 2005 hatchery return (Table 2). These closures were planned to occur during weekends near the beginning and peak of the hatchery return. Closures began near 1:00 PM on Fridays and ended near 1:00 PM on Sundays.

Stock Assessment Reference Summary from CRiS and PSMFC TS1  
 Broodyear 99 Spring Chinook raised at Carson NFH  
 released in Wind River

10/25/2007  
 rd2  
 99CaSCS

Date	Number	#/lb	Tagged	CWT	AT
04/19/2001	528,144	14.1	24,902	053513	Carson NFH
04/19/2001	251,523	15.4	24,863	053514	Carson NFH
04/19/2001	727,155	15.4	0	054838	Carson NFH
04/19/2001	<u>101,862</u>	15.6	<u>24,921</u>	054838	Carson NFH
Totals	1,608,684		74,686		

Where Recovered	Total	292 Observed Recoveries					Total
		=== PSC Expanded Recoveries ===					
		2s	3s	4s	5s	6s	
Columbia River Gillnet ODFW	1,958			30	16		46
Columbia River Sport ODFW	1,269			43			43
Foreign Research Vessels NMFS	0						0
Freshwater Sport WDFW	9,450			262			262
Hatchery FWS	7,218		1	213	13		227
Spawning Ground WDFW	592			12			12
Treaty Ceremonial ODFW	125			2			2
Totals	20,612		1	562	29		592

	Total	% of total	% of release
Ocean contribution	0	0	0.0000
Escapement to Columbia River	20,612	100	1.2813
Total Survival	20,612		1.2813
Escapement to NFH	7,218	35	0.4487
Columbia River contribution	13,394	65	0.8326

Ocean	Contribution by Area	
0 AK		
0 BC		
0 WA	Columbia River	Escapement to NFH
0 OR	13,394	7,218
0 CA		
0 Total		



Stock Assessment Reference Summary from CRiS and PSMFC TS1  
 Broodyear 00 Spring Chinook raised at Carson NFH  
 released in Wind River

10/25/2007  
 rd2  
 00CaSCS

Date	Number	#/lb	Tagged	CWT	AT
04/17/2002	249,927	15.1	48,537	053634	Carson NFH
04/17/2002	543,195	16.0	24,836	054251	Carson NFH
04/17/2002	206,815	16.5	24,731	054252	Carson NFH
04/17/2002	449,424	15.1	24,608	054762	Carson NFH
Totals	1,449,361		122,712		

330 Observed Recoveries  
 === PSC Expanded Recoveries ===

Where Recovered		Total	2s	3s	4s	5s	6s	Total
Columbia River Gillnet	ODFW	1,200			91	3		94
Columbia River Sport	ODFW	1,358		5	106			111
Freshwater Sport	WDFW	4,538			333	4		337
Hatchery	FWS	2,949		9	226	5		240
Ocean Troll (non-treaty)	CDFO	26			5			5
Treaty Ceremonial	ODFW	26			2			2
Totals		10,097		14	763	12		789

	Total	% of total	% of release
Ocean contribution	26	0	0.0018
Escapement to Columbia River	10,071	100	0.6949
Total Survival	10,097		0.6967
Escapement to NFH	2,949	29	0.2035
Columbia River contribution	7,122	71	0.4914

Ocean

Contribution by Area

- 0 AK
- 26 BC
- 0 WA
- 0 OR
- 0 CA
- 26 Total

Columbia River  
 7,122

Escapement to NFH  
 2,949

Stock Assessment Reference Summary from CRiS and PSMFC TS1  
 Broodyear 01 Spring Chinook raised at Carson NFH  
 released in Wind River

10/25/2007  
 rd2  
 01CaSCS

Date	Number	#/lb	Tagged	CWT	AT
04/16/2003	242,855	17.1	23,438	053663	Carson NFH
04/16/2003	705,221	17.1	22,117	054033	Carson NFH
04/16/2003	<u>725,179</u>	17.1	<u>22,169</u>	054034	Carson NFH
Totals	1,673,255		67,724		

Where Recovered	Total	108 Observed Recoveries					Total
		=== PSC Expanded Recoveries ===					
		2s	3s	4s	5s	6s	
Columbia River Gillnet ODFW	483			21			21
Columbia River Sport ODFW	745			19	4		23
Foreign Research Vessels NMFS	0						0
Freshwater Sport WDFW	1,190			59			59
Hatchery FWS	1,691		3	71			74
Treaty Subsistence ODFW	10			1			1
Treaty Troll WDFW	10			1			1
Totals	4,129		3	172	4		179

	Total	% of total	% of release
Ocean contribution	10	0	0.0006
Escapement to Columbia River	4,119	100	0.2462
Total Survival	4,129		0.2468
Escapement to NFH	1,691	41	0.1011
Columbia River contribution	2,428	59	0.1451

Ocean	Contribution by Area	
0 AK		
0 BC		
10 WA	Columbia River	Escapement to NFH
0 OR	2,428	1,691
0 CA		
10 Total		

Stock Assessment Reference Summary from CRIS and PSMFC TS1  
 Broodyear 98 Spring Chinook raised at Dworshak NFH  
 released in Clearwater River

12/06/2007  
 rd2  
 98DwSCS

Date	Number	#/lb	Tagged	CWT	AT
04/05/2000	496,314	0.0	61,400	054208	Dworshak NFH
04/06/2000	521,559	0.0	65,131	054209	Dworshak NFH
Totals	1,017,873		126,531		

Where Recovered	Total	623 Observed Recoveries					Total
		=== PSC Expanded Recoveries ===					
		2s	3s	4s	5s	6s	
Columbia River Gillnet	2,282		1	219	62	2	284
Columbia River Sport	2,440			160	143		303
Fish Trap (freshwater)	24			3			3
Freshwater Sport	354			27	17		44
Freshwater Sport	24			1	2		3
Freshwater Sport	137			17			17
Hatchery	3,338		6	146	263		415
Ocean Troll (non-treaty)	24			3			3
Spawning Ground	40			5			5
Treaty Ceremonial	72			9			9
Totals	8,735		7	590	487	2	1,086

	Total	% of total	% of release
Ocean contribution	24	0	0.0024
Escapement to Columbia River	8,711	100	0.8558
Total Survival	8,735		0.8582
Escapement to NFH	3,338	38	0.3279
Columbia River contribution	5,373	62	0.5279

Ocean	Contribution by Area	
24 AK		
0 BC		
0 WA	Columbia River	Escapement to NFH
0 OR	5,373	3,338
0 CA		
24 Total		

Stock Assessment Reference Summary from CRiS and PSMFC TS1  
 Broodyear 99 Spring Chinook raised at Dworshak NFH  
 released in Clearwater River

12/06/2007  
 rd2  
 99DwSCS

Date	Number	#/lb	Tagged	CWT	AT
03/28/2001	121,624	0.0	59,748	053211	Dworshak NFH
03/28/2001	211,496	0.0	65,704	053215	Dworshak NFH
Totals	333,120		125,452		

Where Recovered	Total	101 Observed Recoveries					Total
		=== PSC Expanded Recoveries ===					
		2s	3s	4s	5s	6s	
Columbia River Gillnet	65			10	13		23
Columbia River Sport	16			5			5
Freshwater Sport	22		1	6	1		8
Freshwater Sport	8			4			4
Hatchery	225		3	77			80
Totals	336		4	102	14		120

	Total	% of total	% of release
Ocean contribution	0	0	0.0000
Escapement to Columbia River	336	100	0.1009
Total Survival	336		0.1009
Escapement to NFH	225	67	0.0675
Columbia River contribution	111	33	0.0333

Ocean	Contribution by Area	
0 AK		
0 BC		
0 WA	Columbia River	Escapement to NFH
0 OR	111	225
0 CA		
0 Total		

Stock Assessment Reference Summary from CRIS and PSMFC TS1  
 Broodyear 00 Spring Chinook raised at Dworshak NFH  
 released in Clearwater River

12/12/2007  
 rd2  
 00DwSCS

Date	Number	#/lb	Tagged	CWT	AT
03/27/2002	508,165	0.0	55,845	050489	Dworshak NFH
Totals	508,165		55,845		

				96 Observed Recoveries				
				=== PSC Expanded Recoveries ===				
Where Recovered			Total	2s	3s	4s	5s	6s Total
Columbia River Gillnet	ODFW		518			55	2	57
Columbia River Sport	ODFW		455			50		50
Freshwater Sport	IDFG		191			18	3	21
Hatchery	FWS		291		32			32
Hatchery	ODFW		9			1		1
Treaty Ceremonial	ODFW		9			1		1
Totals			1,473		32	125	5	162

				% of	% of
				total	release
Ocean contribution			0	0	0.0000
Escapement to Columbia River			1,473	100	0.2899
Total Survival			1,473		0.2899
Escapement to NFH			291	20	0.0573
Columbia River contribution			1,182	80	0.2326

Ocean	Contribution by Area	
0 AK		
0 BC		
0 WA	Columbia River	Escapement to NFH
0 OR	1,182	291
0 CA		
0 Total		

Stock Assessment Reference Summary from CRiS and PSMFC TS1  
 Broodyear 01 Spring Chinook raised at Dworshak NFH  
 released in Clearwater River

12/06/2007  
 rd2  
 01DwSCS

Date	Number	#/lb	Tagged	CWT	AT
03/19/2003	512,794	21.3	64,907	050974	Dworshak NFH
03/20/2003	521,188	21.6	61,944	050975	Dworshak NFH
Totals	1,033,982		126,851		

42 Observed Recoveries  
 === PSC Expanded Recoveries ===

Where Recovered		Total	2s	3s	4s	5s	6s	Total
Columbia River Gillnet	ODFW	100			12			12
Columbia River Sport	ODFW	298			36			36
Freshwater Sport	IDFG	164			18	2		20
Hatchery	FWS	8		1				1
Hatchery	IDFG	8			1			1
Spawning Ground	WDFW	24			3			3
Treaty Subsistence	ODFW	8			1			1
Totals		610		1	71	2		74

	Total	% of total	% of release
Ocean contribution	0	0	0.0000
Escapement to Columbia River	610	100	0.0590
Total Survival	610		0.0590
Escapement to NFH	8	1	0.0008
Columbia River contribution	602	99	0.0582

Ocean	Contribution by Area	
0 AK		
0 BC		
0 WA	Columbia River	Escapement to NFH
0 OR	602	8
0 CA		
0 Total		

Stock Assessment Reference Summary from CRIS and PSMFC TS1  
 Broodyear 97 Summer Steelhead raised at Dworshak NFH  
 released in Clearwater River

12/13/2007  
 rd2  
 97DwsST

Date	Number	#/lb	Tagged	CWT	AT
04/30/1998	149,707	5.3	18,173	053957	Dworshak NFH
04/29/1998	49,918	5.2	21,015	053958	Dworshak NFH
04/27/1998	83,991	7.8	20,296	053959	Dworshak NFH
04/27/1998	336,506	7.5	20,939	053960	Dworshak NFH
04/29/1998	191,123	6.3	17,804	053961	Dworshak NFH
04/29/1998	148,163	5.6	16,966	053962	Dworshak NFH
04/30/1998	269,536	5.4	17,965	053963	Dworshak NFH
Totals	1,228,944		133,158		

377 Observed Recoveries

=== PSC Expanded Recoveries ===

Where Recovered		Total	2s	3s	4s	5s	6s	Total
Columbia River Gillnet	ODFW	438		53	1			54
Columbia River Sport	ODFW	74		8				8
Estuary Sport	ODFW	16		2				2
Freshwater Sport	IDFG	127		12	4			16
Freshwater Sport	ODFW	51		3	2			5
Freshwater Sport	WDFW	772		77	14			91
Hatchery	FWS	2,845		37	278	5		320
Treaty Subsistence	ODFW	2		1				1
Totals		4,325		193	299	5		497

	Total	% of total	% of release
Ocean contribution	0	0	0.0000
Escapement to Columbia River	4,325	100	0.3519
Total Survival	4,325		0.3519
Escapement to NFH	2,845	66	0.2315
Columbia River contribution	1,480	34	0.1204

Ocean

Contribution by Area

- 0 AK
- 0 BC
- 0 WA
- 0 OR
- 0 CA
- 0 Total

Columbia River  
 1,480

Escapement to NFH  
 2,845

Stock Assessment Reference Summary from CRiS and PSMFC TS1 12/12/2007  
 Broodyear 98 Summer Steelhead raised at Dworshak NFH rd2  
 released in Clearwater River 98DwsST

Date	Number	#/lb	Tagged	CWT	AT
04/05/2000	496,314	0.0	61,400	054208	Dworshak NFH
04/06/2000	521,559	0.0	65,131	054209	Dworshak NFH
Totals	1,017,873		126,531		

623 Observed Recoveries  
 === PSC Expanded Recoveries ===

Where Recovered		Total	2s	3s	4s	5s	6s	Total
Columbia River Gillnet	ODFW	2,282		1	219	62	2	284
Columbia River Sport	ODFW	2,440			160	143		303
Fish Trap (freshwater)	ODFW	24			3			3
Freshwater Sport	IDFG	354			27	17		44
Freshwater Sport	ODFW	24			1	2		3
Freshwater Sport	WDFW	137			17			17
Hatchery	FWS	3,338		6	146	263		415
Ocean Troll (non-treaty)	ADFG	24			3			3
Spawning Ground	WDFW	40			5			5
Treaty Ceremonial	ODFW	72			9			9
Totals		8,735		7	590	487	2	1,086

	Total	% of total	% of release
Ocean contribution	24	0	0.0024
Escapement to Columbia River	8,711	100	0.8558
Total Survival	8,735		0.8582
Escapement to NFH	3,338	38	0.3279
Columbia River contribution	5,373	62	0.5279

Ocean Contribution by Area

24 AK		
0 BC		
0 WA	Columbia River	Escapement to NFH
0 OR	5,373	3,338
0 CA		
24 Total		



Stock Assessment Reference Summary from CRIS and PSMFC TS1 12/12/2007  
 Broodyear 99 Summer Steelhead raised at Dworshak NFH rd2  
 released in Clearwater River 99DwsST

Date	Number	#/lb	Tagged	CWT	AT
03/28/2001	121,624	0.0	59,748	053211	Dworshak NFH
03/28/2001	211,496	0.0	65,704	053215	Dworshak NFH
Totals	333,120		125,452		

Where Recovered	Total	101 Observed Recoveries					Total
		=== PSC Expanded Recoveries ===					
		2s	3s	4s	5s	6s	
Columbia River Gillnet	ODFW	65		10	13		23
Columbia River Sport	ODFW	16		5			5
Freshwater Sport	IDFG	22	1	6	1		8
Freshwater Sport	WDFW	8		4			4
Hatchery	FWS	225	3	77			80
Totals		336	4	102	14		120

	Total	% of total	% of release
Ocean contribution	0	0	0.0000
Escapement to Columbia River	336	100	0.1009
Total Survival	336		0.1009
Escapement to NFH	225	67	0.0675
Columbia River contribution	111	33	0.0333

Ocean	Contribution by Area	
0 AK		
0 BC		
0 WA	Columbia River	Escapement to NFH
0 OR	111	225
0 CA		
0 Total		

Stock Assessment Reference Summary from CRiS and PSMFC TS1  
 Broodyear 00 Summer Steelhead raised at Dworshak NFH  
 released in Clearwater River

12/12/2007  
 rd2  
 00DwSST

Date	Number	#/lb	Tagged	CWT	AT
03/27/2002	508,165	0.0	55,845	050489	Dworshak NFH
03/28/2002	492,396	0.0	52,189	050491	Dworshak NFH
Totals	1,000,561		108,034		

Where Recovered	Total	193 Observed Recoveries					Total
		=== PSC Expanded Recoveries ===					
		2s	3s	4s	5s	6s	
Columbia River Gillnet	886			90	6		96
Columbia River Sport	870			89	5		94
Freshwater Sport	408			41	3		44
Freshwater Sport	28			3			3
Freshwater Sport	75			8			8
Hatchery	602		65				65
Hatchery	9				1		1
Hatchery	9			1			1
Ocean Troll (non-treaty)	47			5			5
Treaty Ceremonial	28			3			3
Totals	2,962		65	240	15		320

	Total	% of total	% of release
Ocean contribution	47	2	0.0047
Escapement to Columbia River	2,915	98	0.2913
Total Survival	2,962		0.2960
Escapement to NFH	602	20	0.0602
Columbia River contribution	2,313	78	0.2312

Ocean	Contribution by Area	
0 AK		
47 BC		
0 WA	Columbia River	Escapement to NFH
0 OR	2,313	602
0 CA		
47 Total		

Stock Assessment Reference Summary from CRiS and PSMFC TS1  
 Broodyear 00 Coho raised at Eagle Creek NFH  
 released in Eagle Creek

10/25/2007  
 rd2  
 00ECCOS

Date	Number	#/lb	Tagged	CWT	AT
05/17/2002	483,614	12.5	24,128	054249	Eagle Creek NFH
05/17/2002	24,707	12.5	23,820	054253	Eagle Creek NFH
Totals	508,321		47,948		

Where Recovered	Total	511 Observed Recoveries					Total
		=== PSC Expanded Recoveries ===					
		2s	3s	4s	5s	6s	
Columbia River Gillnet	252		42				42
Estuary Sport	200		10				10
Hatchery	6,887	286	490				776
Ocean Sport	301		15				15
Spawning Ground	20	1					1
Sport (charter)	20		1				1
Sport (private)	200		10				10
Treaty Troll	3		3				3
Totals	7,883	287	571				858

	Total	% of total	% of release
Ocean contribution	524	7	0.1031
Escapement to Columbia River	7,359	93	1.4477
Total Survival	7,883		1.5508

Escapement to NFH	6,887	87	1.3549
Columbia River contribution	472	6	0.0929

Ocean	Contribution by Area	
0 AK		
0 BC		
223 WA	Columbia River	Escapement to NFH
301 OR	472	6,887
0 CA		
524 Total		

Stock Assessment Reference Summary from CRiS and PSMFC TS1  
 Broodyear 01 Coho raised at Eagle Creek NFH  
 released in Eagle Creek

10/25/2007  
 rd2  
 01ECCOS

Date	Number	#/lb	Tagged	CWT	AT
05/06/2003	25,076	14.5	24,392	054035	Eagle Creek NFH
05/06/2003	480,324	14.5	24,366	054036	Eagle Creek NFH
Totals	505,400		48,758		

Where Recovered	Total	495 Observed Recoveries					Total
		2s	3s	4s	5s	6s	
Estuary Sport	355	5	13				18
Hatchery	5,110	46	544				590
Hatchery	1		1				1
Ocean Sport	256		13				13
Ocean Troll (non-treaty)	39		2				2
Spawning Ground	21		2				2
Sport (charter)	79		4				4
Sport (private)	256		13				13
Totals	6,117	51	592				643

	Total	% of total	% of release
Ocean contribution	630	10	0.1247
Escapement to Columbia River	5,487	90	1.0857
Total Survival	6,117		1.2103

Escapement to NFH	5,110	84	1.0111
Columbia River contribution	377	6	0.0746

Ocean	Contribution by Area	
0 AK		
0 BC		
374 WA	Columbia River	Escapement to NFH
256 OR	377	5,110
0 CA		
630 Total		

Stock Assessment Reference Summary from CRiS and PSMEC TS1  
 Broodyear 02 Coho raised at Eagle Creek NFH  
 released in Eagle Creek

10/25/2007  
 rd2  
 02ECCOS

Date	Number	#/lb	Tagged	CWT	AT
04/19/2004	24,947	17.6	22,955	053354	Eagle Creek NFH
04/19/2004	532,069	17.6	23,674	053355	Eagle Creek NFH
Totals	557,016		46,629		

Where Recovered	Total	443 Observed Recoveries					Total
		=== PSC Expanded Recoveries ===					
		2s	3s	4s	5s	6s	
Columbia River Gillnet	465		35				35
Estuary Sport	22		1				1
Hatchery	7,480	24	640				664
Hatchery	22		1				1
Ocean Sport	67		3				3
Sport (charter)	315		14				14
Sport (private)	202		9				9
Totals	8,573	24	703				727

	Total	% of total	% of release
Ocean contribution	584	7	0.1048
Escapement to Columbia River	7,989	93	1.4342
Total Survival	8,573		1.5391
Escapement to NFH	7,480	87	1.3429
Columbia River contribution	509	6	0.0914

Ocean	Contribution by Area	
0 AK		
0 BC		
517 WA	Columbia River	Escapement to NFH
67 OR	509	7,480
0 CA		
584 Total		

Stock Assessment Reference Summary from CRIS and PSMFC TS1  
 Broodyear 99 Spring Chinook raised at Entiat NFH  
 released in Entiat River

11/01/2007  
 rd2  
 99EtSCS

Date	Number	#/lb	Tagged	CWT	AT
04/03/2001	196,448	12.9	194,922	054528	Entiat NFH
04/03/2001	100,122	12.8	99,172	054950	Entiat NFH
04/03/2001	<u>101,285</u>	12.6	<u>100,317</u>	054951	Entiat NFH
Totals	<u>397,855</u>		<u>394,411</u>		

Where Recovered	Total	321 Observed Recoveries					Total
		=== PSC Expanded Recoveries ===					
		2s	3s	4s	5s	6s	
Columbia River Gillnet	13			10	3		13
Columbia River Sport	18			18			18
Freshwater Sport	1			1			1
Hatchery	310		6	294	7		307
Hatchery	1			1			1
Spawning Ground	<u>11</u>		<u>11</u>				<u>11</u>
Totals	<u>354</u>		<u>17</u>	<u>324</u>	<u>10</u>		<u>351</u>

	Total	% of total	% of release
Ocean contribution	0	0	0.0000
Escapement to Columbia River	354	100	0.0890
Total Survival	354		0.0890
Escapement to NFH	310	88	0.0779
Columbia River contribution	44	12	0.0111

Ocean	Contribution by Area	
0 AK		
0 BC		
0 WA	Columbia River	Escapement to NFH
0 OR	44	310
0 CA		
0 Total		

Stock Assessment Reference Summary from CRiS and PSMFC TS1  
 Broodyear 00 Spring Chinook raised at Entiat NFH  
 released in Entiat River

11/01/2007  
 rd2  
 00EtSCS

Date	Number	#/lb	Tagged	CWT	AT
04/08/2002	102,525	15.8	67,466	054434	Entiat NFH
04/08/2002	184,090	17.4	65,261	054435	Entiat NFH
04/07/2002	131,155	22.3	33,962	054913	Entiat NFH
04/08/2002	65,446	16.1	26,636	054914	Entiat NFH
04/08/2002	<u>50,504</u>	32.7	<u>0</u>	054914	Entiat NFH
Totals	533,720		193,325		

322 Observed Recoveries

=== PSC Expanded Recoveries ===

Where Recovered		Total	2s	3s	4s	5s	6s	Total
Columbia River Gillnet	ODFW	55			21	2		23
Columbia River Sport	ODFW	40			17			17
Freshwater Net	WDFW	2			1			1
Hatchery	FWS	738		14	290			304
Hatchery	WDFW	2			1			1
Spawning Ground	WDFW	<u>12</u>			<u>4</u>	<u>4</u>		<u>8</u>
Totals		849		<u>14</u>	334	<u>6</u>		354

	Total	% of total	% of release
Ocean contribution	0	0	0.0000
Escapement to Columbia River	849	100	0.1591
Total Survival	849		0.1591
Escapement to NFH	738	87	0.1383
Columbia River contribution	111	13	0.0208

Ocean

Contribution by Area

0 AK		
0 BC		
0 WA	Columbia River	Escapement to NFH
0 OR	111	738
0 CA		
0 Total		

Stock Assessment Reference Summary from CRIS and PSMFC TS1  
 Broodyear 01 Spring Chinook raised at Entiat NFH  
 released in Entiat River

11/01/2007  
 rd2  
 01EtSCS

Date	Number	#/lb	Tagged	CWT	AT
04/15/2003	119,499	19.7	58,785	050490	Entiat NFH
04/15/2003	99,100	19.6	38,419	054916	Entiat NFH
04/15/2003	88,114	19.8	47,951	054937	Entiat NFH
04/15/2003	88,976	19.8	48,127	054938	Entiat NFH
Totals	395,689		193,282		

177 Observed Recoveries  
 === PSC Expanded Recoveries ===

Where Recovered		Total	2s	3s	4s	5s	6s	Total
Columbia River Gillnet	ODFW	54			20	6		26
Columbia River Sport	ODFW	109			50	8		58
Hatchery	FWS	637		7	311			318
Spawning Ground	FWS	8			4			4
Treaty Subsistence	ODFW	3			1			1
Totals		811		7	386	14		407

	Total	% of total	% of release
Ocean contribution	0	0	0.0000
Escapement to Columbia River	811	100	0.2050
Total Survival	811		0.2050
Escapement to NFH	637	79	0.1610
Columbia River contribution	174	21	0.0440

Ocean

Contribution by Area

- 0 AK
- 0 BC
- 0 WA
- 0 OR
- 0 CA
- 0 Total

Columbia River  
 174

Escapement to NFH  
 637



Stock Assessment Reference Summary from CRiS and PSMFC TS1  
 Broodyear 99 Spring Chinook raised at Kooskia NFH  
 released in Clear Creek

12/26/2007  
 rd2  
 99KoSCS

Date	Number	#/lb	Tagged	CWT	AT
03/27/2001	82,974	0.0	62,067	053217	Kooskia NFH
Totals	82,974		62,067		

Where Recovered	Total	62 Observed Recoveries					Total
		=== PSC Expanded Recoveries ===					
		2s	3s	4s	5s	6s	
Columbia River Gillnet	22			2	14		16
Columbia River Sport	7			5			5
Freshwater Sport	1			1			1
Freshwater Sport	1			1			1
Freshwater Sport	5		4				4
Hatchery	56		6	36			42
Spawning Ground	1		1				1
Spawning Ground	4				3		3
Treaty Ceremonial	1			1			1
Totals	98		11	46	17		74

	Total	% of total	% of release
Ocean contribution	0	0	0.0000
Escapement to Columbia River	98	100	0.1181
Total Survival	98		0.1181
Escapement to NFH	56	57	0.0675
Columbia River contribution	42	43	0.0506

Ocean	Contribution by Area	
0 AK		
0 BC		
0 WA		
0 OR	Columbia River	Escapement to NFH
0 CA	42	56
0 Total		

Stock Assessment Reference Summary from CRiS and PSMFC TS1  
 Broodyear 00 Spring Chinook raised at Kooskia NFH  
 released in Clear Creek

12/26/2007  
 rd2  
 00KoSCS

Date	Number	#/lb	Tagged	CWT	AT
04/04/2002	51,329	0.0	0	!072002000	Kooskia NFH
04/04/2002	498,532	0.0	95,678	054516	Kooskia NFH
Totals	549,861		95,678		

Where Recovered	Total	92 Observed Recoveries					Total
		=== PSC Expanded Recoveries ===					
		2s	3s	4s	5s	6s	
Columbia River Gillnet ODFW	365			69	1		70
Columbia River Sport ODFW	432			78	5		83
Freshwater Sport IDFG	130			25			25
Freshwater Sport ODFW	5			1			1
Hatchery FWS	57		11				11
Ocean Troll (non-treaty) CDFO	16			3			3
Totals	1,005		11	176	6		193

	Total	% of total	% of release
Ocean contribution	16	2	0.0029
Escapement to Columbia River	989	98	0.1799
Total Survival	1,005		0.1828
Escapement to NFH	57	6	0.0104
Columbia River contribution	932	93	0.1695

Ocean	Contribution by Area	
0 AK		
16 BC		
0 WA	Columbia River	Escapement to NFH
0 OR	932	57
0 CA		
16 Total		

Stock Assessment Reference Summary from CRIS and PSMFC TS1  
 Broodyear 01 Spring Chinook raised at Kooskia NFH  
 released in Clear Creek

12/26/2007  
 rd2  
 01KoSCS

Date	Number	#/lb	Tagged	CWT	AT
03/26/2003	346,508	0.0	65,864	050799	Kooskia NFH
03/26/2003	201,589	0.0	38,318	053016	Kooskia NFH
Totals	548,097		104,182		

Where Recovered	Total	10 Observed Recoveries					Total
		=== PSC Expanded Recoveries ===					
		2s	3s	4s	5s	6s	
Columbia River Gillnet ODFW	32			6			6
Columbia River Sport ODFW	47			9			9
Freshwater Sport IDFG	10		1	1			2
Ocean Troll (non-treaty) ODFW	11			2			2
Totals	100		1	18			19

	Total	% of total	% of release
Ocean contribution	11	11	0.0020
Escapement to Columbia River	89	89	0.0162
Total Survival	100		0.0182
Escapement to NFH	0	0	0.0000
Columbia River contribution	89	89	0.0162

Ocean	Contribution by Area	
0 AK		
0 BC		
0 WA		
11 OR	Columbia River	Escapement to NFH
0 CA	89	0
11 Total		

Stock Assessment Reference Summary from CRIS and PSMFC TSI  
 Broodyear 99 Spring Chinook raised at Leavenworth NFH  
 released in Icicle Creek

10/31/2007  
 rd2  
 99LeSCS

Date	Number	#/lb	Tagged	CWT	AT
04/17/2001	387,846	16.5	64,535	054427	Leavenworth NFH
04/17/2001	459,566	16.5	67,258	054428	Leavenworth NFH
04/17/2001	414,838	17.2	53,915	054429	Leavenworth NFH
04/17/2001	184,047	17.0	30,344	054911	Leavenworth NFH
04/17/2001	183,792	17.0	26,680	054912	Leavenworth NFH
Totals	1,630,089		242,732		

Where Recovered	Total	138 Observed Recoveries					Total
		=== PSC Expanded Recoveries ===					
		2s	3s	4s	5s	6s	
Columbia River Gillnet	ODFW	161		14	10		24
Columbia River Sport	ODFW	109	6	10			16
Freshwater Sport	WDFW	415		63			63
Hatchery	FWS	807	7	88	25		120
Hatchery	WDFW	7		1			1
Spawning Ground	WDFW	87		5	8		13
Totals		1,586	13	181	43		237

	Total	% of total	% of release
Ocean contribution	0	0	0.0000
Escapement to Columbia River	1,586	100	0.0973
Total Survival	1,586		0.0973
Escapement to NFH	807	51	0.0495
Columbia River contribution	779	49	0.0478

Ocean	Contribution by Area	
0 AK		
0 BC		
0 WA	Columbia River	Escapement to NFH
0 OR	779	807
0 CA		
0 Total		

Stock Assessment Reference Summary from CRiS and PSMFC TS1  
 Broodyear 00 Spring Chinook raised at Leavenworth NFH  
 released in Icicle Creek

10/31/2007  
 rd2  
 00LeSCS

Date	Number	#/lb	Tagged	CWT	AT
04/22/2002	137,392	23.8	48,412	054307	Leavenworth NFH
04/22/2002	191,346	20.5	24,272	054414	Leavenworth NFH
04/22/2002	184,658	20.5	22,200	054415	Leavenworth NFH
04/22/2002	196,015	23.1	68,654	054436	Leavenworth NFH
04/22/2002	259,442	23.1	66,779	054437	Leavenworth NFH
04/22/2002	175,946	22.7	71,057	054438	Leavenworth NFH
04/22/2002	238,944	22.7	70,164	054439	Leavenworth NFH
04/22/2002	170,619	23.8	72,955	054440	Leavenworth NFH
Totals	1,554,362		444,493		

Where Recovered	Total	804 Observed Recoveries					Total
		=== PSC Expanded Recoveries ===					
		2s	3s	4s	5s	6s	
Columbia River Gillnet ODFW	556			100	12		112
Columbia River Sport ODFW	713		5	146	5		156
Foreign Research Vessels NMFS	0						0
Freshwater Net WDFW	15			4			4
Freshwater Sport ODFW	16			3	1		4
Freshwater Sport WDFW	825		21	169			190
Hatchery FWS	3,327		33	584	57		674
Hatchery ODFW	8			1			1
Hatchery WDFW	42			9			9
Ocean Troll (non-treaty) ADFG	5			2			2
Spawning Ground WDFW	292		2	58			60
Treaty Subsistence ODFW	3				1		1
Totals	5,802		61	1,076	76		1,213

	Total	% of total	% of release
Ocean contribution	5	0	0.0003
Escapement to Columbia River	5,797	100	0.3730
Total Survival	5,802		0.3733
Escapement to NFH	3,327	57	0.2140
Columbia River contribution	2,470	43	0.1589

Ocean	Contribution by Area	
5 AK		
0 BC		
0 WA		
0 OR	Columbia River	Escapement to NFH
0 CA	2,470	3,327
5 Total		

Stock Assessment Reference Summary from CRiS and PSMFC TS1  
 Broodyear 01 Spring Chinook raised at Leavenworth NFH  
 released in Icicle Creek

10/31/2007  
 rd2  
 01LeSCS

Date	Number	#/lb	Tagged	CWT	AT
04/21/2003	145,951	15.5	100,899	050789	Leavenworth NFH
04/21/2003	137,770	15.5	78,248	050790	Leavenworth NFH
04/21/2003	259,693	18.3	103,755	050791	Leavenworth NFH
04/21/2003	194,469	15.6	104,700	050792	Leavenworth NFH
04/21/2003	128,876	15.6	97,545	050793	Leavenworth NFH
04/21/2003	281,022	16.0	195,303	054530	Leavenworth NFH
04/21/2003	39,931	18.3	20,762	054707	Leavenworth NFH
04/21/2003	<u>101,181</u>	16.0	<u>54,532</u>	054936	Leavenworth NFH
Totals	1,288,893		755,744		

Where Recovered	Total	944 Observed Recoveries					Total
		=== PSC Expanded Recoveries ===					
		2s	3s	4s	5s	6s	
Columbia River Gillnet ODFW	161			78	18		96
Columbia River Sport ODFW	491		6	229	52		287
Estuary Sport WDFW	3				1		1
Freshwater Sport ODFW	1			1			1
Freshwater Sport WDFW	17		12				12
Hatchery FWS	2,520		77	1,409			1,486
Hatchery WDFW	3			1			1
Ocean Troll (non-treaty) CDFO	16			10			10
Spawning Ground FWS	2			1			1
Spawning Ground WDFW	13			8			8
Treaty Subsistence ODFW	7			4			4
Totals	<u>3,234</u>		<u>95</u>	<u>1,741</u>	<u>71</u>		<u>1,907</u>

	Total	% of total	% of release
Ocean contribution	16	0	0.0012
Escapement to Columbia River	3,218	100	0.2497
Total Survival	3,234		0.2509
Escapement to NFH	2,520	78	0.1955
Columbia River contribution	698	22	0.0542

Ocean	Contribution by Area	
0 AK		
16 BC		
0 WA	Columbia River	Escapement to NFH
0 OR	698	2,520
0 CA		
16 Total		

Stock Assessment Reference Summary from CRIS and PSMFC TS1 10/31/2007  
 Broodyear 99 Spring Chinook raised at L White Salmon NFH rd2  
 released in L White Salmon River 99LWSCS

Date	Number	#/lb	Tagged	CWT	AT
04/19/2001	1,016,574	15.9	67,781	054407	L White Salmon NFH
Totals	1,016,574		67,781		

				49 Observed Recoveries					
				=== PSC Expanded Recoveries ===					
Where Recovered			Total	2s	3s	4s	5s	6s	Total
Columbia River Gillnet	ODFW		225			11	4		15
Columbia River Sport	ODFW		270			18			18
Fish Trap (freshwater)	ODFW		15			1			1
Freshwater Sport	WDFW		480			32			32
Hatchery	FWS		480		2	26	4		32
Totals			1,470		2	88	8		98

				% of	% of
				total	release
Ocean contribution		0		0	0.0000
Escapement to Columbia River		1,470		100	0.1446
Total Survival		1,470			0.1446
Escapement to NFH		480		33	0.0472
Columbia River contribution		990		67	0.0974

Ocean	Contribution by Area	
0 AK		
0 BC		
0 WA	Columbia River	Escapement to NFH
0 OR	990	480
0 CA		
0 Total		

Stock Assessment Reference Summary from CRIS and PSMFC TS1 10/26/2007  
 Broodyear 00 Spring Chinook raised at L White Salmon NFH rd2  
 released in L White Salmon River 00LWSCS

Date	Number	#/lb	Tagged	CWT	AT
04/18/2002	1,037,382	15.8	73,828	054426	L White Salmon NFH
Totals	1,037,382		73,828		

				123 Observed Recoveries				
				=== PSC Expanded Recoveries ===				
Where Recovered			Total	2s	3s	4s	5s	6s Total
Columbia River Gillnet	ODFW		899			60	4	64
Columbia River Sport	ODFW		239			17		17
Freshwater Sport	WDFW		323			23		23
Hatchery	FWS		1,138		2	76	3	81
Ocean Troll (non-treaty)	CDFO		42			3		3
Treaty Ceremonial	ODFW		14			1		1
Totals			2,655		2	180	7	189

				% of total	% of release
Ocean contribution			42	2	0.0040
Escapement to Columbia River			2,613	98	0.2519
Total Survival			2,655		0.2559
Escapement to NFH			1,138	43	0.1097
Columbia River contribution			1,475	56	0.1422

Ocean	Contribution by Area	
0 AK		
42 BC		
0 WA	Columbia River	Escapement to NFH
0 OR	1,475	1,138
0 CA		
42 Total		



Stock Assessment Reference Summary from CRiS and PSMFC TS1 10/26/2007  
 Broodyear 01 Spring Chinook raised at L White Salmon NFH rd2  
 released in L White Salmon River 01LWSCS

Date	Number	#/lb	Tagged	CWT	AT
04/17/2003	1,012,339	15.4	69,126	054425	L White Salmon NFH
Totals	1,012,339		69,126		

				48 Observed Recoveries				
				=== PSC Expanded Recoveries ===				
Where Recovered			Total	2s	3s	4s	5s	6s Total
Columbia River Gillnet	ODFW		147			9	1	10
Columbia River Sport	ODFW		337			23		23
Hatchery	FWS		498		1	33		34
Totals			982		1	65	1	67

				% of	% of
				total	release
Ocean contribution			0	0	0.0000
Escapement to Columbia River			982	100	0.0970
Total Survival			982		0.0970
Escapement to NFH			498	51	0.0492
Columbia River contribution			484	49	0.0478

Ocean

Contribution by Area

- 0 AK
- 0 BC
- 0 WA
- 0 OR
- 0 CA
- 0 Total

Columbia River  
484

Escapement to NFH  
498

Stock Assessment Reference Summary from CRIS and PSMFC TS1 11/21/2007  
 Broodyear 99 Upriver Bright FCS raised at L White Salmon NFH rd2  
 released in L White Salmon River 99LWURB

Date	Number	#/lb	Tagged	CWT	AT
06/22/2000	1,970,592	65.9	199,907	0501021005	L White Salmon NFH
Totals	1,970,592		199,907		

Where Recovered	Total	618 Observed Recoveries					Total
		=== PSC Expanded Recoveries ===					
		2s	3s	4s	5s	6s	
Columbia River Gillnet ODFW	1,745	3	32	93	45	4	177
Columbia River Sport ODFW	316			22	10		32
Estuary Sport ODFW	88		5	4			9
Freshwater Sport WDFW	20			2			2
Hatchery FWS	2,187	19	46	78	74	5	222
Hatchery ODFW	20		1	1			2
Multiple Gear ADFG	10				1		1
Ocean Sport ADFG	178			15	3		18
Ocean Sport CDFO	187				19		19
Ocean Trawl By-Catch ODFW	10	1					1
Ocean Troll (non-treaty) ADFG	3,686		25	169	168	12	374
Ocean Troll (non-treaty) CDFO	543		9	21	23	2	55
Ocean Troll (non-treaty) ODFW	30		3				3
Ocean Troll (non-treaty) WDFW	59			6			6
Ocean Troll - Day Boat ADFG	109		2	7	2		11
Other ADFG	10				1		1
Spawning Ground WDFW	7,117	2	68	342	293	17	722
Sport (charter) WDFW	20				2		2
Sport (private) WDFW	30	2	1				3
Treaty Troll WDFW	20				2		2
<b>Totals</b>	<b>16,385</b>	<b>27</b>	<b>192</b>	<b>760</b>	<b>643</b>	<b>40</b>	<b>1,662</b>

	Total	% of total	% of release
Ocean contribution	4,892	30	0.2483
Escapement to Columbia River	11,493	70	0.5832
Total Survival	16,385		0.8315
Escapement to NFH	2,187	13	0.1110
Columbia River contribution	9,306	57	0.4722

Ocean	Contribution by Area	
3,993 AK		
730 BC		
129 WA	Columbia River	Escapement to NFH
40 OR	9,306	2,187
0 CA		
4,892 Total		

Stock Assessment Reference Summary from CRIS and PSMFC TS1 11/21/2007  
 Broodyear 00 Upriver Bright FCS raised at L White Salmon NFH rd2  
 released in L White Salmon River 00LWURB

Date	Number	#/lb	Tagged	CWT	AT
06/21/2001	1,937,764	109.2	193,877	0501010910	L White Salmon NFH
Totals	1,937,764		193,877		

Where Recovered	Total	257 Observed Recoveries					Total
		=== PSC Expanded Recoveries ===					
		2s	3s	4s	5s	6s	
Coastal Gillnet WDFW	60			6			6
Columbia River Gillnet ODFW	780		14	39	25		78
Columbia River Sport ODFW	290		16	5	8		29
Commercial Seine ADFG	110	11					11
Estuary Sport ODFW	30		3				3
Hatchery FWS	860	1	4	49	32		86
Hatchery ODFW	10			1			1
Ocean Sport ADFG	250			8	14	3	25
Ocean Sport CDFO	160				7	9	16
Ocean Sport ODFW	20				2		2
Ocean Troll (non-treaty) ADFG	1,050		7	52	34	12	105
Ocean Troll (non-treaty) CDFO	710		7	29	35		71
Ocean Troll (non-treaty) WDFW	20			2			2
Ocean Troll - Day Boat ADFG	70			2	5		7
Spawning Ground ODFW	10			1			1
Spawning Ground WDFW	1,719		38	114	20		172
Sport (private) WDFW	30		3				3
Treaty Troll WDFW	10			1			1
Totals	6,189	12	92	309	182	24	619

	Total	% of total	% of release
Ocean contribution	2,490	40	0.1285
Escapement to Columbia River	3,699	60	0.1909
Total Survival	6,189		0.3194
Escapement to NFH	860	14	0.0444
Columbia River contribution	2,839	46	0.1465

Ocean	Contribution by Area	
1,480 AK		
870 BC		
120 WA	Columbia River	Escapement to NFH
20 OR	2,839	860
0 CA		
2,490 Total		

Stock Assessment Reference Summary from CRiS and PSMFC TS1 11/21/2007  
 Broodyear 01 Upriver Bright FCS raised at L White Salmon NFH rd2  
 released in L White Salmon River 01LWURB

Date	Number	#/lb	Tagged	CWT	AT
06/20/2002	2,074,295	82.2	198,933	0501030106	L White Salmon NFH
Totals	2,074,295		198,933		

Where Recovered	Total	210 Observed Recoveries					Total
		=== PSC Expanded Recoveries ===					
		2s	3s	4s	5s	6s	
Columbia River Gillnet	ODFW 636		23	24	14		61
Columbia River Sport	ODFW 188		10	4	4		18
Estuary Sport	ODFW 52		4	1			5
Hatchery	FWS 812	1	15	62			78
Hatchery	ODFW 10			1			1
Ocean Sport	ADFG 63			4	2		6
Ocean Troll (non-treaty)	ADFG 1,106		2	77	27		106
Ocean Troll (non-treaty)	CDFO 230		3	13	6		22
Spawning Ground	WDFW 917		22	66			88
Sport (charter)	WDFW 31		1		2		3
Totals	4,045	1	80	252	55		388

	Total	% of total	% of release
Ocean contribution	1,430	35	0.0689
Escapement to Columbia River	2,615	65	0.1261
Total Survival	4,045		0.1950
Escapement to NFH	812	20	0.0391
Columbia River contribution	1,803	45	0.0869

Ocean	Contribution by Area	
1,169 AK		
230 BC		
31 WA	Columbia River	Escapement to NFH
0 OR	1,803	812
0 CA		
1,430 Total		

Stock Assessment Reference Summary from CRIS and PSMFC TS1  
 Broodyear 99 Spring Chinook raised at Kooskia NFH  
 released in Clear Creek

12/26/2007  
 rd2  
 99KoSCS

Date	Number	#/lb	Tagged	CWT	AT
03/27/2001	<u>82,974</u>	0.0	<u>62,067</u>	053217	Kooskia NFH
Totals	82,974		62,067		

				62 Observed Recoveries					
				=== PSC Expanded Recoveries ===					
Where Recovered			Total	2s	3s	4s	5s	6s	Total
Columbia River Gillnet	ODFW		22			2	14		16
Columbia River Sport	ODFW		7			5			5
Freshwater Sport	IDFG		1			1			1
Freshwater Sport	ODFW		1			1			1
Freshwater Sport	WDFW		5		4				4
Hatchery	FWS		56		6	36			42
Spawning Ground	FWS		1		1				1
Spawning Ground	WDFW		4				3		3
Treaty Ceremonial	ODFW		<u>1</u>			<u>1</u>			<u>1</u>
Totals			98		<u>11</u>	<u>46</u>	<u>17</u>		<u>74</u>

				% of	% of
				total	release
Ocean contribution			0	0	0.0000
Escapement to Columbia River			98	100	0.1181
Total Survival			98		0.1181
Escapement to NFH			56	57	0.0675
Columbia River contribution			42	43	0.0506

Ocean	Contribution by Area	
0 AK		
0 BC		
0 WA	Columbia River	Escapement to NFH
0 OR	42	56
0 CA		
0 Total		

Stock Assessment Reference Summary from CRiS and PSMFC TS1  
 Broodyear 00 Spring Chinook raised at Kooskia NFH  
 released in Clear Creek

12/26/2007  
 rd2  
 00KoSCS

Date	Number	#/lb	Tagged	CWT	AT
04/04/2002	51,329	0.0	0	!072002000	Kooskia NFH
04/04/2002	498,532	0.0	95,678	054516	Kooskia NFH
Totals	549,861		95,678		

Where Recovered	Total	92 Observed Recoveries					Total
		=== PSC Expanded Recoveries ===					
		2s	3s	4s	5s	6s	
Columbia River Gillnet ODFW	365			69	1		70
Columbia River Sport ODFW	432			78	5		83
Freshwater Sport IDFG	130			25			25
Freshwater Sport ODFW	5			1			1
Hatchery FWS	57		11				11
Ocean Troll (non-treaty) CDFO	16			3			3
Totals	1,005		11	176	6		193

	Total	% of total	% of release
Ocean contribution	16	2	0.0029
Escapement to Columbia River	989	98	0.1799
Total Survival	1,005		0.1828
Escapement to NFH	57	6	0.0104
Columbia River contribution	932	93	0.1695

Ocean	Contribution by Area	
0 AK		
16 BC		
0 WA	Columbia River	Escapement to NFH
0 OR	932	57
0 CA		
16 Total		

Stock Assessment Reference Summary from CRIS and PSMFC TS1  
 Broodyear 01 Spring Chinook raised at Kooskia NFH  
 released in Clear Creek

12/26/2007  
 rd2  
 01KoSCS

Date	Number	#/lb	Tagged	CWT	AT
03/26/2003	346,508	0.0	65,864	050799	Kooskia NFH
03/26/2003	201,589	0.0	38,318	053016	Kooskia NFH
Totals	548,097		104,182		

Where Recovered	Total	10 Observed Recoveries					Total
		=== PSC Expanded Recoveries ===					
		2s	3s	4s	5s	6s	
Columbia River Gillnet ODFW	32			6			6
Columbia River Sport ODFW	47			9			9
Freshwater Sport IDFG	10		1	1			2
Ocean Troll (non-treaty) ODFW	11			2			2
Totals	100		1	18			19

	Total	% of total	% of release
Ocean contribution	11	11	0.0020
Escapement to Columbia River	89	89	0.0162
Total Survival	100		0.0182
Escapement to NFH	0	0	0.0000
Columbia River contribution	89	89	0.0162

Ocean	Contribution by Area	
0 AK		
0 BC		
0 WA	Columbia River	Escapement to NFH
11 OR	89	0
0 CA		
11 Total		

Stock Assessment Reference Summary from CRiS and PSMFC TS1  
 Broodyear 99 Tule Fall Chinook raised at Spring Creek NFH  
 released in Columbia River

11/09/2007  
 rd2  
 99SCFCS

Date	Number	#/lb	Tagged	CWT	AT
05/18/2000	1,792,347	38.3	63,943	054418	Spring Creek NFH
05/18/2000	1,786,197	39.0	64,643	054419	Spring Creek NFH
03/09/2000	3,873,155	121.9	67,718	054420	Spring Creek NFH
03/09/2000	4,304,570	121.9	73,080	054421	Spring Creek NFH
04/20/2000	2,150,498	67.7	66,303	054422	Spring Creek NFH
04/20/2000	2,159,178	67.7	63,721	054423	Spring Creek NFH
Totals	16,065,945		399,408		

2,334 Observed Recoveries  
 === PSC Expanded Recoveries ===

Where Recovered		Total	2s	3s	4s	5s	6s	Total
Columbia River Gillnet	ODFW	66,943	119	1,162	446	5		1,732
Columbia River Sport	ODFW	259			8			8
Estuary Sport	ODFW	2,195	8	53	4			65
Estuary Sport	WDFW	1,458	21	10	3			34
Hake Trawl Fishery (CA/O	NMFS	83	3					3
Hatchery	FWS	67,116	314	861	601	25		1,801
Hatchery	ODFW	1,873	6	23	17	1		47
Mixed Net and Seine	WDFW	118		2				2
Ocean Sport	CDFO	4,998		64	53			117
Ocean Sport	ODFW	2,350	2	62	4			68
Ocean Trawl By-Catch	ODFW	333	8					8
Ocean Trawl By-Catch	WDFW	87	1	1				2
Ocean Troll (non-treaty)	CDFG	97			3			3
Ocean Troll (non-treaty)	CDFO	25,897	6	419	264			689
Ocean Troll (non-treaty)	ODFW	12,774	12	283	50			345
Ocean Troll (non-treaty)	WDFW	14,341		305	81	3		389
Spawning Ground	WDFW	7,904	10	12	195			217
Sport (charter)	WDFW	6,039	9	141	13			163
Sport (private)	WDFW	8,078	11	181	21			213
Treaty Troll	WDFW	3,220		66	34			100
Totals		226,163	530	3,645	1,797	34		6,006

		% of total	% of release
Ocean contribution	78,415	35	0.4881
Escapement to Columbia River	147,748	65	0.9196
Total Survival	226,163		1.4077
Escapement to NFH	67,116	30	0.4178
Columbia River contribution	80,632	36	0.5019

Ocean	Contribution by Area	
0 AK		
30,895 BC		
31,883 WA	Columbia River	Escapement to NFH
15,457 OR	80,632	67,116
97 CA		
78,332 Total		



Stock Assessment Reference Summary from CRIS and PSMFC TS1 11/06/2007  
 Broodyear 00 Tule Fall Chinook raised at Spring Creek NFH rd2  
 released in Columbia River 00SCFCS

Date	Number	#/lb	Tagged	CWT	AT
03/08/2001	5,314,481	117.7	224,645	054523	Spring Creek NFH
04/16/2001	5,255,329	60.0	216,142	054525	Spring Creek NFH
Totals	10,569,810		440,787		

Where Recovered	Total	1,600 Observed Recoveries					Total
		2s	3s	4s	5s	6s	
Columbia River Gillnet	30,518	30	850	389	4		1,273
Columbia River Sport	118			5			5
Estuary Sport	1,409	3	41	15			59
Estuary Sport	236	5	5				10
Hake Trawl Fishery (CA/O	24	1					1
Hatchery	38,460	80	954	563	7		1,604
Hatchery	499		14	7			21
Mixed Net and Seine	47		2				2
Ocean Sport	73			3			3
Ocean Sport	3,456	5	84	55			144
Ocean Sport	894	8	20	9			37
Ocean Trawl By-Catch	97	4					4
Ocean Troll (non-treaty)	16,718		432	261	4		697
Ocean Troll (non-treaty)	5,951	4	199	43	2		248
Ocean Troll (non-treaty)	4,875		168	35			203
Spawning Ground	4,192		92	78	5		175
Sport (charter)	2,224		81	12			93
Sport (private)	2,970	13	100	11			124
Treaty Troll	4,794		149	46	5		200
Totals	117,555	153	3,191	1,532	27		4,903

	Total	% of total	% of release
Ocean contribution	42,123	36	0.3985
Escapement to Columbia River	75,432	64	0.7137
Total Survival	117,555		1.1122
Escapement to NFH	38,460	33	0.3639
Columbia River contribution	36,972	31	0.3498

Ocean	Contribution by Area	
0 AK		
20,174 BC		
15,007 WA	Columbia River	Escapement to NFH
6,845 OR	36,972	38,460
73 CA		
42,099 Total		

Stock Assessment Reference Summary from CRiS and PSMFC TS1  
 Broodyear 01 Tule Fall Chinook raised at Spring Creek NFH  
 released in Columbia River

11/07/2007  
 rd2  
 01SCFCS

Date	Number	#/lb	Tagged	CWT	AT
02/11/2002	848,986	350.0	0	-	Spring Creek NFH
03/29/2002	3,995,694	99.8	145,949	050579	Spring Creek NFH
03/11/2002	6,376,144	116.2	68,627	050777	Spring Creek NFH
03/11/2002	1,415,571	116.0	65,933	050778	Spring Creek NFH
04/30/2002	2,178,023	48.6	63,908	050779	Spring Creek NFH
04/30/2002	1,303,488	49.5	68,076	050780	Spring Creek NFH
Totals	16,117,906		412,493		

Where Recovered	Total	1,782 Observed Recoveries					Total
		=== PSC Expanded Recoveries ===					
		2s	3s	4s	5s	6s	
Columbia River Gillnet ODFW	33,064	51	723	240	6		1,020
Columbia River Sport ODFW	780		20	8			28
Estuary Sport ODFW	1,476	13	39				52
Estuary Sport WDFW	402		21				21
Hake Trawl Fishery (CA/O NMFS	276	8	1	1			10
Hatchery FWS	65,982	262	1,605	352			2,219
Hatchery ODFW	2,335	5	31	30			66
Limited-Entry Non-Hake G NMFS	204	6					6
Ocean Sport CDFO	9,221		134	67			201
Ocean Sport ODFW	2,422	7	48	2			57
Ocean Trawl By-Catch WDFW	27		1				1
Ocean Troll (non-treaty) CDFG	372	4					4
Ocean Troll (non-treaty) CDFO	24,437	9	455	327	4		795
Ocean Troll (non-treaty) ODFW	9,675		233	17			250
Ocean Troll (non-treaty) WDFW	6,209		118	59			177
Spawning Ground WDFW	4,502	15	82	24			121
Sport (charter) WDFW	1,926	5	38	5			48
Sport (private) WDFW	4,201	40	104	2			146
Treaty Troll WDFW	4,875		105	25			130
Totals	172,386	425	3,758	1,159	10		5,352

		% of total	% of release
Ocean contribution	63,845	37	0.3961
Escapement to Columbia River	108,541	63	0.6734
Total Survival	172,386		1.0695
Escapement to NFH	65,982	38	0.4094
Columbia River contribution	42,559	25	0.2640

Ocean	Contribution by Area	
0 AK		
33,658 BC		
17,238 WA	Columbia River	Escapement to NFH
12,097 OR	42,559	65,982
372 CA		
63,365 Total		