PACIFIC SALMON COMMISSION
TECHNICAL COMMITTEE ON DATA SHARING

REPORT ON THE 1994 STATUS
OF THE COASTWIDE CODED WIRE TAG DATABASE

REPORT TCDS (99)-1

December 1999

ACRONYMS

Agencies	
ADF&G	Alaska Department of Fish and Game
CDFG	California Department of Fish and Game
CDFO	Canada Department of Fisheries and Oceans
USFWS	U.S. Fish and Wildlife Service
IDFG	Idaho Department of Fish and Game
MIC	Metlakatla Indian Community - Alaska
NMFS (AK)	National Marine Fisheries Service - Alaska
NMFS (CR)	National Marine Fisheries Service - Columbia R.
NWIFC	Northwest Indian Fisheries Commission
ODFW	Oregon Department of Fish and Wildlife
PSC	Pacific Salmon Commission
PSMFC	Pacific States Marine Fisheries Commission
QDNR	Quinault Department of Natural Resources
WDFW	Washington Department of Fish and Wildlife

Other	
CWT	Code Wire Tag
ESA	Endangered Species Act
MRP	Mark Recovery Program
RMIS	Regional Mark Information System

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EXECUTIVE SUMMARY

This report was initially prepared in 1994, although it was unpublished at that time. The Data Sharing Committee took up the report again in September 1997 and it was decided to maintain the report as a status report through 1994.

Coded wire micro-tags were first introduced in the late 1960's as an alternative to fin clipping and various types of external tags. Coastwide use quickly followed and led to the early establishment of large-scale ocean sampling/recovery programs by the five State/Province fisheries agencies (ADF&G, CDFO, WDFW, ODFW, and CDFG). Tagging programs have continued to expand, with over 55 federal, state/province, tribal/aboriginal, and private entities releasing approximately 45 million CWT marked salmonids annually (1994 statistics).

The Pacific Salmon Commission (PSC) coded wire tag (CWT) database contains five types of data files: 1) Release, 2) Recovery, 3) Catch and Sample, 4) Location Codes, and 5) File Description. These five data files are described and the file specifications for Format Version 3.1 are provided. The status of data provided to the database is also given.

The Canadian copy of the coastwide CWT data resides on a VAX computer at CDFO's Pacific Biological Station in Nanaimo, B.C. and is called the Mark Recovery Database, it is managed by the Salmon Stock Assessment group at Nanaimo. The Pacific States Marine Fisheries Commission (PSMFC) in Gladstone, Oregon maintains a second complete copy of the coastwide CWT data. By agreement through the Pacific Salmon Commission, PSMFC's Regional Mark Processing Center serves as the site for collecting and validating all CWT data for U.S. agencies for exchange with Canada. The U.S. and Canadian data are exchanged on an "as available" basis.

Coastwide CWT studies are carried out for a wide variety of purposes, including basic questions of stock distribution and relative survival, as well as the more complex issues of fisheries management and harvest allocation. PSC concerns are likewise varied and differ from region to region and by species. Some of these key applications are briefly reviewed.

There are approximately 24,000 CWT release records in the database for release years 1973 to 1993. During this period the tagging rate for chinook release groups averaged 16%, and for coho release groups averaged 14%. The number of coded wire recoveries has varied over the years. Peak CWT recoveries occurred in 1986 to 1988, which coincided with high tagging rates for contributing years, good ocean survival, and full participation in the tag recovery and reporting program by all agencies.

There is general agreement among agencies that commercial fisheries should be sampled for CWTs at 15-20% level in each stratum (defined by gear, week, species, area) in order to recover enough coded wire tags to generate reliable estimates of each tag group's contribution to the catch in that stratum. This is shown to not always be met by 1994 sampling programs.

RECOMMENDATIONS:

- The Working Group on Mark-Recovery Statistics should examine recent low survival rates and determine whether existing tagging and sampling rates continue to be appropriate.

- The Technical Committee on Data Sharing should encourage standardization among the various tagging and recovery agencies with respect to the interpretation and use of the fields in the exchange formats.

- The Technical Committee on Data Sharing should routinely monitor the exchanged CWT data to determine which fields are not being reported and by which agencies.

- The Technical Committee on Data Sharing should reconsider its designations of mandatory and optional fields in the exchange formats to ensure that information required for meaningful use of the data is included in the exchange.

I. INTRODUCTION

This report was initially prepared in 1994, although it was unpublished at that time. The Data Sharing Committee took up the report again in September 1997 and it was decided to maintain the report as a status report through 1994. Memberships of the Committee at these two periods of time are given in Appendix 1. Readers should note that unless otherwise indicated, data used in this report were extracted from the database in the fall of 1994. Current information on the status of the database may be found at the website www.psmfc.org/rmpc/dataset_status.html.

A. HISTORY

The commitment of Canada and the United States to develop a coast-wide stock assessment and data management system for Pacific salmon is detailed in a Memorandum of Understanding attached to the Pacific Salmon Treaty. Therefore, the Pacific Salmon Commission (PSC) formed the Data Sharing Committee in 1985, placing it under the direction of the Standing Committee on Research and Statistics. Its primary functions are to facilitate data exchange between Canada and the U.S., and to develop standard methods of reporting and analyzing salmonid fisheries data of importance for both nations. Key responsibilities include the standardization and exchange of the important coastwide coded wire tag (CWT) data, unmarked hatchery production data, and also the coastwide catch and effort data for all PSC agencies.

B. COMMITTEE STRUCTURE

The Data Sharing Committee is assisted by various work groups: the Mark-Recovery Statistics Work Group (inactive since 1993), the Catch Data Exchange Work Group, which is developing standard formats for the exchange of catch and effort data between the two Parties, and the Data Standards Work Group, which provides continual maintenance of data standards and formats for CWT data exchange between the two Parties. An earlier work group, the Work Group on Mark Recovery Databases, completed its task in 1989 of designing the first set of standards and formats (Format Version 1.0) for exchanging and validating CWT related data. Data Standards has since developed several updated versions, the most recent, as of 1994, is Format Version 3.1 (Appendix 2) for the exchange of CWT data.

C. DATABASE OVERVIEW

The exchange of coded wire data and unmarked hatchery production data in standard formats has proven invaluable to both Parties for research purposes and for allocation and stock management negotiations. Both nations, however, are experiencing a prolonged period of significant fiscal cutbacks, with impacts on all fisheries programs, including the marking, sampling, and recovery of CWT data. As such, the Data Sharing Committee is concerned that the integrity and high quality of the CWT data be maintained, and that the importance of both data quality and accessibility be reinforced. With this in mind, this report examines the CWT database as of 1994 and the unmarked hatchery production database to determine what trends, if any, exist in the quality of the data. Refer to Section V for a description of concerns about the database.

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II. DESCRIPTION OF THE CWT DATABASE

A. OVERVIEW

Coded wire micro-tags were first introduced in the late 1960's as an alternative to fin clipping and various types of external tags. Coastwide use quickly followed and led to the early establishment of large-scale ocean sampling/recovery programs by the five State/Province fisheries agencies (ADF&G, CDFO, WDFW, ODFW, and CDFG). Tagging programs have continued to expand, with over 55 federal, state/province, tribal/aboriginal, and private entities releasing approximately 45 million CWT marked salmonids annually (1994 statistics).

Approximately 1,600 new tag codes are released annually, representing hundreds of studies, at a cost in the range of $3.5-4 million (U.S.). The marking cost per tag is approximately 8-10 cents. An additional $8-10 million is expended coastwide annually in sampling, recovery, dissection, decoding and data entry.

While there are a multiplicity of marking objectives, CWT studies can be divided into three basic groups: a) Experimental, b) Stock assessment, and c) Stock contribution. Experimental tagging studies are designed to compare the effects of various treatments such as pond density factors, diet, time, and/or site of release, disease control, etc. Stock assessment studies typically have a hatchery viewpoint and are designed to estimate the contribution and distribution of a given stock among the various fisheries. Stock contribution studies, on the other hand, are designed to estimate contribution of major stocks to the various fisheries and to provide key information for fisheries management.

B. CWT DATA FILES

The CWT database contains five types of data files: 1) Release, 2) Recovery, 3) Catch and Sample, 4) Location codes, and 5) File Description. These five data files are briefly described below. The file specifications for Format Version 3.1 are provided in Appendix 2.

B.1 Release Data File

The release data records include a wide variety of information, including species, stock, hatchery, release site, number tagged, release dates, brood year, release agency, etc. The data set in 1994 contained 24,698 tag releases and 35,452 untagged, unassociated releases, for a total of 60,150 release groups. The physical size of the file in 1994 was 14.4 million bytes, with a single record containing 238 bytes.

The total numbers of released fish represented in the data file in 1994 are as follows:

Total fish tagged	617,500,000
Total fish that shed tags	22,730,000
Total fish unmarked/ unassociated	30,682,000,000
Total fish releases in file	31,322,230,000

The earliest tagged groups were released in 1967, while the earliest untagged, unassociated groups were released in 1956. *It is important to note that the untagged, unassociated production release data were not, as of 1994, complete for all agencies* (see discussion below in Section II.C.1).

B.2 Recovery Data File

The recovery data represent individual tag recoveries of specific tag codes, with the specific location of catch, data of catch, fishery, expansion number (based on associated catch and sampling data), type of sample, and other related data (115 bytes/record). The data set in 1994 contained 3,443,337 recoveries, of which 2,785,786 were "status 1's" (tag read OK). The remaining 657,551 records were problematic recoveries (i.e., "no tags," "lost tags," "unreadable tags"). Approximately 300,000 new recoveries are

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added to the data file yearly by the recovery agencies. The physical size of the recovery file in 1994 was in excess of 396 million bytes.

B.3   Catch and Sample Data File

Tagged fish are sampled coastwide in the various commercial and recreational fisheries, as well as escapement at the hatcheries and in the spawning grounds. The catch and sampling information are then used to estimate "expansions" for the tag recoveries found in the given area/time sampling strata.

The physical size of the Catch/Sample file in 1994 was 115,633 records, representing observations of 89,209,318 fish. A catch/sample record contains 122 bytes per record. The total number of bytes in the file in 1994 stands at 14.1 million. Table 4 indicates which agency-year combinations were present in the Catch/Sample file.

B.4   Location Data File

Location codes for release site, catch/sample area, recovery area, hatchery, and stock are based on a 19 character, seven level hierarchical coding scheme. The location codes are given both a short name (20 characters maximum) and a long name (101 characters maximum) to facilitate report generation as well as allow for detailed location descriptions. The location codes are standardized by Province/State only, with only minimal similarities seen between the various coding schemes used by each Province/State.

In 1994, there were 18,148 location codes in the file, with a record size of 185 bytes, giving 3,357,380 bytes in the file.

B.5   Description Data File

A new "Description" data file has been added to the CWT database in Format Version 3.1. The file will provide date of file submission, file type, reporting agency, file year, and a text description of what the data represent. The file provides reporting agencies with a means to identify the status of the data (i.e., complete or incomplete) and any pertinent information. This would include discussion of missing fisheries, missing escapement, exceptions for calculating estimated numbers, etc.

The description record length is 80 bytes. As of the end of 1994, no data were yet available for exchange in the new Format Version 3.1.

C. STATUS OF THE CWT DATA FILES IN 1994

C.1 Release Data File Status

All of the CWT release data through 1993 are reported in PSC format (Table 1). As noted above, the unmarked, unassociated production release data are incomplete and missing ADF&G and CDFG data for all years; in addition, ODFW data were reported only from 1982 onward (Table 2).

C.2 Recovery Data File Status

Nearly all historical recovery data were reported in PSC format by 1994 (Table 3). Missing data sets in 1994 included ADF&G 1977-1979, CDFG 1977, IDFG 1992-1993, NMFS (AK) 1977-1978, 1991-1993, NWIFC 1993, and QDNR 1993. Other missing subsets of recovery data included CDFG's freshwater recoveries (sport, hatchery, spawning grounds), USFWS's recoveries for the Klamath River system, WDFW's steelhead recoveries for Columbia River tributaries and Puget Sound, and Metlakatla's hatchery rack recoveries on Annette Island, SE Alaska.

Fortunately, with the exception of the ADF&G 1977-1979 and CDFG 1977 data, the missing data sets represented very low numbers of recoveries and as such were not likely to have a major impact on data analyses. In addition, the missing 1991-1993 data sets are expected to be reported in the near future.

C.3 Catch and Sample Data File Status

The catch and sample data sets as of 1994 (Table 4) are somewhat less complete but generally mirror that for the recovery data. Missing data sets include ADF&G 1977-1979, CDFG 1977, NMFS (AK) 1977-1993, NWIFC 1993, QDNR 1993, and WDFW 1973-1979. In addition, there are no catch/sample data for those missing subsets of recovery data noted above[1].

C.4 Location Data File Status

In 1994 the location data file was complete and up to date for all location codes used in the release, recovery and catch/sample data files. This condition is a requirement for all other data to pass validation before being loaded into the CWT database.

C.5 Description Data File Status

The description data file was added to the CWT database in the newly released Format Version 3.1. There were only a few test sets of data available by 1994.

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[1] ADF&G 1977-1979, NWIFC 1993, QDNR 1993, and WDFW 1973-1979 catch sample data files have been submitted and validated as of printing of this report.

Table 1. Status of CWT release data on 10/20/94.

YEAR	CDFG	ODFW	WDFW	IDFG	CDFO	ADF&G	USFWS	NMFS (AK)	NMFS (CR)	NWIFC	QDNR	MIC
PRE-1975	V	V	V		V	V	V	V		V	V	
1975	V	V	V		V	V	V	V	V	V	V	
1976	V	V	V	V	V	V	V	V	V	V	V	
1977	V	V	V	V	V	V	V	V	V	V	V	
1978	V	V	V	V	V	V	V	V	V	V	V	
1979	V	V	V	V	V	V	V	V	V	V	V	
1980	V	V	V	V	V	V	V	V	V	V	V	V
1981	V	V	V	V	V	V	V	V	V	V	V	V
1982	V	V	V	V	V	V	V	V	V	V	V	V
1983	V	V	V	V	V	V	V	V	V	V	V	V
1984	V	V	V	V	V	V	V	V	V	V	V	V
1985	V	V	V	V	V	V	V	V	V	V	V	V
1986	V	V	V	V	V	V	V	V	V	V	V	V
1987	V	V	V	V	V	V	V	V	V	V	V	V
1988	V	V	V	V	V	V	V	V	V	V	V	V
1989	V	V	V	V	V	V	V	V	V	V	V	V
1990	V	V	V	V	V	V	V	V	V	V	V	V
1991	V	V	V	V	V	V	V	V	V	V	V	V
1992	V	V	V	V	V	V	V	V	V	V	V	V
1993	V	V	V	V	V	V	V	V	V	V	V	V

(S = Submitted; I = Incomplete, Mid-Year Only; V = Validated)

Table 2. Status of unmarked hatchery production release data on 10/20/94.

YEAR	CDFG	ODFW	WDFW	IDFG	CDFO	ADF&G	USFWS	NMFS1(AK)	NWIFC	QDNR	MIC
1965 – 72			V		V		V				
1973			V		V		V			V	
1974			V		V		V		V	V	
1975	–	U	V		V	–	V	NA	V	V	
1976	–	U	V	V	V	–	V	NA	V	V	
1977	–	U	V	V	V	–	V	NA	V	V	
1978	–	U	V	V	V	–	V	NA	V	V	
1979	–	U	V	V	V	–	V	NA	V	V	
1980	–	U	V	V	V	–	V	NA	V	V	
1981	–	U	V	V	V	–	V	NA	V	V	V
1982	–	V	V	V	V	–	V	NA	V	V	V
1983	–	V	V	V	V	–	V	NA	V	V	V
1984	–	V	V	V	V	–	V	NA	V	V	V
1985	–	V	V	V	V	–	V	NA	V	V	V
1986	–	V	V	V	V	–	V	NA	V	V	V
1987	–	V	V	V	V	–	V	NA	V	V	V
1988	–	V	V	V	V	–	V	NA	V	V	V
1989	–	V	V	V	V	–	V	V	V	V	V
1990	–	V	V	V	V	–	V	NA	V	V	V
1991	–	V	V	V	V	–	V	NA	V	V	V
1992	–	V	V	V	V	–	V	NA	V	V	V
1993	–	V	V	V	V	–	V	NA	V	V	V

(U = Unavailable; I = Incomplete but Validated Data Sets; V = Validated) (NA = Not Applicable; S = Submitted;
Dash = Not Yet Reported)
Note: 1989 was the only year that NMFS-AK released unmarked groups.

Table 3. Status of CWT recovery data at 10/20/94.

YEAR	CDFG	ODFW	WDFW	IDFG	CDFO	ADF&G	USFWS	NMFS(AK)	NWIFC	QDNR	MIC
1973	–	–	V		V						
1974	–	–	V		V						
1975	–	–	V		V				V		
1976	–	–	V		V				V	V	
1977	–	V	V	V	V	–		–	V	V	
1978	V	V	V	V	V	–		–	V	V	
1979	V	V	V	V	V	–	V		V	V	
1980	V	V	V	V	V	V	V	V	V	V	
1981	V	V	V	V	V	V	V	V	V	V	I
1982	V	V	V	V	V	V	V	V	V	V	I
1983	V	V	V	V	V	V	V	V	V	V	I
1984	V	V	V	V	V	V	V	V	V	V	I
1985	V	V	V	V	V	V	V	V	V	V	I
1986	V	V	V	V	V	V	V	V	V	V	I
1987	V	V	V	V	V	V	V	V	V	V	I
1988	V	V	V	V	V	V	V	V	V	V	I
1989	V	V	V	V	V	V	V	V	V	V	I
1990	V	V	V	V	V	V	V	V	V	V	I
1991	V	V	V	V	V	V	V	–	V	V	I
1992	V	V	V	–	V	V	V	–	V	I	I
1993	V	V	I	–	I	I	V	–	–	–	I

(I = Incomplete but Valid Data Sets; V = Validated; S = Submitted but Not Yet Processed; E = Submitted but Unresolved Errors; Dash = Not Yet Reported)

Incomplete Data Sets:
1)   WDFW's recoveries in the main stem Columbia River have been reported through ODFW.
        However, recoveries in Columbia River basin tributaries and Puget Sound are unreported.
2)   Metlakatla (MIC) has reported recoveries for its fisheries through ADF&G. However, hatchery returns are unreported
3)   WDFW's 1993 recoveries are incomplete for Puget Sound and hatchery/spawning ground returns.
4)   QDNR's 1992 recoveries include only hatchery returns at this point.

Table 4. Status of CWT catch/sample data on 10/20/94.

YEAR	CDFG	ODFW	WDFW	IDFG	CDFO	ADF&G	USFWS	NMFS (AK)	NWIFC	QDNR	MIC
1975			–		V				V		
1976			–		V				V	V	
1977	–	V	–	–	V	–		–	V	V	
1978	V	V	–	–	V	–		–	V	V	
1979	V	V	–	–	V	–	V	–	V	V	
1980	V	V	V	–	V	V	V	–	V	V	
1981	V	V	V	–	V	V	V	–	V	V	
1982	V	V	V	–	V	V	V	–	V	V	I
1983	V	V	V	–	V	V	V	–	V	V	I
1984	V	V	V	–	V	V	V	–	V	V	I
1985	V	V	V	–	V	V	V	–	V	V	I
1986	V	V	V	–	V	V	V	–	V	V	I
1987	V	V	V	–	V	V	V	–	V	V	I
1988	V	V	V	–	V	V	V	–	V	V	I
1989	V	V	V	–	V	V	V	–	V	V	I
1990	V	V	V	–	V	V	V	–	V	V	I
1991	V	V	V	–	V	V	V	–	V	V	I
1992	V	V	V	–	V	V	V	–	V	I	I
1993	V	V	I	–	I	I	V	–	–	–	I

(I = Incomplete but Valid Data Sets;   V = Validated;   S = Submitted;   Dash = Not Yet Reported)

D. ACCESSING THE CWT DATABASE

D.1 Canadian Copy

The Canadian copy of the coastwide CWT data resides on a VAX computer at CDFO's Pacific Biological Station in Nanaimo, B.C. and is called the Mark Recovery Database. It is managed by the Salmon Stock Assessment group at Nanaimo.

An extensive set of menu driven applications, called the Mark Recovery Program (MRP), allow for users to select from several different reporting options, including spreadsheet or fixed-field flat files, as well as custom reports. Options include Release reports, Production reports, Catch reports, and Data dumps. Users may also use the menu to extract subsets of the MRP database into flat file formats suitable for downloading to other computers, and for input to other software packages. Readers who would like to gain dial-up access to the MRP system should contact Brenda Adkins at 250-756-7094 or by e-mail to adkinsb@pbs.dfo.ca.

Supporting documentation is contained in the CDFO publications listed below:

- Kuhn, B.R., L. Lapi and J.M. Hamer. 1988. An introduction to the Canadian database on marked Pacific salmonids. Can. Tech. Rep. Fish Aquat. Sci. 1649:viii+56 p.

- Kuhn, B.R. 1988. The MRP-Reporter program: A data extraction and reporting tool for the mark recovery program database. Can. Tech. Rep. Fish Aquat. Sci. 1625:145 p.

- Holmes, M.A. and J.M. Hamer. 1992. System documentation for the mark recovery program database, second edition. Can. Tech. Rep. Fish Aquat. Sci. 1858:94 p.

D.2 U.S. Copy

The Pacific States Marine Fisheries Commission (PSMFC) in Gladstone, Oregon maintains a second complete copy of the coastwide CWT data. By agreement through the Pacific Salmon Commission, PSMFC's Regional Mark Processing Center serves as the site for collecting and validating all CWT data

for U.S. agencies for exchange with Canada. The U.S. and Canadian data are exchanged on an "as available" basis (see Section E below).

The Regional Mark Processing Center recently completed the first phase of an extensive development and data migration project of the CWT database to a new platform using the Ingres relational database software. The new menu driven system, called the Regional Mark Information System (RMIS), resides on PSMFC's Sequent computer in Portland.

Users may access RMIS to obtain a variety of release and recovery reports as well as data records in either aggregated or individual form. Recoveries can be accessed either by customized lists of tag codes or by location code. Catch/sample data are also available but, in 1994, only in individual agency/year file format. Location codes can be either captured by individual Province/State or by complete file.

RMIS is directly linked to several other fisheries agencies through the Internet computer network. With this capacity, users having an Internet connection can download reports, data subsets, and validation error listings via FTP (File Transfer Protocol). The FTP address is: psmfc.org[2].

Further information, including a RMIS User Manual, can be obtained by contacting Ken Johnson or James Longwill at PSMFC (Tel: 503-650-5400). E-mail addresses are: johnsonk@psmfc.org and longwill@psmfc.org.

E. DATA EXCHANGE AGREEMENTS

CWT data are exchanged between the Nanaimo and Gladstone sites in Format Version 3.1 using ASCII files. Files are either exchanged by magnetic media (tape, disk) or electronically (Internet FTP protocol, standard or compressed "Kermit"). See Section I.A of Format Version 3.1 (Appendix 2) for additional information.

In order to maintain concurrence between the two copies of the CWT data, the Mark Center forwards to Canada new data sets within one week of passing validation. The target period for validation of newly received data is also one week. Agencies have agreed to submit preliminary (perhaps incomplete) release data to Gladstone by July 1 of each year, and complete release data for a given year by March 1 of the following year. The recovery data for a given year is to be submitted in preliminary form by the first week of January in the following year and in final form by August of that year. The target dates for submission of preliminary and final catch/sample files are the same as for the recovery files.

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[2] The data and status and data reports are available at the website: www.psmfc.org.

III. USERS AND USES OF THE CWT DATABASE

As noted earlier, coastwide CWT studies are carried out for a wide variety of purposes, including basic questions of stock distribution and relative survival, as well as the more complex issues of fisheries management and harvest allocation. PSC concerns are likewise varied and differ from region to region and by species. Some of these key applications are briefly reviewed below.

A. USE BY PACIFIC SALMON COMMISSION TECHNICAL COMMITTEES

A.1 Chinook Technical Committee

The CWT database fulfills an essential role in PSC coastwide management of chinook salmon stocks. In fact, because much of the chinook salmon production migrates out of local waters and is harvested in fisheries from Alaska to Oregon, rational management would be impossible without a shared CWT database. CWT data is used to estimate the harvest distribution, survival, and total exploitation rate of chinook salmon indicator stocks from Southeast Alaska to the Oregon Coast and upper Columbia River (Report TCChinook 93-2). Analytical procedures use CWT release and recovery data to forecast the relative abundance of stocks in the principal fisheries, assess the impacts of proposed management options on both stocks and fisheries, and evaluate the success of management regimes towards rebuilding depressed stocks. These analytical procedures can be divided into two categories, the 'exploitation rate analyses' and the 'chinook model' (see Report TCChinook 92-3 and many of the past annual reports for a more complete description of these procedures).

The exploitation rate analysis evaluates exploitation rate on and status of 38 different chinook salmon stocks and the relative change in harvest rates in 25 different fisheries. The analysis is divided into seven segments; fishery indices, stock indices, brood year exploitation rates, survival rate estimates, stock catch distribution, stock contribution indices, and pass-through exploitation rates. Each of these segments looks at a different aspect of the progress towards achieving conservation and harvest sharing goals.

The chinook model provides a common bilateral basis for evaluating the impacts of management actions on the chinook rebuilding program. Results from the model are also used to estimate chinook interceptions. Once chinook population parameters are estimated, the model is used to evaluate management strategies such as catch ceilings, quotas, harvest rate adjustments, nonretention regulations, size limit changes, and enhancement activities.

A.2 Coho Technical Committee

As for chinook salmon, the CWT database provides critical information required for the assessment and management of coho salmon stocks along the Pacific coast of North America. Although they do not range as far as chinook salmon, coho salmon are often caught in neighboring jurisdictions as they migrate back to their spawning grounds. With harvest occurring in many fisheries, most of which are highly mixed stock in nature, analysis of CWT data is the only means currently available to determine the catch and escapement of an individual coho stock. As such, the Coho Technical Committee relies on CWT data to determine catch distribution patterns, marine survival rates, and total fishery exploitation rates (TCCOHO (91)-1).

The estimation of Canada/US stock composition in all fisheries is an important PSC requirement fulfilled by the Coho Technical Committee using a mathematical model which relies on catch and CWT data (TCCOHO (89)-1, TCCOHO (94)-1). This model has led to a consensus between the two countries on coho stock composition because of the quality of the data used and the sound technical basis for the method. Prior to the development of this methodology there were wide discrepancies between Canadian and U.S. estimates of stock composition for coho.

CWT data were also instrumental in the development of a simulation model designed to evaluate the potential effectiveness of selective hatchery mark fisheries. In this application, CWT data were used to estimate migration and exploitation rate parameters for model stocks (Ad-hoc Selective Fishery Evaluation Committee, 1995). Further development of such models is likely, given the interest being shown by a number of agencies for selective fisheries.

A.3 Northern Boundary Technical Committee

Several Northern Boundary chum and sockeye salmon stock assessment studies rely on CWT programs to monitor the harvest distribution of and exploitation rate on these stocks and Alaska and Canada jointly use this data to evaluate various management plans and interception estimates. Efficient and accurate joint management of the boundary area stocks requires an improved understanding of migration routes, timing, fishery contributions, and exploitation rates on the wild stocks. In addition, increasing enhancement activities have the potential to substantially impact wild stock management and obscure the discrimination of Fraser and non-Fraser sockeye salmon in boundary area catches.

Two natural sockeye salmon stocks, McDonald Lake and Salmon Bay, in southern Southeast Alaska have been tagged intermittently in past years and identified as being good exploitation rate indicator stocks in future (Report TCNB (93)-1). The Hugh Smith Lake sockeye salmon stock is already being CWT tagged each year as an indicator stock and the Queen Charlotte Island stocks may also serve as a good indicator stock. Alaska Department of Fish and Game implemented a CWT program in Portland Canal in 1986 to monitor the harvest distribution and exploitation of the Fish Creek chum salmon stock. Canadian and Alaskan chum salmon catches in this area are routinely sampled for CWTs. Most (if not all) of the enhanced chum, sockeye and steelhead are represented by a CWT.

A.4 Transboundary Technical Committee

Alaska and Canada jointly manage transboundary sockeye, coho and chinook salmon stocks based on a number of stock assessment programs, which include wild stock CWT tag-and-recovery studies. Chinook salmon stocks have been tagged in the Alsek, Taku, and Stikine rivers and coho salmon stocks in the Taku and Stikine rivers. These studies have provided much insight into the migratory patterns and magnitude of exploitation rates on these stocks.

A.5 Interceptions and Equity

Coded wire tag recoveries from indicator stocks are the preferred method used for both chinook and coho catches to determine stock composition and interceptions. In order to maintain reliable interception estimates for these two salmon species:

- indicator stocks must be maintained that represent the majority of the naturally spawning stocks (this involves both an adequate number of indicator stocks and maintaining, through hatchery handling, the migratory behavior of each indicator stock to represent the naturally spawning stocks),

- the indicator stocks must be tagged in sufficient numbers for adequate recovery in each of the fisheries strata,

- the indicator stocks and naturally spawning stocks they represent must be harvested in similar fashion, and

- tag recovery programs must be sufficient to adequately recover the CWT's (20% of the catch within each fishing/time strata is the current coastwide standard; with the advent of mass marking and selective fisheries, the recovery programs will need to be reviewed and increased).

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B. OTHER USES

B.1 Endangered Species

Monitoring stocks listed under the Endangered Species Act (ESA) will require greater stock-specific management capabilities than are needed under healthy stock management. In most cases the salmon stocks listed under the ESA include only natural spawners, which are generally not tagged or otherwise marked. In order to estimate the exploitation rate on the listed stock, a corresponding tagged hatchery stock is used as a surrogate or indicator. For example, Lyons Ferry Hatchery CWTed fall chinook releases tagged fish are used to represent naturally spawning Snake River fall chinook. The major assumption in using hatchery indicator stocks is that the hatchery stock has similar fishery contribution patterns as the naturally spawning stock. The validity of this assumption depends, in large part, on the kind and degree of stock manipulation that has occurred in the hatchery.

B.2 Hatchery Evaluation

Hatcheries use marking programs to assess production and improve the enhancement program. Marking studies are designed to determine contribution and survival and/or the relative survival of different groups of fish. Contribution marking is designed to determine the survival and contribution of a particular group(s) of fish to fisheries and/or escapement. The data are used for biological assessments and provide the basis for economic assessments. Comparative release programs are designed to assess the effects of different rearing and release strategies on marine survival. Studies include the effects of time and size of release, seapen rearing, antibiotics, different feeds and rations, and different marking techniques. Researchers have also investigated biological traits such as the heritability of adult age, size and return timing and the mechnisms of homing and imprinting.

B.3 Fisheries Management

B.3.1 Alaska

ADF&G manages its chinook and coho fisheries to catch as much of the Alaska hatchery production as possible without jeopardizing the escapement goals for the naturally spawning stocks. For chinook salmon, catch quotas/ceilings are also imposed by the Pacific Salmon treaty that restrict catch of non-Alaska hatchery stocks and a base level catch of Alaskan hatchery stocks. Catches of Alaskan hatchery stocks above this level are referred to as the Alaska add-on. It is important to be able to monitor the hatchery contribution to the catch inseason in order to manage the fisheries according to the treaty and add-on catch regulations.

Port sampling occurs through out the fishing season to sample for adipose fin clips. The heads of these fish are sent to the Coded Wire Tag Lab in Juneau and are processed as they arrive. Inseason reports of hatchery contributions are thus generated through out the fishing season and are used by ADF&G fishery managers to help determine fishing openings. ADF&G currently uses the inseason data to manage the spring chinook hatchery fisheries; however, in recent years, the summer chinook season has been too short to use the information inseason. Postseason updates to the CWT recovery database are used to refine estimates of hatchery contribution to the catch and evaluate hatchery contributions.

In addition, analyses of CWT recoveries from chinook and coho salmon provide a better understand the migration patterns of these fish and data necessary for the estimation of harvest rates. The information is used to develop stock specific run reconstruction and to establish escapement goals for some of our chinook and coho stocks. Alaska has several wild coho stocks that are CWTed and monitored. For coho salmon, data from the sampling program are used to estimate the total number of hatchery fish and subtract that off the total so that we know the magnitude of the Alaska naturally spawning stocks.

B.3.2 Canada

[not submitted]

B.3.3 Washington, Oregon

[not submitted]

IV. SCOPE OF TAGGING AND SAMPLING PROGRAMS

A. TAGGING PROGRAMS AND RELEASE DATA

A.1 Total Number of Salmon in Releases Represented by CWTs

Figure 1 is intended to give the reader a general idea of the vast numbers of fish represented in the release files. It includes both hatchery and wild fish in releases for which some or all members of the release group are tagged. Since 1990 over 1,000 million fish have been released annually. It should be noted that, in most cases, the number released is not obtained by an actual count, but is rather an estimate derived using some, perhaps unspecified, counting method (see discussion in Section A.4 below).
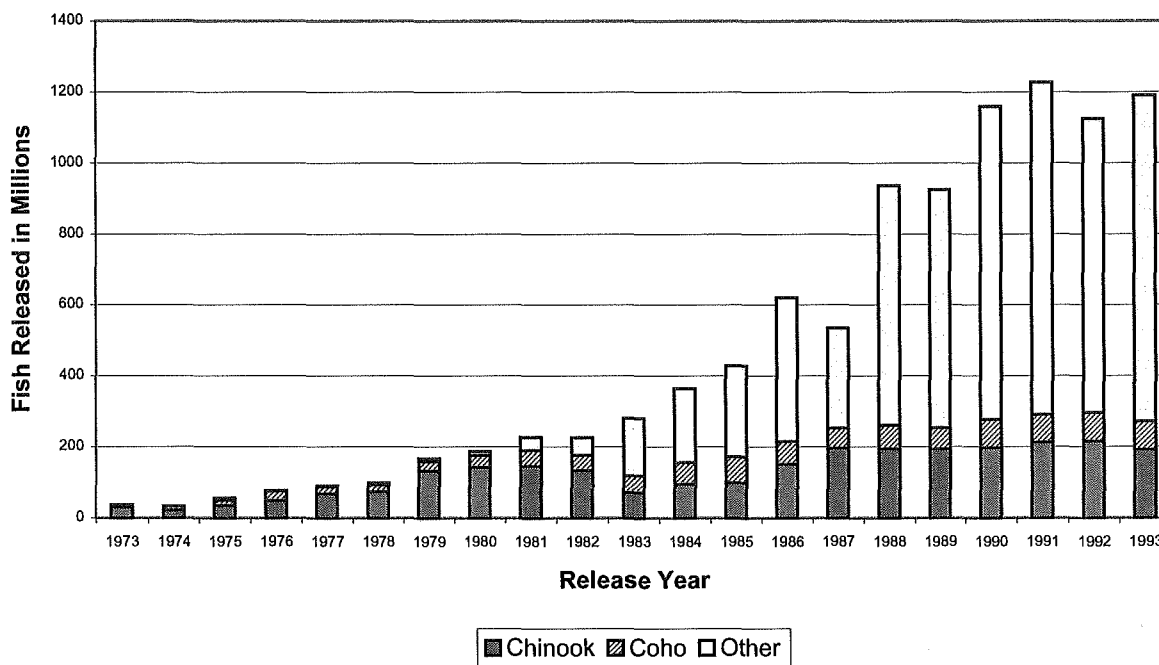
Figure 1. Total number of salmon involved in CWT releases.

A.2 CWT Releases: Number of Tagged Fish and Proportion of Release Tagged

There are approximately 24,000 CWT release records in the database for release years 1973 to 1993. During this period the tagging rate for chinook release groups averaged 16%, and for coho release groups averaged 14%. The graphs in Figure 2 show the number of tagged fish released and the proportion of tagged fish in CWT groups, by year, for each of chinook and coho. More detailed graphs at the end of the Section present the same information by province/state (Figures 3-5).

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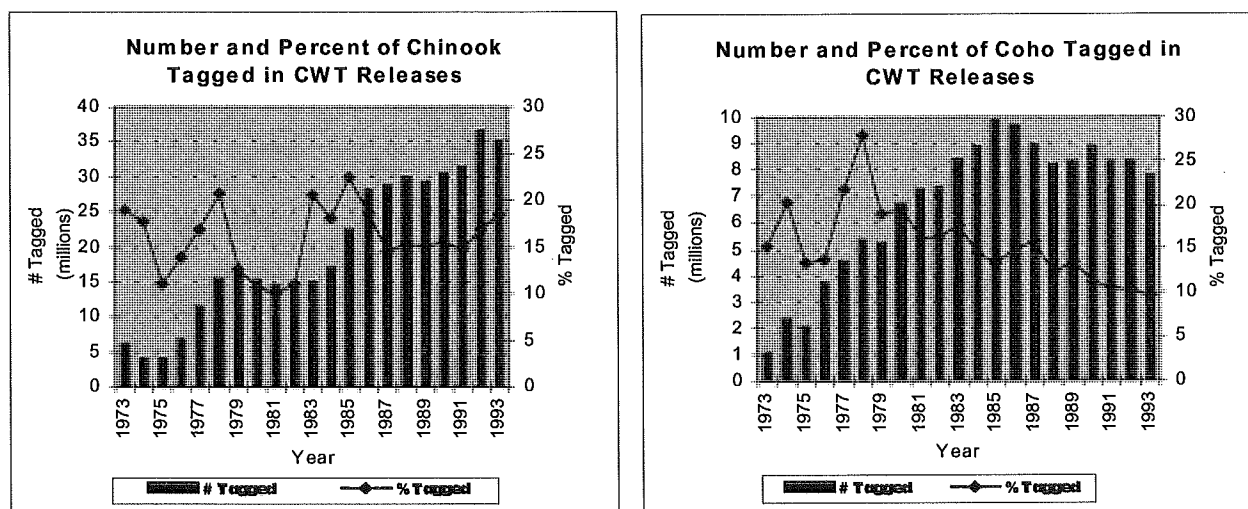
Figure 2. Chinook and coho: number of fish tagged and percent of release that is tagged.

A.3 Wild Tagging Studies

Wild tagging studies are identified in the release records by the "rearing type" field. The CWT release groups described above include both hatchery-reared fish and wild (natural) production. Wild stocks are tagged to determine their exploitation rate in coastal fisheries and their ocean survival rate. Coastwide, a few wild coho and chinook stocks have been selected for these tagging experiments to be used as indicators of larger groups of un-monitored wild stocks. Figures 6 and 7 show the number of wild chinook and coho, respectively, salmon that are CWTed in each region.

A.4 Issues Related to the Quality of Release Data

A.4.1 Non-reporting of Release Data Fields

Some of the data fields associated with a release, identified by a single CWT code, are not required fields (the fields can be blank). However, these data do provide the user with a better understanding of the conditions at release and quality of release information. These data may also be important to many of the analytical applications. Release agencies are strongly encouraged to provide this data if possible. The Data Sharing Committee examined all CWT release records to evaluate the frequency of missing data for seven important data elements (i.e., fields); first release date, release stage, type of release, counting method, tag loss days, size of fish (either length or weight), and expected survival. The percents of the tagged releases with blanks for these seven fields are summarized in Table 5. The same information is presented in graphical format in Figures 8-14.

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Table 5. Percent of CWT release records that have no data by species for each of seven data fields.

Species	First Date Released	Release Stage	Type of Release	Counting Method	Tag Loss Days	Size at Release	Survival Flag
Brood years prior to 1985							
Chinook	39.1%	40.0%	16.6%	73.2%	36.8%	6.9%	42.2%
Coho	39.6%	58.3%	17.3%	72.9%	23.0%	6.3%	67.3%
All Others	26.6%	43.6%	13.8%	66.0%	40.8%	30.7%	57.1%
Brood years 1985-1991							
Chinook	30.0%	17.3%	2.1%	26.3%	6.2%	3.7%	37.7%
Coho	21.4%	13.8%	4.8%	31.5%	10.7%	13.7%	48.6%
All Others	19.3%	21.1%	7.3%	34.0%	9.8%	12.0%	37.3%

The "first release date" entry, along with the required "last release date" entry, provides information on the interval of time over which juvenile fish were released. Survival, growth, and other characteristics may be affected if fish are all released in one day or over an interval of many days. A blank in the "first release date" field may either mean that all fish were released on the date in the "last release date" field, or the time interval over which the fish were released is unknown. Figure 8 indicates that the "first release date" is not provided for a large number of releases. An average of 35% of the chinook salmon releases do not have a "first release date" associated with the code, and this percentage has not significantly decreased in recent years. Although over 60% of the 1979 and 1980 coho salmon releases have no "first release date", the trend of not providing this information has declined. Only 13% of the 1989 through 1991 releases have no "first release date". There is not an obvious trend in releases of all other species, which average 23% of releases with no "first release date".

Knowledge of the "release stage" is useful for evaluating survival, exploitation patterns, maturity rates, etc. Although other information associated with the release (e.g., size or brood year and release year) may, in some cases, be used to approximate the release stage, this is not possible for all releases. Providing this data also facilitates selection of indicator stocks in many applications. Figure 9 indicates that there has been a large improvement in providing this data in recent years. From 1985 to 1991, 83% of the chinook salmon releases, 86% of the coho salmon releases, and 79% of all other species releases have designated a "release stage".

"Type of release" is often used to characterize the appropriateness of using recoveries from a release in a number of applications. While "PSC Key Indicator Stocks" or "Other Index Streams" are relevant to specific applications, the "Experimental" or "Production" designation certainly should be considered when choosing releases as wild stock indicator stocks. There has been a substantial improvement in providing this data since the 1970's, for both coho and chinook salmon and to some degree for all other species. From 1985 to 1991, "type of release" data are available for 98% of the chinook salmon releases, 95% of the coho salmon releases, and 93% of all other species releases (Figure 10).

Knowing the "type of counting method" is essential to understanding the relative quality of release data relating to number of untagged fish in a release, which is directly related to the quality of contribution estimates. For example, book estimates are likely to be the most inaccurate while actual physical counts are considered the most accurate. Prior to 1985, over two-thirds of the releases have no counting method

associated with them. Although in recent years, the reporting rate of counting methods has increased (a 1985 to 1991 average of 74%, 69%, and 66% for chinook salmon, coho salmon, and all other species releases respectively), there is still a large number of releases with unknown counting method (Figure 11).

"Tag loss days" information provides an assessment of the quality of tag loss estimates, which is important in estimating the tag to untagged ratio of releases. If tag loss is measured over a small number of days, it is likely that additional tag loss will occur and the tag to untagged ratio will be biased high. Reporting this data field has increased significantly since the 1970's and early 1980's for all species (Figures 12). From 1985 to 1991, tag loss days have been reported for 94% of the chinook salmon releases, 89% of the coho salmon, and 90% of all other species releases.

"Size at release" information also provides a measurement of the quality of the release and is likely related to the survival, maturity rate, exploitation rate, and other release characteristics. Size at release may also provide an estimate of the age composition of the release. Although an estimate of "size at release" is associated with most releases, the reporting of "size at release" has not significantly improved from early brood years, especially for coho salmon (Figure 13). From 1985 to 1991, "size at release" has been reported for 96% of the chinook salmon releases, 86% of the coho salmon, and 88% of all other species releases.

The "expected survival" data field serves to provide data users with a warning flag for releases which were either destroyed or which have unusual problems associated with the release. Although a blank is generally considered to indicate a normal release, an 'N' should be provided in this field if the release is really designated as normal. Many records still contain a blank in this field (Figure 14). From 1985 to 1991, expected survival has been reported for 62% of the chinook salmon releases, 51% of the coho salmon, and 63% of all other species releases

A.4.2 Trends in Counting Methods and Time Intervals for Tag Loss Measurements

Two of the data fields in the release file provide some indication of the quality of the estimates of number tagged and total release size. The choice of method to use to estimate the total release size affects the accuracy of the estimate. The book method is the least accurate and is generally believed to over-estimate the number released. The Petersen and weight methods tend to be more accurate than the book method, but the accuracy is related to how representative the sampling is and how many fish are sampled. The most accurate method is a total count, which, if done correctly, should provide the actual number of fish released.

A fraction of the fish tagged will lose these tags after the tagging, and this rate of tag loss is highest in the days immediately following the tagging (Blankenship, pers. comm.). Estimates of tag loss become less biased as the time interval between the tagging of the fish and measurement of tag loss increases. Measurement of tag loss immediately after tagging provides an underestimate of true tag loss and results in an overestimate of the number of tags released.

The Data Sharing Committee examined trends in the counting methods that hatcheries were using to estimate the total number of fish released to determine if the frequency of use of better counting methods was increasing (or decreasing). The results are presented graphically in Figure 15 and summarized in Table 6. Use of the book method of estimation increased significantly for both chinook and coho salmon from 1985 to 1991.

Table 6. Percentage of releases by species that use each of the different estimation methods for total number released.

	Estimation Method			
Species	Book	Petersen	Weight	Count
Brood years prior to 1985				
Chinook	43.6%	0.0%	22.3%	34.1%
Coho	52.4%	0.7%	29.9%	17.0%
All Others	19.0%	0.0%	25.6%	29.9%
All Releases	44.2%	0.3%	25.6%	29.9%
Brood years 1985-1991				
Chinook	45.5%	1.2%	36.8%	16.5%
Coho	42.6%	3.0%	29.9%	24.5%
All Others	29.9%	0.0%	31.2%	38.9%
All Releases	42.2%	1.5%	34.0%	22.4%

The DSC also examined trends in number of days between tagging and measurement of tag loss to see if the number of releases with a small number of days (0 to 5 days) has decreased in recent years. The results are graphically presented in Figure 16 and in Table 7.

Table 7. Percentage of releases using time intervals of 0-5 days, 6-20 days, and over 20 days between tagging and estimation of tag loss.

Species	0-5 Days	6-20 Days	Over 20 Days
Brood years prior to 1985			
Chinook	26.0%	21.6%	52.3%
Coho	25.0%	15.7%	59.3%
All Others	46.2%	12.0%	41.9%
All Releases	28.8%	17.3%	53.9%
Brood years 1985-1991			
Chinook	28.0%	14.2%	57.2%
Coho	45.0%	10.6%	44.4%
All Others	47.9%	18.7%	33.4%
All Releases	36.0%	13.9%	50.1%

The graphs and table suggest that there is no trend to using a larger time interval than 5 days, and, especially with coho salmon, there may be an increasing tendency for using smaller time intervals for measuring tag loss.

B. SAMPLING PROGRAM

B.1 Recovery Data

CWT recoveries by year, fishery, and species are presented in Table 8. The number of coded wire recoveries has varied over the years for three main reasons:

1. During the early years of the program not all agencies were involved. Canada and Washington provided recover data starting in 1973, the Quinault Nation in 1976, Oregon and Idaho in 1977, California in 1978, USFWS in 1979, and Alaska and NMFS in 1980.

2. A major reason for varying annual recoveries is the variable number of tagged fish released each year.

3. The remaining reason for varying recoveries is ocean survival. In years of good ocean survival more tagged fish survive and are caught. During years of poor ocean survival, fisheries are curtailed or closed, and any open fishery would have reduced catches, which means fewer tags recovered.

Peak CWT recoveries occurred in 1986 to 1988, which coincided with high tagging rates for contributing years, good ocean survival, and full participation in the tag recovery and reporting program by all agencies.

Not all adipose clipped recovered fish have CWTs that are found or readable. Sampled fish are classified as good, adclip with no tag, lost tag, unreadable tag, unresolved discrepancy, or head lost and not processed. Most tags are good (i.e., readable): about 86% for chinook (Table 9), 78% for coho (Table 10), and 62% for other salmonid species (Table 11).

Besides being readable, tag recoveries must be expandable, based in large part on sample size, in order to be used in estimating contributions to the entire catch or escapement. Table 12 provides the percentage of tag recoveries that have expansion factors provided in the database.

Table 8. Number of coded wire tag recoveries by year, species (chinook, coho, other, total) and type of sampling program (commercial fishery, sport fishery, escapement, total).

	Chinook Salmon Recoveries				Coho Salmon Recoveries			
Year	Comm.	Sport	Esc.	Total	Comm.	Sport	Esc.	Total
1973	213	2,595	1,436	4,244	403	895	3,635	4,933
1974	1,016	5,750	1,518	8,284	4,309	1,284	20,818	26,411
1975	7,023	8,629	2,774	18,426	6,946	6,872	9,132	22,950
1976	8,809	6,967	3,945	19,721	21,861	8,901	6,878	37,640
1977	8,148	4,310	4,968	17,426	24,641	6,888	14,353	45,882
1978	12,527	6,494	6,119	25,140	30,756	13,464	12,029	56,249
1979	15,052	7,983	9,415	32,450	30,974	15,076	20,083	66,133
1980	20,432	6,048	13,656	40,136	41,964	16,025	27,458	85,447
1981	16,195	5,305	10,785	32,285	42,502	18,925	41,299	102,726
1982	21,697	6,413	14,592	42,702	38,401	12,806	37,259	88,466
1983	15,811	6,258	15,861	37,930	29,961	14,997	39,962	84,920
1984	15,316	5,149	18,166	38,631	36,587	10,972	56,465	104,024
1985	18,228	6,635	28,352	53,215	39,572	22,694	60,048	122,314
1986	27,632	7,167	38,062	72,861	58,808	19,269	97,686	175,763
1987	37,055	8,967	37,901	83,923	53,025	20,243	56,370	129,638
1988	37,490	7,477	33,182	78,149	48,560	20,180	57,604	126,344
1989	29,290	7,265	35,944	72,499	45,744	17,406	43,294	106,444
1990	33,690	7,608	28,897	70,195	46,634	14,610	28,591	89,835
1991	24,873	7,422	23,972	56,267	63,879	17,395	37,849	119,123
1992	18,006	7,703	21,889	47,598	47,097	13,070	26,905	87,072
1993	16,420	6,122	10,956	33,498	33,123	10,334	6,552	50,009

	Other Species Recoveries				Total Recoveries (All Species)			
Year	Comm.	Sport	Esc.	Total	Comm.	Sport	Esc.	Total
1973	0	11	6	17	616	3,501	5,077	9,194
1974	0	7	0	7	5,325	7,041	22,336	34,702
1975	2	0	0	2	13,971	15,501	11,906	41,378
1976	9	0	1	10	30,679	15,868	10,824	57,371
1977	302	4	0	306	33,091	11,202	19,321	63,614
1978	534	31	16	581	43,817	19,989	18,164	81,970
1979	346	44	316	706	46,372	23,103	29,814	99,289
1980	1,401	151	521	2,073	63,797	22,224	41,635	127,656
1981	1,167	215	1,256	2,638	59,864	24,445	53,340	137,649
1982	1,665	583	1,601	3,849	61,763	19,802	53,452	135,017
1983	2,252	940	3,098	6,290	48,024	22,195	58,921	129,140
1984	6,357	1,168	6,483	14,008	58,260	17,289	81,114	156,663
1985	4,850	1,736	7,993	14,579	62,650	31,065	96,393	190,108
1986	3,991	1,589	5,336	10,916	90,431	28,025	141,084	259,540
1987	6,042	1,459	4,687	12,188	96,122	30,669	98,958	225,749
1988	4,452	705	3,244	8,401	90,502	28,362	94,030	212,894
1989	2,774	683	3,746	7,203	77,808	25,354	82,984	186,146
1990	2,438	448	3,099	5,985	82,762	22,666	60,587	166,015
1991	2,678	305	2,998	5,981	91,430	25,122	64,819	181,371
1992	9,080	368	4,583	14,031	74,183	21,141	53,377	148,701
1993	7,899	261	6,140	14,300	57,442	16,717	23,648	97,807

Table 9. Number of chinook salmon coded wire tag recoveries by tag status and year.

Year	Good	AdClip w/ No Tag	Lost Tag	Unreadable Tags	Unresolved Discrepancy	Head Lost, Not Processed	Total
1973	4,244 (82.6%)	337 (6.6%)	23 (0.4%)	21 (0.4%)	515 (10.0%)	0 (0.0%)	5,140
1974	8,284 (85.0%)	667 (6.8%)	6 (0.1%)	7 (0.1%)	645 (6.6%)	140 (1.4%)	9,749
1975	18,426 (84.2%)	2,695 (12.3%)	218 (1.0%)	63 (0.3%)	399 (1.8%)	87 (0.4%)	21,888
1976	19,721 (84.4%)	2,682 (11.5%)	417 (1.8%)	0 (0.0%)	381 (1.6%)	164 (0.7%)	23,365
1977	17,426 (84.5%)	2,464 (11.9%)	342 (1.7%)	1 (0.0%)	178 (0.9%)	216 (1.0%)	20,627
1978	25,140 (86.2%)	2,899 (9.9%)	546 (1.9%)	3 (0.0%)	205 (0.7%)	371 (1.3%)	29,164
1979	32,498 (76.2%)	6,806 (16.0%)	2,391 (5.6%)	9 (0.0%)	530 (1.2%)	412 (1.0%)	42,646
1980	40,857 (86.3%)	4,310 (9.1%)	996 (2.1%)	18 (0.0%)	191 (0.4%)	955 (2.0%)	47,327
1981	32,667 (83.9%)	3,956 (10.2%)	995 (2.6%)	46 (0.1%)	276 (0.7%)	1,014 (2.6%)	38,954
1982	43,368 (85.7%)	4,708 (9.3%)	739 (1.5%)	100 (0.2%)	233 (0.5%)	1,455 (2.9%)	50,603
1983	38,223 (84.0%)	5,113 (11.2%)	485 (1.1%)	51 (0.1%)	291 (0.6%)	1,340 (2.9%)	45,503
1984	39,234 (88.2%)	3,879 (8.7%)	285 (0.6%)	41 (0.1%)	343 (0.8%)	721 (1.6%)	44,503
1985	55,198 (88.6%)	5,234 (8.4%)	419 (0.7%)	41 (0.1%)	120 (0.2%)	1,258 (2.0%)	62,270
1986	74,468 (90.0%)	6,002 (7.3%)	477 (0.6%)	101 (0.1%)	139 (0.2%)	1,579 (1.9%)	82,766
1987	85,085 (89.7%)	7,146 (7.5%)	585 (0.6%)	127 (0.1%)	166 (0.2%)	1,706 (1.8%)	94,815
1988	78,961 (87.6%)	7,799 (8.7%)	568 (0.6%)	341 (0.4%)	125 (0.1%)	2,316 (2.6%)	90,110
1989	73,752 (88.0%)	6,912 (8.2%)	456 (0.5%)	119 (0.1%)	201 (0.2%)	2,379 (2.8%)	83,819
1990	71,385 (90.0%)	5,893 (7.4%)	494 (0.6%)	82 (0.1%)	173 (0.2%)	1,284 (1.6%)	79,311
1991	57,658 (90.4%)	4,798 (7.5%)	368 (0.6%)	22 (0.0%)	163 (0.3%)	787 (1.2%)	63,796
1992	48,982 (89.9%)	4,094 (7.5%)	219 (0.4%)	7 (0.0%)	156 (0.3%)	1,019 (1.9%)	54,477
1993	34,630 (89.4%)	3,239 (8.4%)	184 (0.5%)	18 (0.0%)	256 (0.7%)	396 (1.0%)	38,723

Table 10. Number of coho salmon coded wire tag recoveries by tag status.

Year	Good	AdClip w/ No Tag	Lost Tag	Unreadable Tags	Unresolved Discrepancy	Head Lost, Not Processed	Total
1973	4,933 (76.4%)	860 (13.3%)	89 (1.4%)	24 (0.4%)	14 (0.2%)	539 (8.3%)	6,459
1974	26,276 (71.2%)	2,718 (7.4%)	7 (0.0%)	7 (0.0%)	1,057 (2.9%)	6,840 (18.5%)	36,905
1975	22,892 (52.4%)	4,185 (9.6%)	105 (0.2%)	128 (0.3%)	106 (0.2%)	16,234 (37.2%)	43,650
1976	37,630 (65.8%)	6,174 (10.8%)	919 (1.6%)	3 (0.0%)	617 (1.1%)	11,864 (20.7%)	57,207
1977	46,085 (73.0%)	7,480 (11.8%)	946 (1.5%)	61 (0.1%)	1,221 (1.9%)	7,376 (11.7%)	63,169
1978	56,187 (69.7%)	8,689 (10.8%)	1,688 (2.1%)	5 (0.0%)	676 (0.8%)	13,344 (16.6%)	80,589
1979	66,211 (79.2%)	8,511 (10.2%)	1,483 (1.8%)	8 (0.0%)	690 (0.8%)	6,731 (8.0%)	83,634
1980	85,498 (79.7%)	12,034 (11.2%)	2,404 (2.2%)	9 (0.0%)	383 (0.4%)	6,993 (6.5%)	107,321
1981	103,287 (83.9%)	11,773 (9.6%)	2,408 (2.0%)	27 (0.0%)	87 (0.1%)	5,508 (4.5%)	123,090
1982	89,583 (77.5%)	10,569 (9.1%)	1,438 (1.2%)	57 (0.0%)	145 (0.1%)	13,791 (11.9%)	115,583
1983	84,889 (83.5%)	9,598 (9.4%)	784 (0.8%)	113 (0.1%)	107 (0.1%)	6,200 (6.1%)	101,691
1984	104,146 (83.6%)	12,408 (10.0%)	924 (0.7%)	28 (0.0%)	305 (0.2%)	6,788 (5.4%)	124,599
1985	124,011 (85.4%)	14,763 (10.2%)	1,201 (0.8%)	49 (0.0%)	378 (0.3%)	4,812 (3.3%)	145,214
1986	175,395 (84.2%)	24,100 (11.6%)	1,122 (0.5%)	111 (0.1%)	288 (0.1%)	7,241 (3.5%)	208,257
1987	130,109 (80.2%)	18,388 (11.3%)	833 (0.5%)	62 (0.0%)	323 (0.2%)	12,491 (7.7%)	162,206
1988	125,499 (78.9%)	18,611 (11.7%)	834 (0.5%)	83 (0.1%)	439 (0.3%)	13,639 (8.6%)	159,105
1989	107,627 (77.0%)	19,146 (13.7%)	531 (0.4%)	65 (0.0%)	335 (0.2%)	12,139 (8.7%)	139,843
1990	92,250 (79.5%)	16,364 (14.1%)	756 (0.7%)	178 (0.2%)	475 (0.4%)	6,050 (5.2%)	116,073
1991	121,026 (79.6%)	20,344 (13.4%)	679 (0.4%)	38 (0.0%)	462 (0.3%)	9,509 (6.3%)	152,058
1992	91,262 (80.3%)	12,362 (10.9%)	325 (0.3%)	25 (0.0%)	298 (0.3%)	9,325 (8.2%)	113,597
1993	55,410 (84.6%)	8,274 (12.6%)	181 (0.3%)	19 (0.0%)	449 (0.7%)	1,194 (1.8%)	65,527

Table 11. Number of coded wire tag recoveries of other species of salmon by tag status.

Year	Good	AdClip/ No Tag	Lost Tag	Unreadable Tag	Unresolved Discrepancy	Head Lost Not Processed	Total
1973	17 (100.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	17
1974	7 (87.5%)	1 (12.5%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	8
1975	2 (10.5%)	14 (73.7%)	0 (0.0%)	0 (0.0%)	3 (15.8%)	0 (0.0%)	19
1976	10 (6.8%)	31 (21.1%)	0 (0.0%)	8 (5.4%)	69 (46.9%)	29 (19.7%)	147
1977	306 (74.6%)	78 (19.0%)	7 (1.7%)	0 (0.0%)	10 (2.4%)	9 (2.2%)	410
1978	581 (45.0%)	218 (16.9%)	25 (1.9%)	0 (0.0%)	380 (29.5%)	86 (6.7%)	1,290
1979	553 (50.5%)	128 (11.7%)	28 (2.6%)	1 (0.1%)	378 (34.6%)	6 (0.5%)	1,094
1980	2,165 (70.3%)	433 (14.1%)	95 (3.1%)	2 (0.1%)	272 (8.8%)	113 (3.7%)	3,080
1981	2,416 (69.8%)	547 (15.8%)	54 (1.6%)	8 (0.2%)	340 (9.8%)	98 (2.8%)	3,463
1982	4,024 (70.7%)	779 (13.7%)	84 (1.5%)	5 (0.1%)	209 (3.7%)	589 (10.4%)	5,690
1983	6,150 (76.0%)	1,272 (15.7%)	65 (0.8%)	14 (0.2%)	156 (1.9%)	437 (5.4%)	8,094
1984	14,556 (79.2%)	2,659 (14.5%)	107 (0.6%)	151 (0.8%)	441 (2.4%)	457 (2.5%)	18,371
1985	14,953 (68.5%)	4,830 (22.1%)	105 (0.5%)	21 (0.1%)	1,254 (5.7%)	662 (3.0%)	21,825
1986	11,321 (62.8%)	4,711 (26.1%)	69 (0.4%)	7 (0.0%)	145 (0.8%)	1,766 (9.8%)	18,019
1987	13,783 (63.8%)	6,088 (28.2%)	95 (0.4%)	10 (0.0%)	22 (0.1%)	1,601 (7.4%)	21,599
1988	9,006 (58.0%)	6,191 (39.9%)	50 (0.3%)	12 (0.1%)	41 (0.3%)	226 (1.5%)	15,526
1989	6,989 (63.0%)	3,809 (34.4%)	40 (0.4%)	3 (0.0%)	35 (0.3%)	209 (1.9%)	11,085
1990	6,505 (58.8%)	4,357 (39.4%)	28 (0.3%)	7 (0.1%)	46 (0.4%)	124 (1.1%)	11,067
1991	5,448 (62.2%)	3,160 (36.1%)	11 (0.1%)	9 (0.1%)	21 (0.2%)	106 (1.2%)	8,755
1992	17,478 (55.8%)	8,858 (28.3%)	48 (0.2%)	12 (0.0%)	51 (0.2%)	4,848 (15.5%)	31,295
1993	18,184 (69.7%)	7,419 (28.4%)	53 (0.2%)	8 (0.0%)	68 (0.3%)	363 (1.4%)	26,095

Table 12. Percent of expandable tags (sample types 1, 2, 4, and 6) that are expanded by State/Province, type of fishery, and year.

State/Province	Fishery	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Alaska	Commercial	na	na	na	na	na	na	na	100%	100%	99%	100%
Alaska	Sport	na	na	na	na	na	na	na	0%	13%	14%	15%
Alaska	Escapement	na	na	na	na	na	na	na	100%	100%	44%	56%
British Columbia	Commercial	na	na	99%	98%	99%	99%	100%	100%	100%	100%	100%
British Columbia	Sport	na	na	na	na	na	na	na	100%	100%	100%	100%
British Columbia	Escapement	100%	99%	98%	84%	100%	100%	99%	99%	99%	93%	91%
Washington	Commercial	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	97%
Washington	Sport	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Washington	Escapement	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Oregon	Commercial	na	na	100%	100%	100%	100%	100%	100%	100%	100%	100%
Oregon	Sport	na	na	na	na	100%	100%	100%	100%	100%	100%	100%
Oregon	Escapement	na	na	na	na	100%	100%	100%	100%	100%	100%	100%
Idaho	Commercial	na	na	na	na	na	na	na	na	na	na	na
Idaho	Sport	na	na	na	na	na	0%	0%	0%	0%	0%	0%
Idaho	Escapement	na	na	na	na	100%	100%	100%	100%	99%	97%	99%
California	Commercial	na	na	na	100%	100%	100%	100%	100%	100%	100%	100%
California	Sport	na	na	na	na	na	100%	100%	100%	100%	100%	100%
California	Escapement	na	na	na	na	na	na	100%	100%	100%	100%	100%

State/Province	Fishery	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Alaska	Commercia	98%	98%	98%	100%	100%	98%	100%	100%	99%	93%
Alaska	Sport	7%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Alaska	Escapemen	52%	35%	50%	55%	52%	40%	34%	0%	0%	0%
British Columbia	Commercia	99%	100%	100%	100%	100%	100%	99%	100%	100%	100%
British Columbia	Sport	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
British Columbia	Escapemen	90%	94%	86%	87%	88%	84%	87%	82%	82%	na
Washington	Commercia	100%	100%	100%	90%	100%	96%	100%	100%	100%	99%
Washington	Sport	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Washington	Escapemen	100%	99%	100%	100%	99%	99%	99%	99%	99%	100%
Oregon	Commercia	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Oregon	Sport	100%	100%	100%	100%	88%	99%	93%	98%	100%	100%
Oregon	Escapemen	100%	100%	100%	100%	99%	99%	97%	99%	99%	100%
Idaho	Commercia	na	na	na	na	na	na	na	na	na	na
Idaho	Sport	78%	99%	99%	100%	100%	100%	100%	na	na	na
Idaho	Escapemen	100%	100%	100%	98%	98%	100%	100%	100%	100%	100%
California	Commercia	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
California	Sport	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
California	Escapemen	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

B.2. Sampling Rates

There is general agreement among agencies that commercial fisheries should be sampled at 15-20% level in each stratum (defined by gear, week, species, area) in order to recover enough coded wire tags to generate reliable estimates of each tag group's contribution to the catch in that stratum. Obviously, the uncertainties in the estimates of survival rates, exploitation rates and total hatchery contributions are likewise affected by the sampling rates in all the strata contributing to the calculations. It is important to know, then, when analyzing recovery data, where and when sampling rates might have fallen below acceptable levels.

Graphs are included at the end of the section (Figures 17-20) that show the percentage of catch sampled below the 15% level and below the 20% level. Ideally, no catch would be sampled below these rates, so the closer a line is to the horizontal axis, the better. Sampling has often been less than that desired, and, unfortunately, there does not seem to be any reassuring downward trend to these lines.

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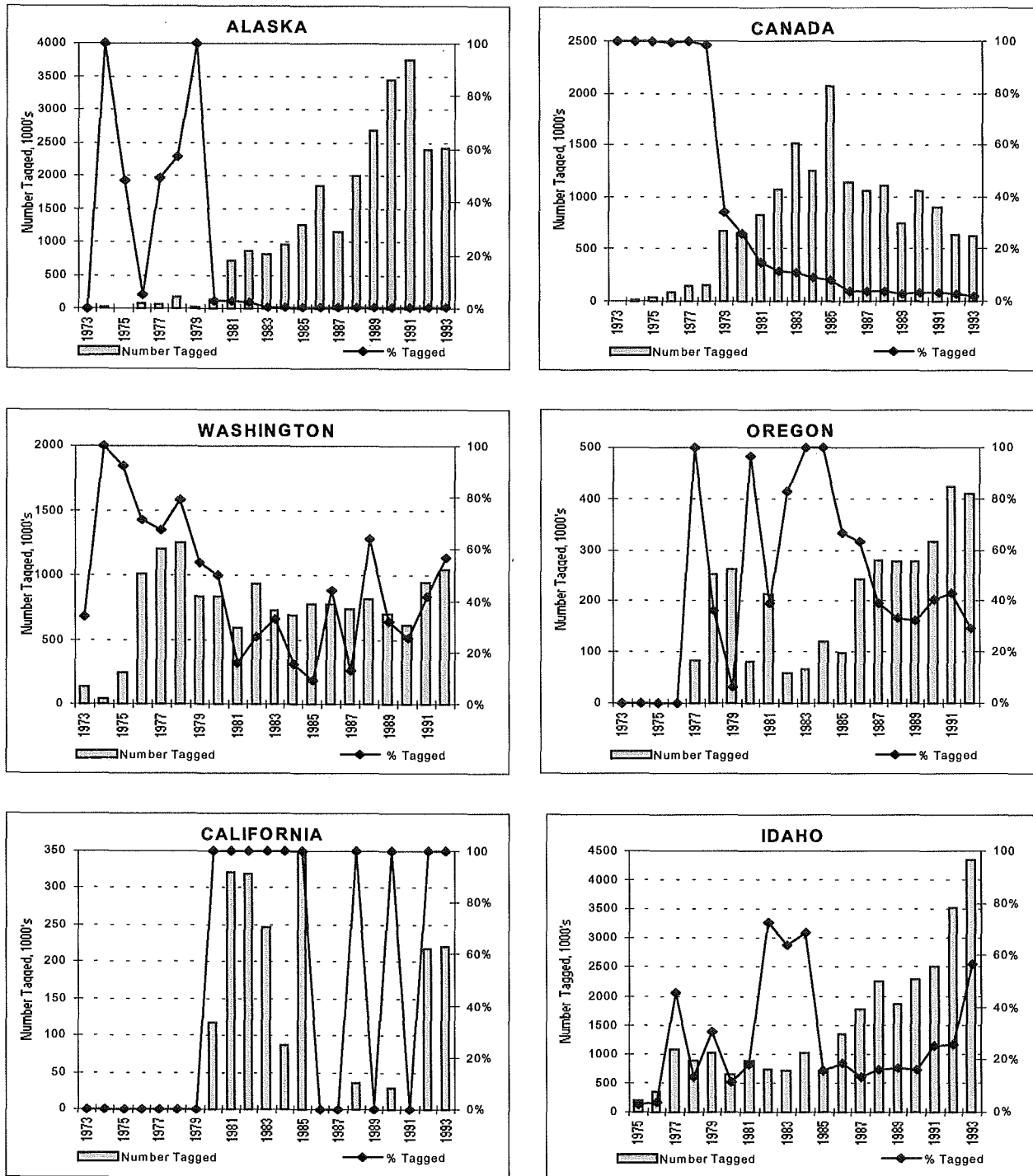
Figure 3. Chinook CWT releases.

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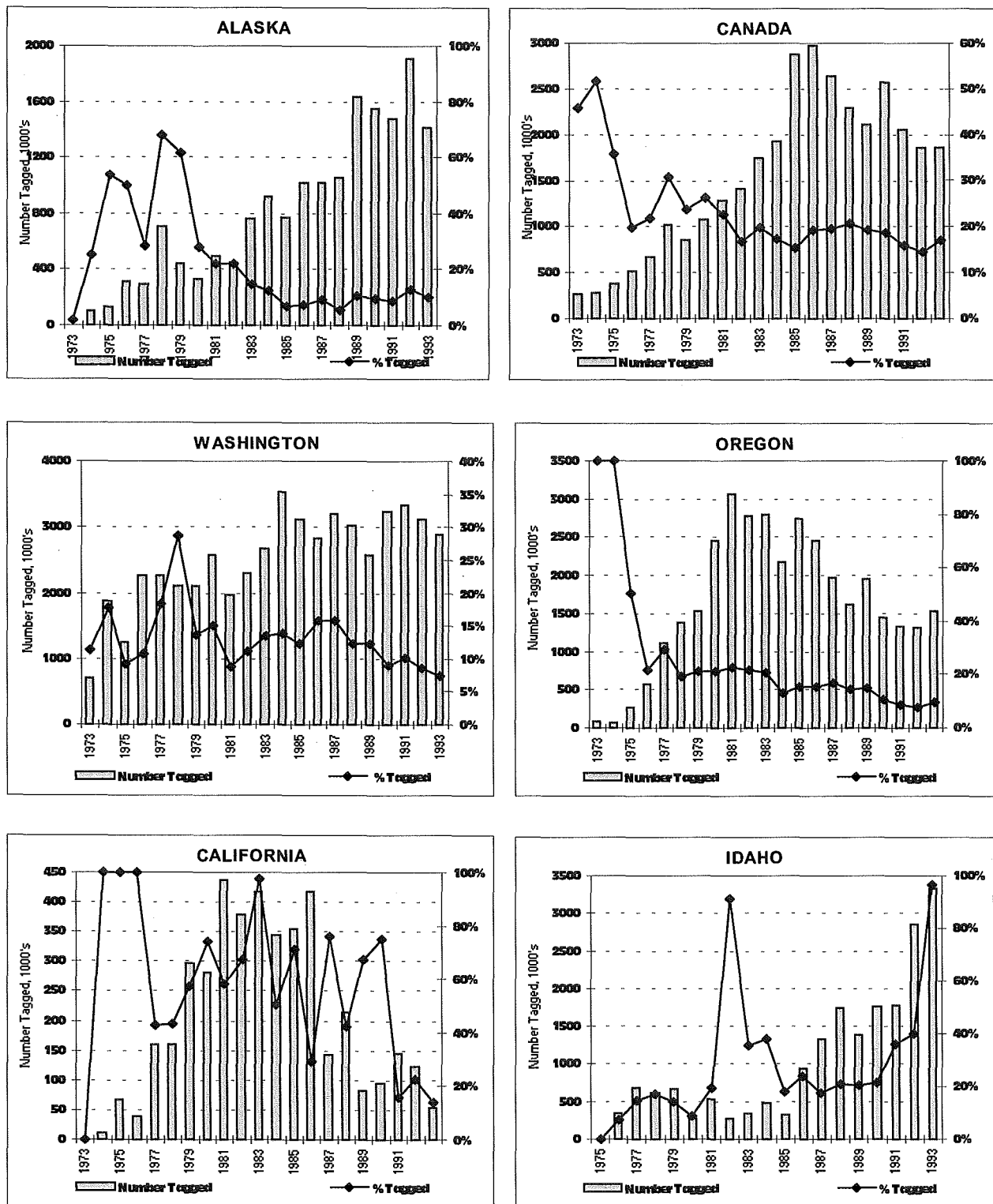
Figure 4. Coho CWT releases.
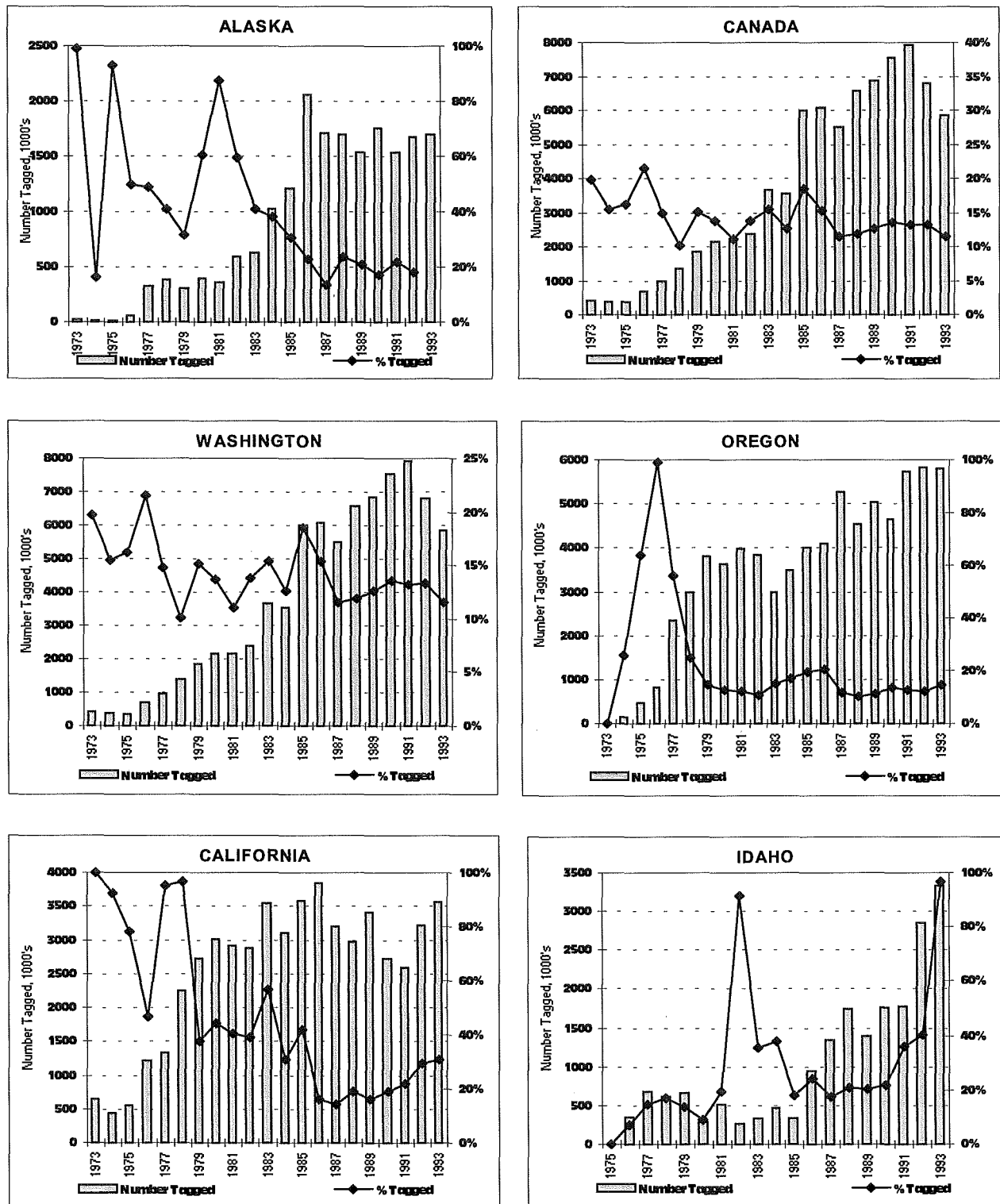
Figure 5. Salmon CWT releases other than chinook and coho.

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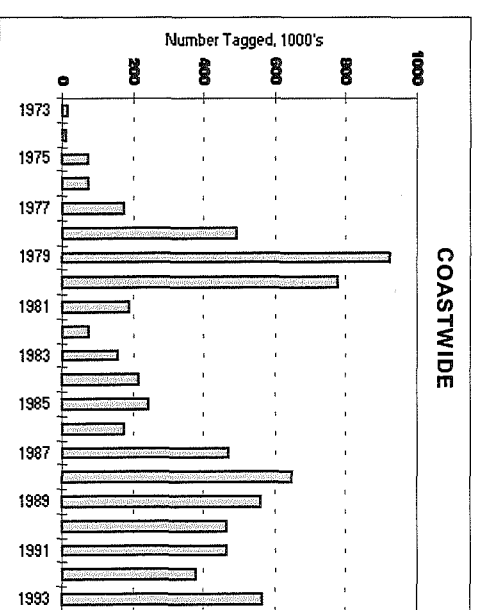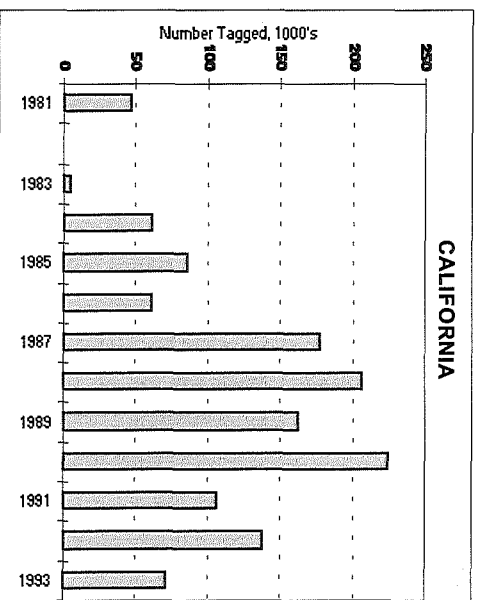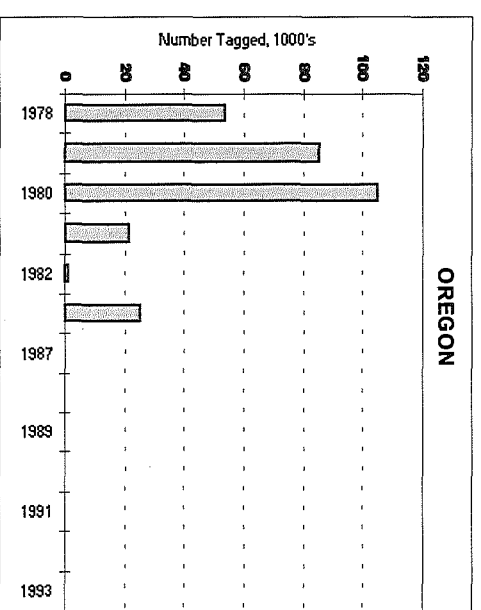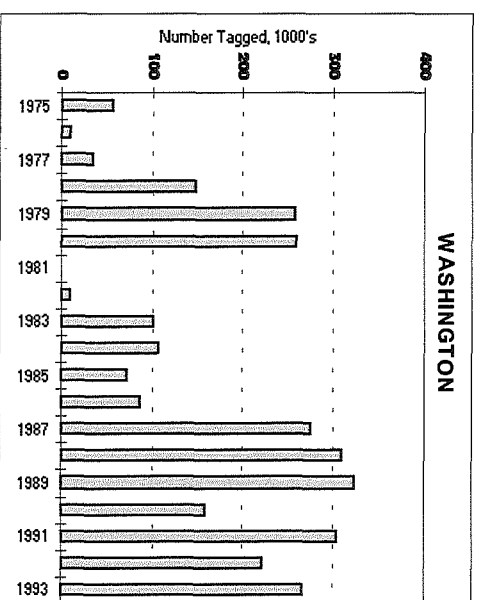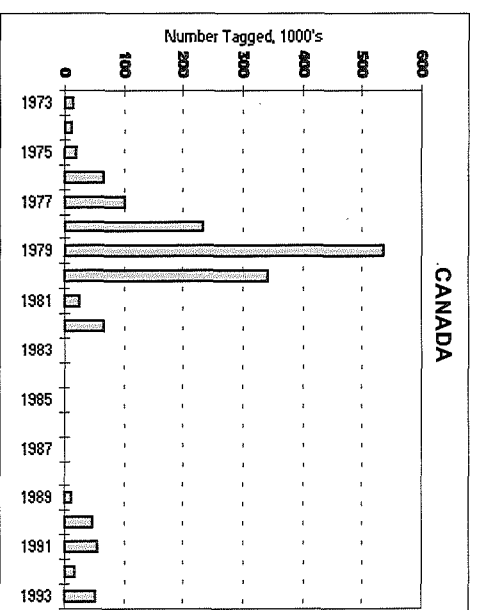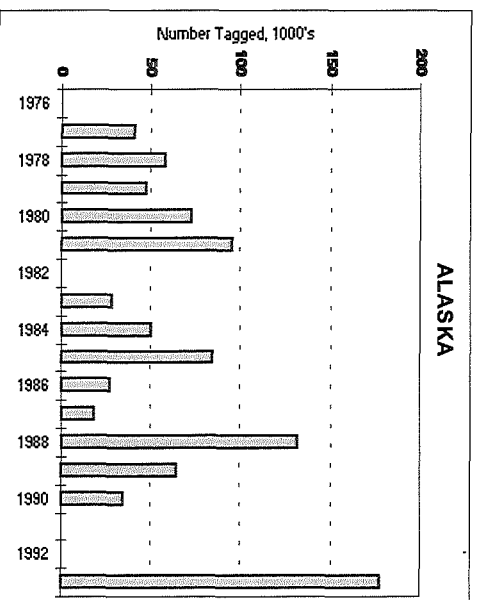
Figure 6. Wild Chinook CWT Releases

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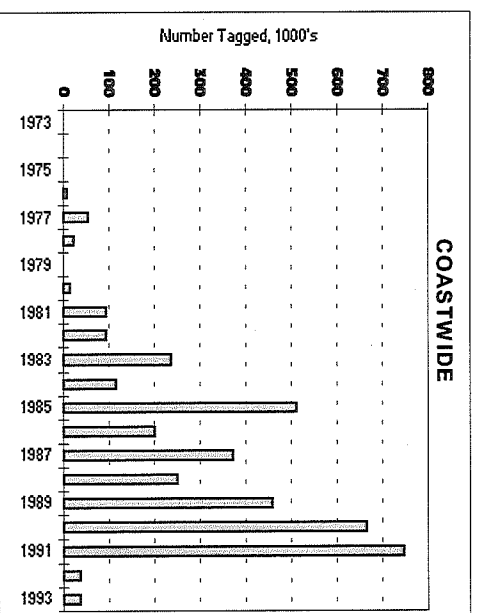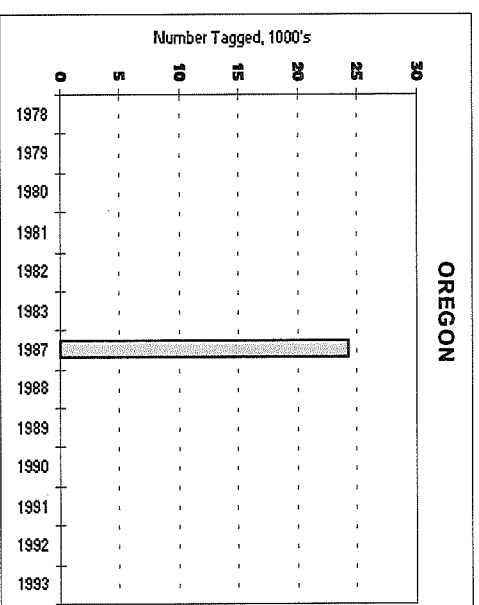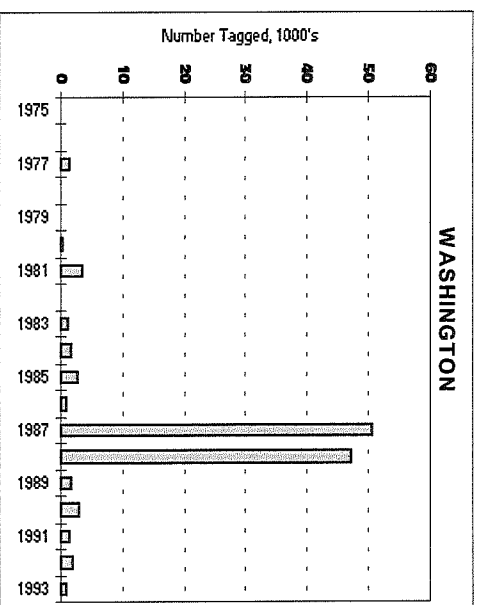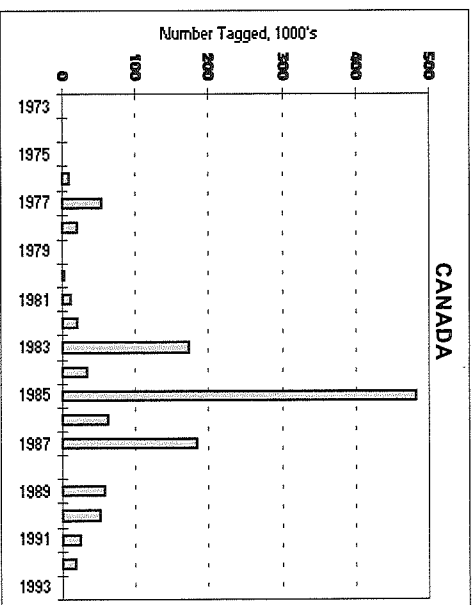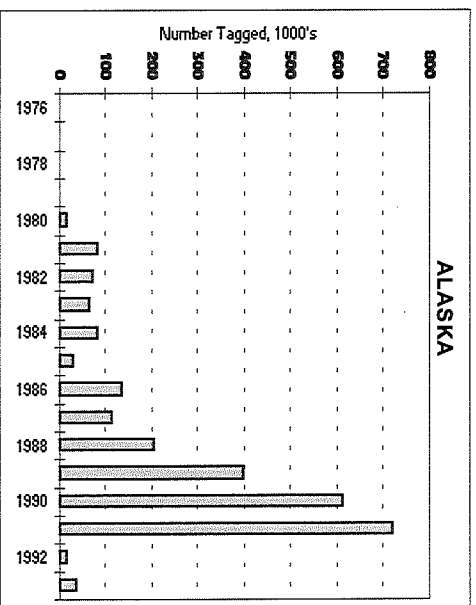
Figure 7. Wild Coho CWT Releases

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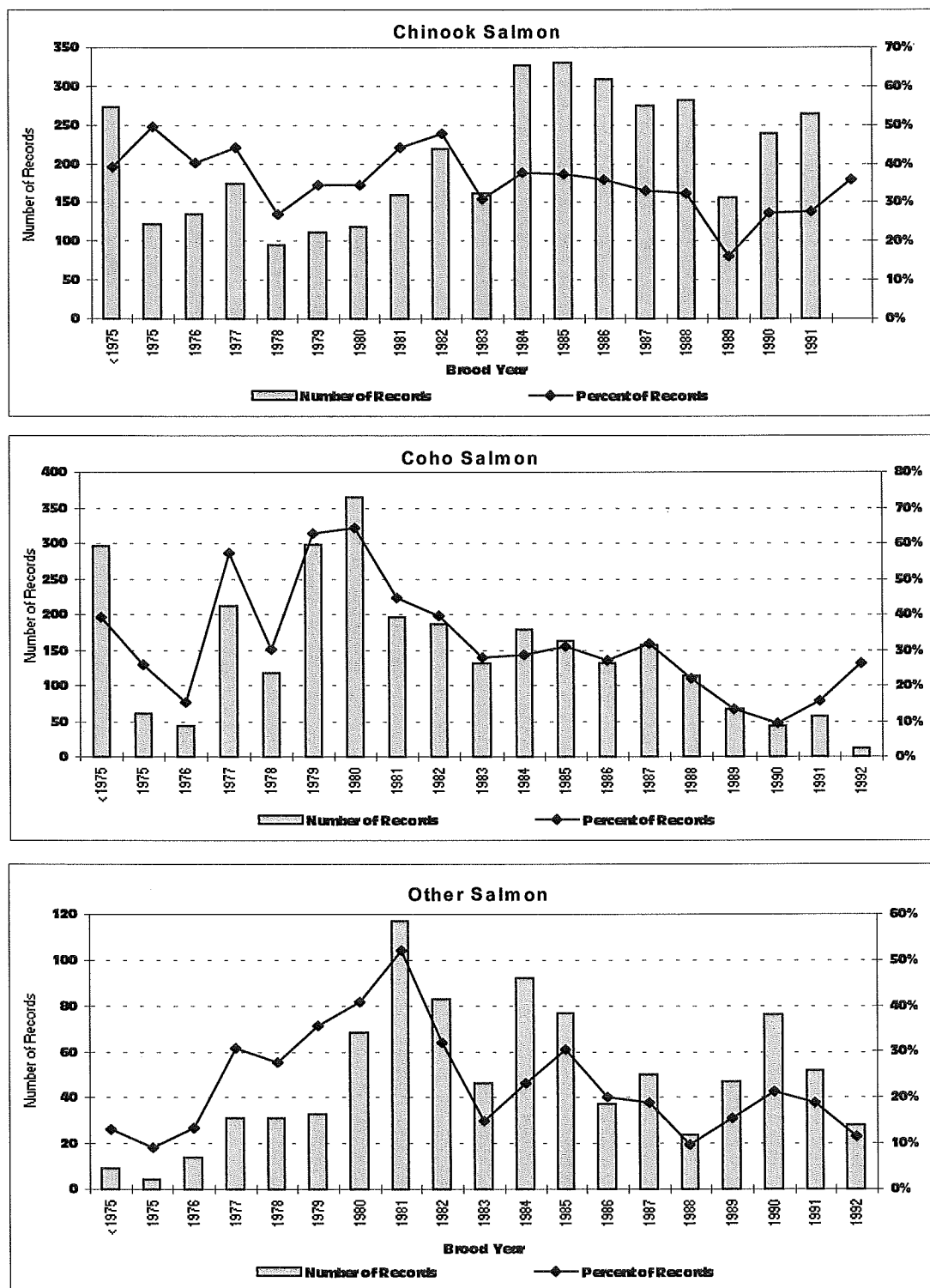
Figure 8. Records missing entries in the "first release date" field.
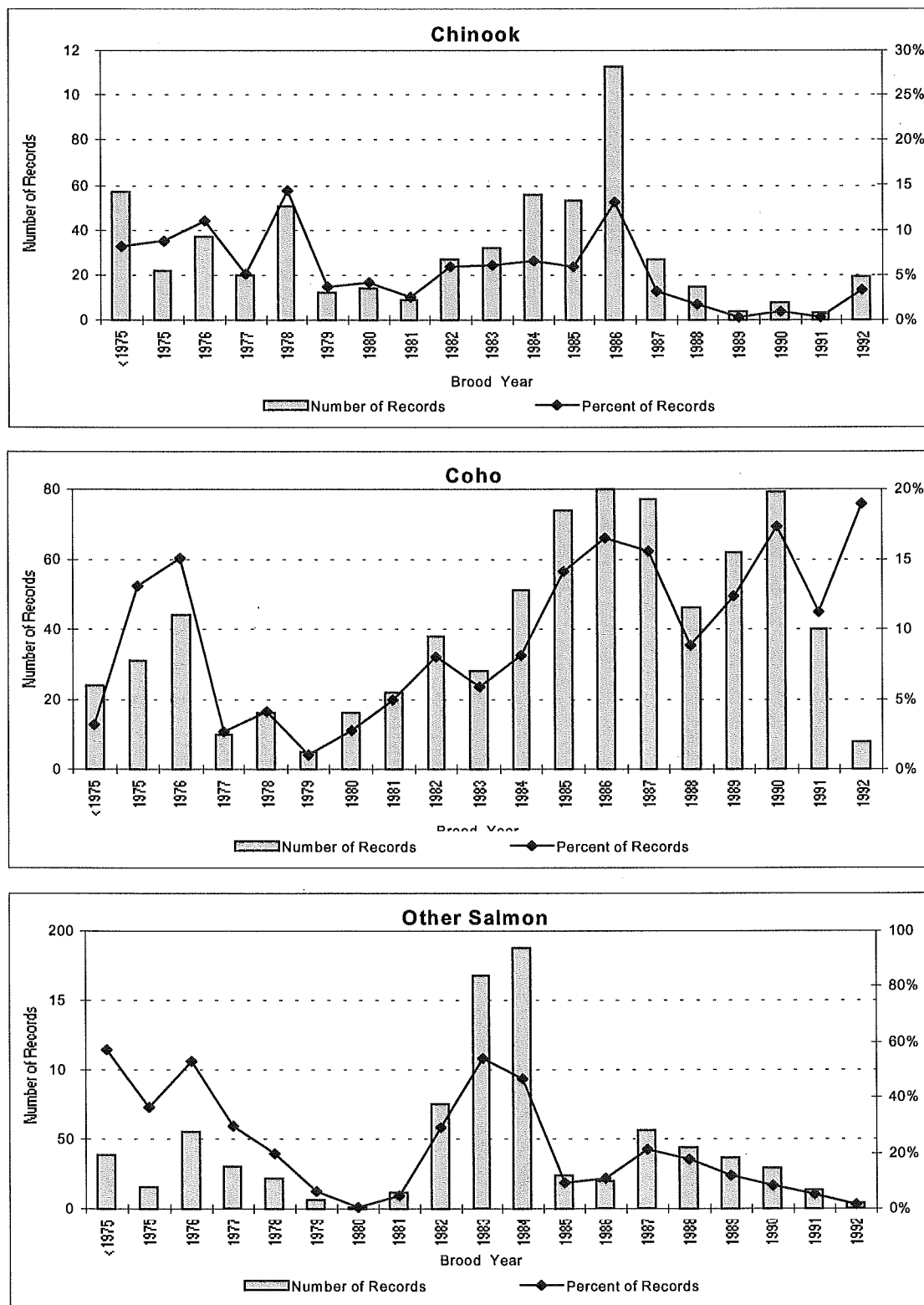
Figure 9. Records missing entries in the "release stage" field.
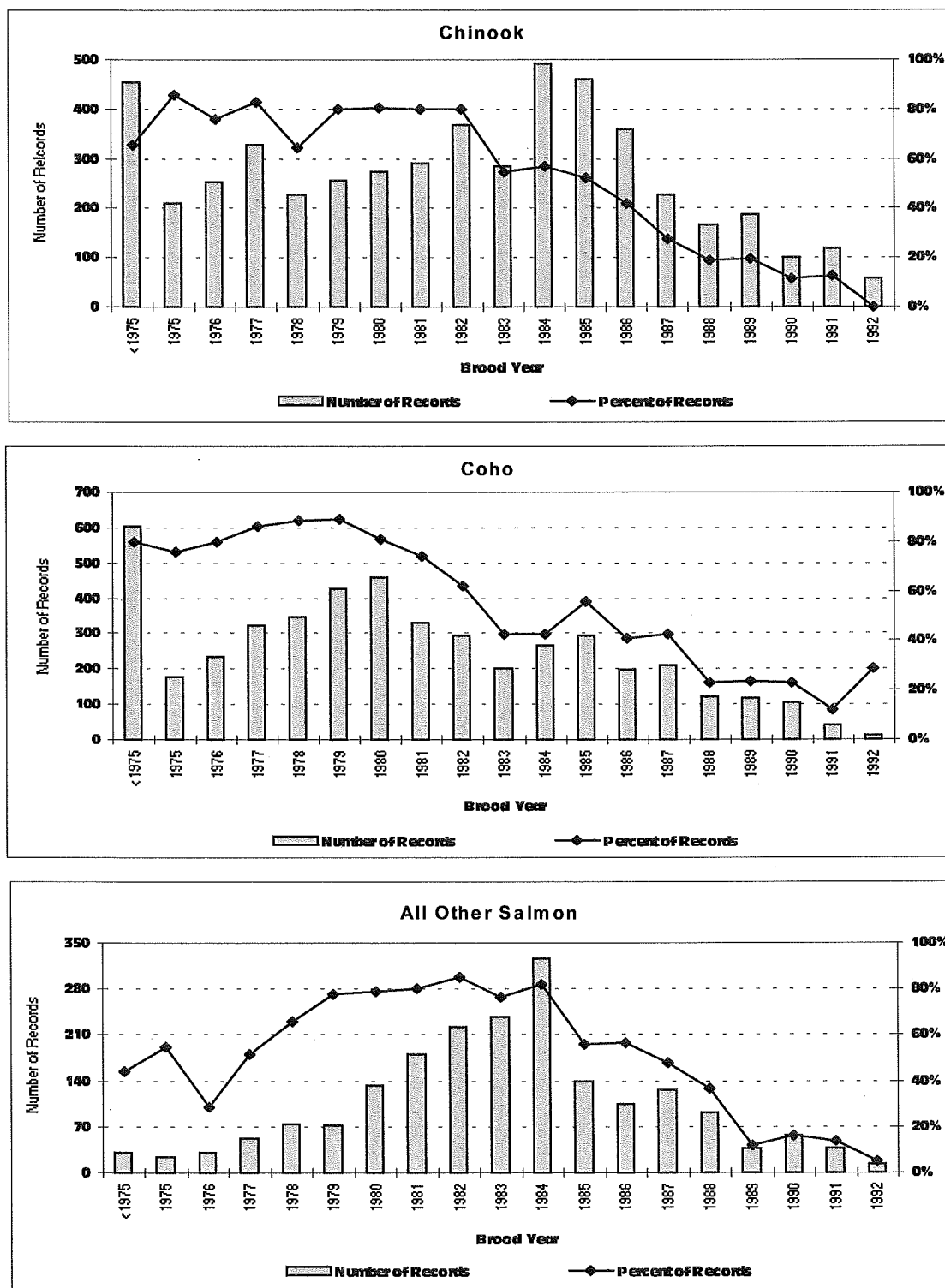
Figure 10. Records missing entries in the "type of release" field.
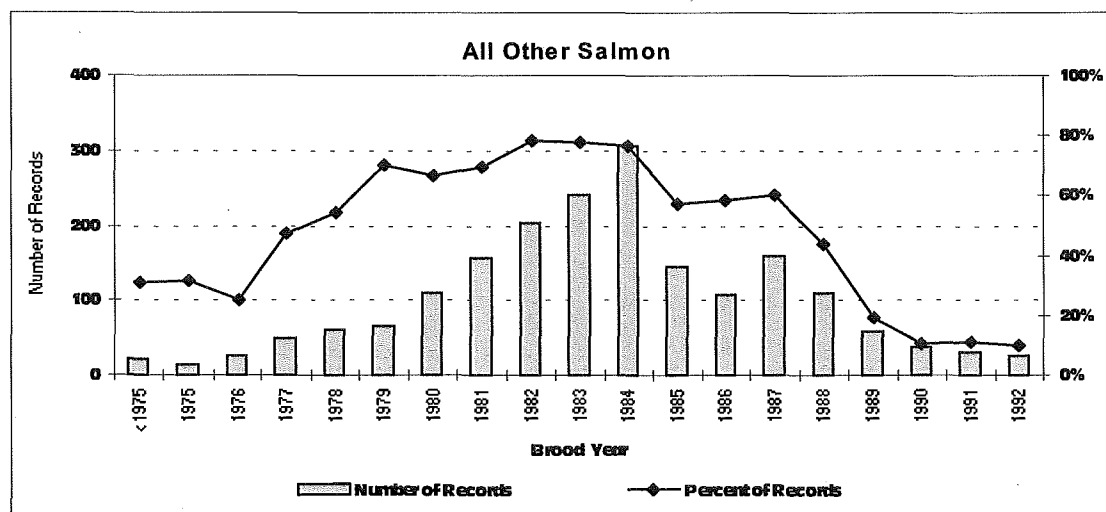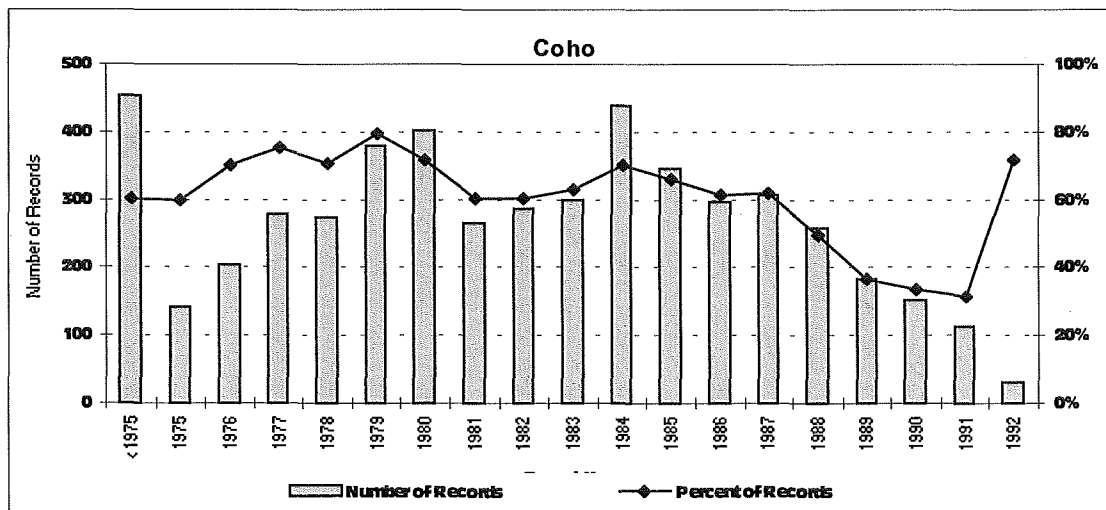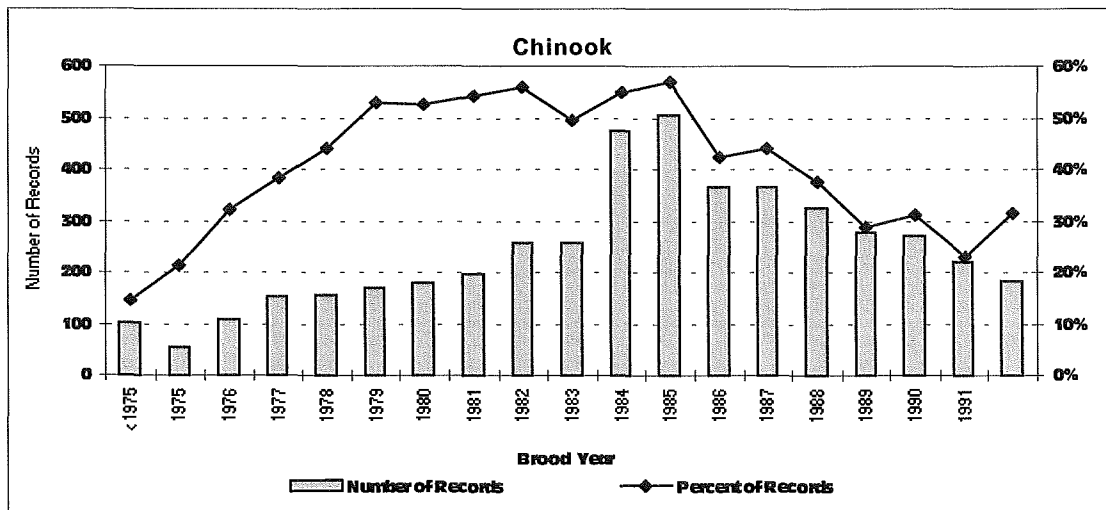
Figure 11. Records missing entries in the "type of counting method" field.
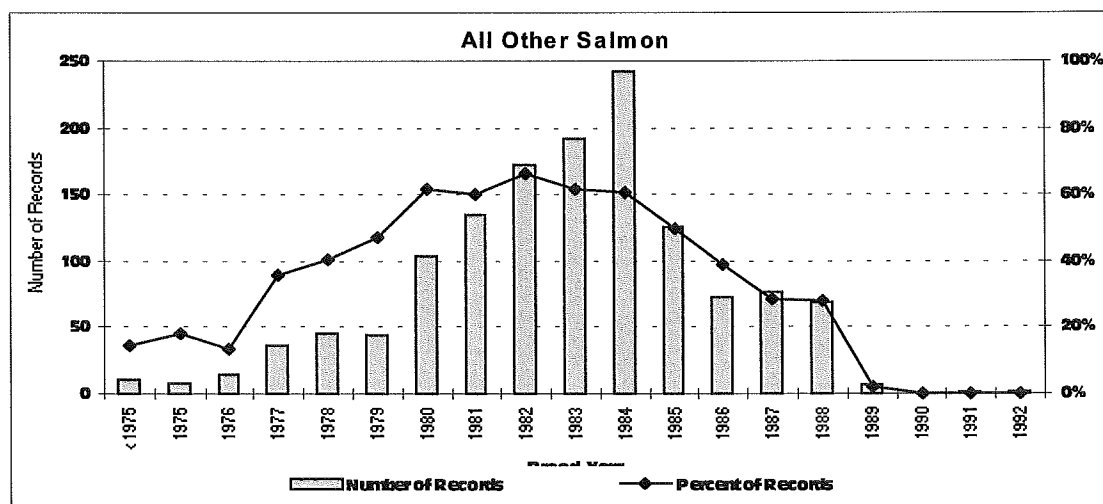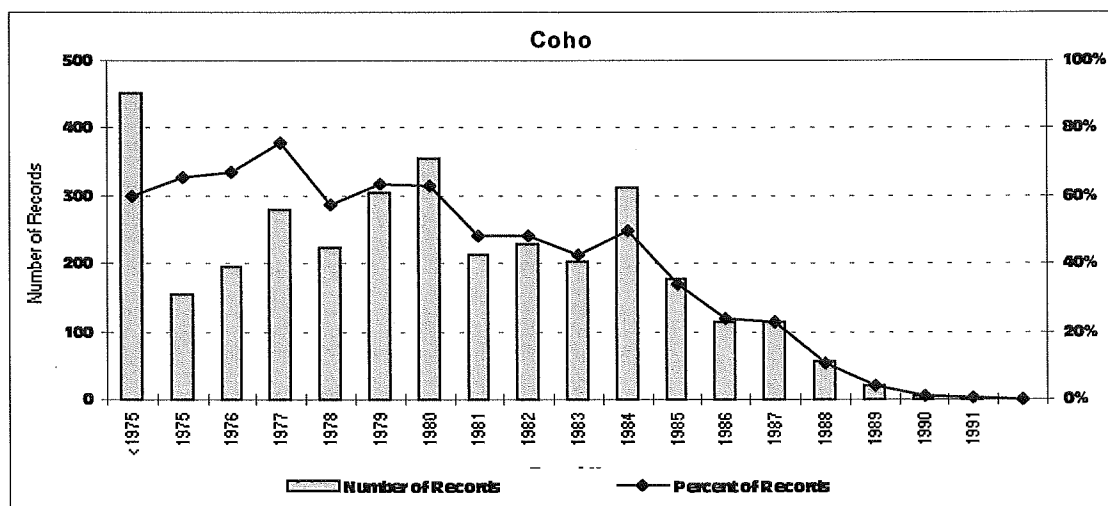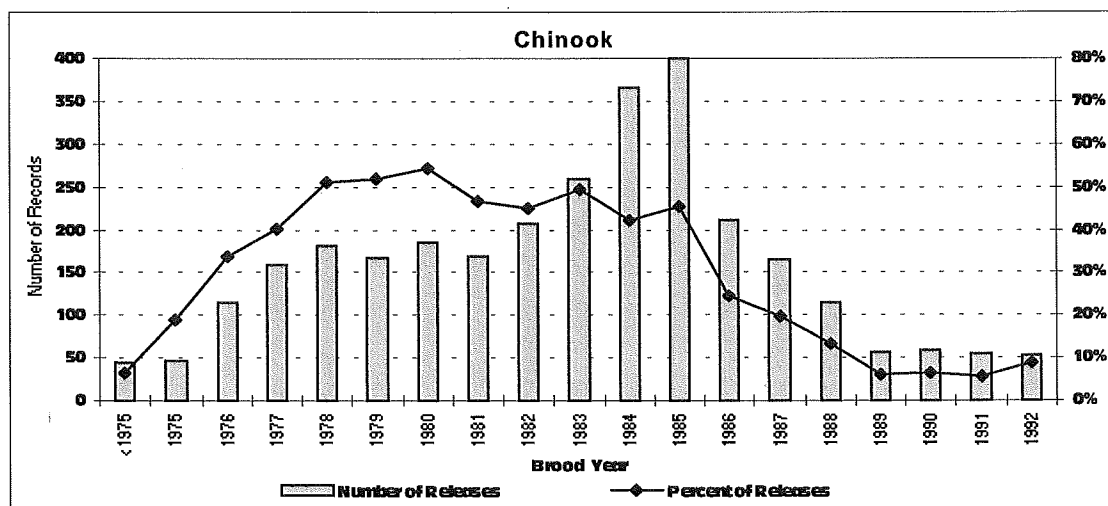
Figure 12. Records missing entries in the "tag loss days" field.
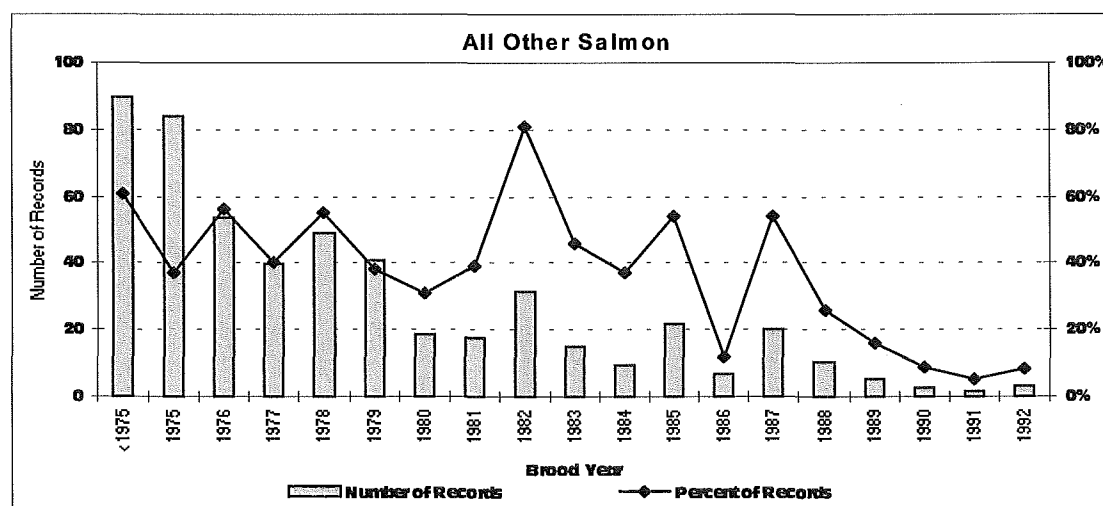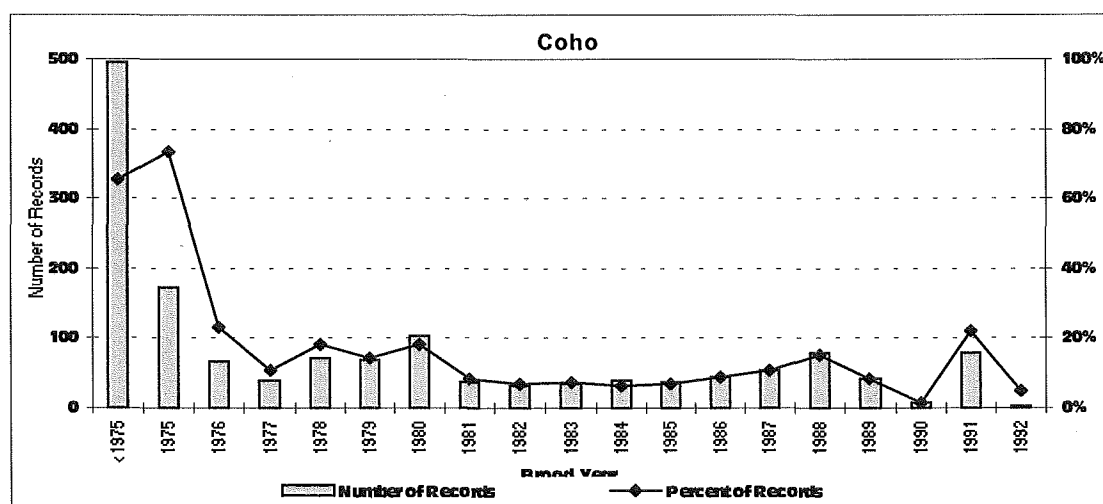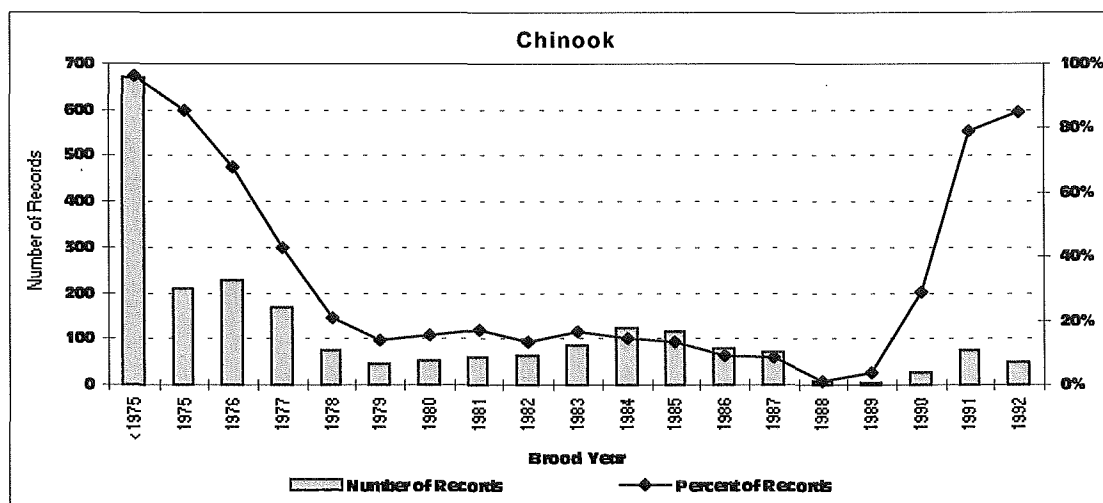
Figure 13. Records missing entries in the "size at release" field.
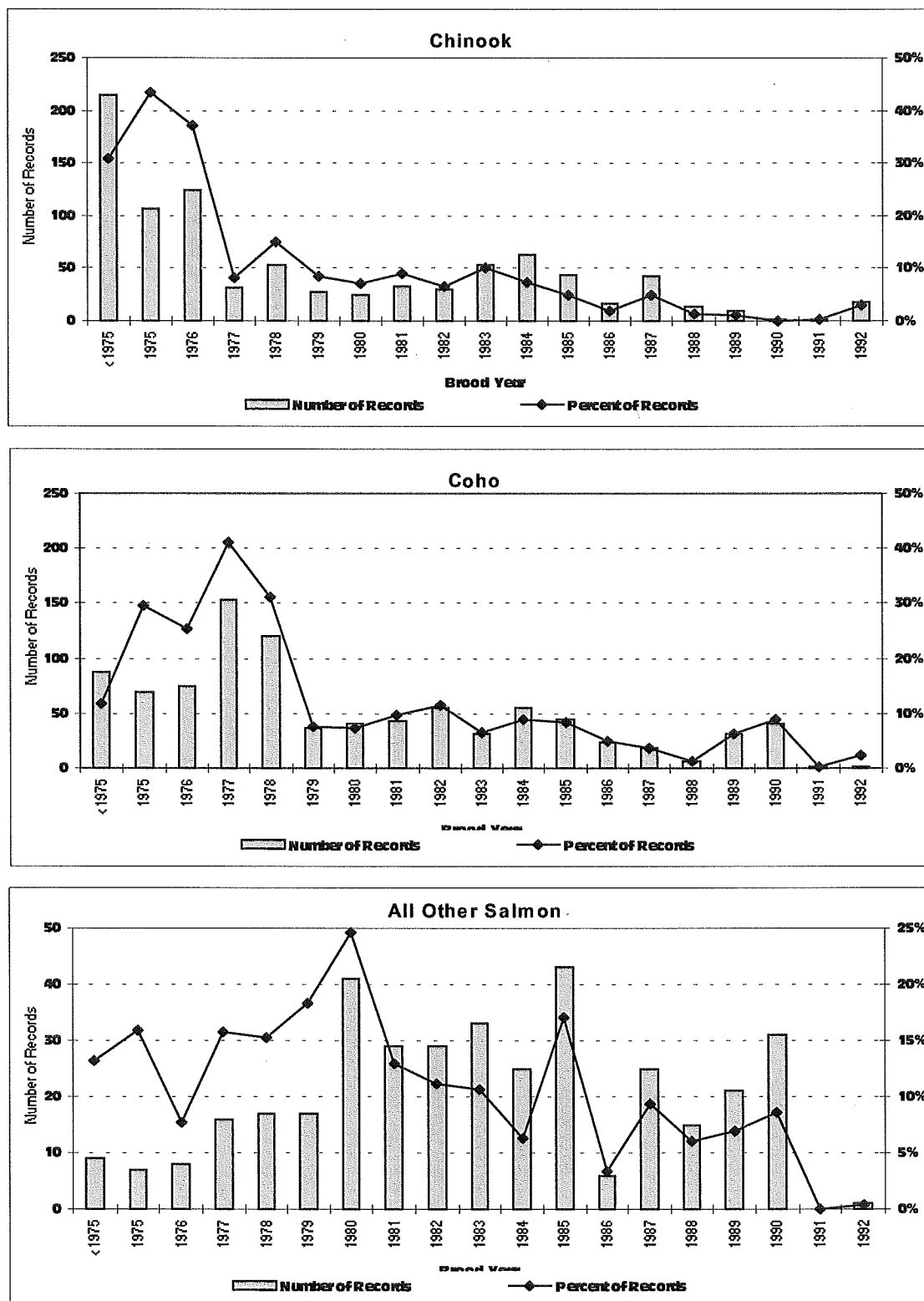
Figure 14. Records missing entries in the "expected survival" field.
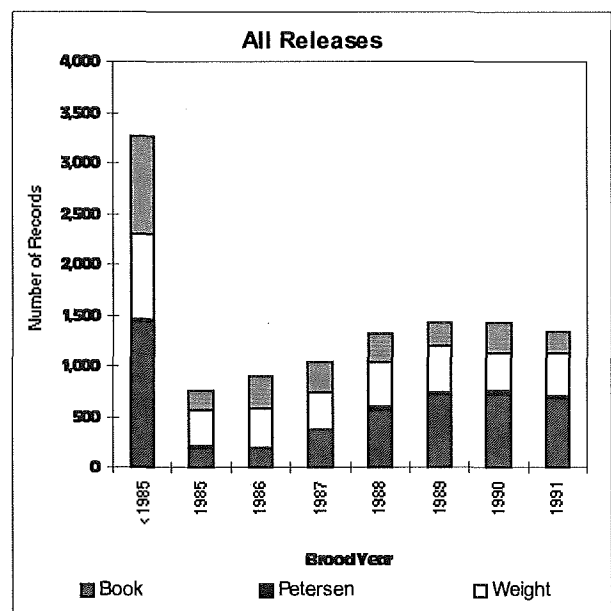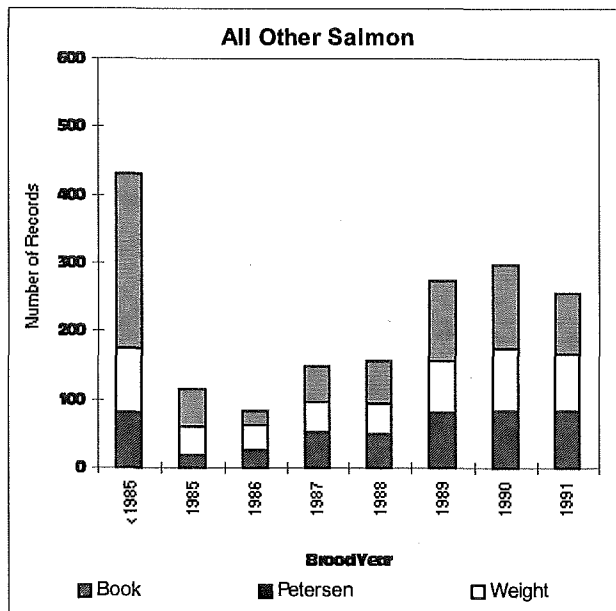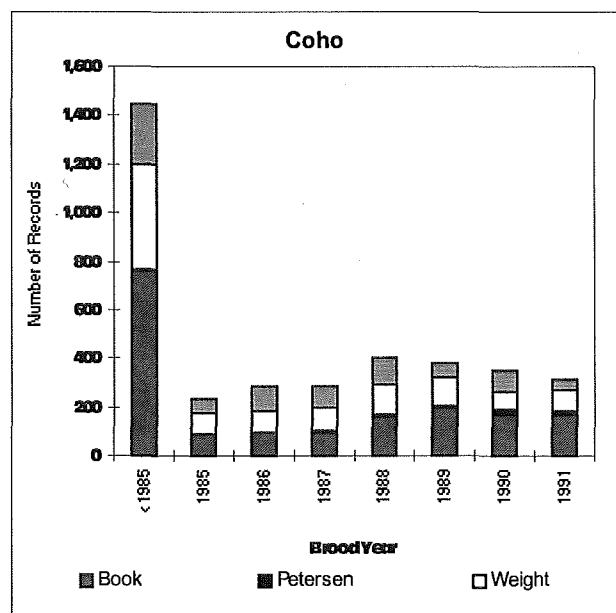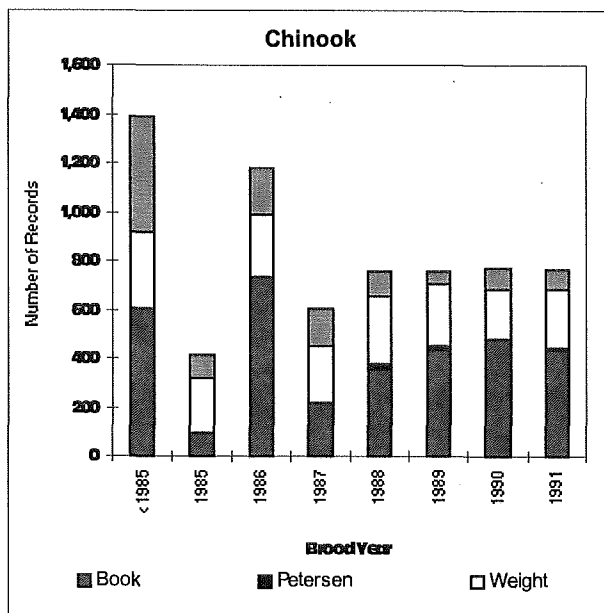
Figure 15. Counting methods used to estimate the total number of fish released.
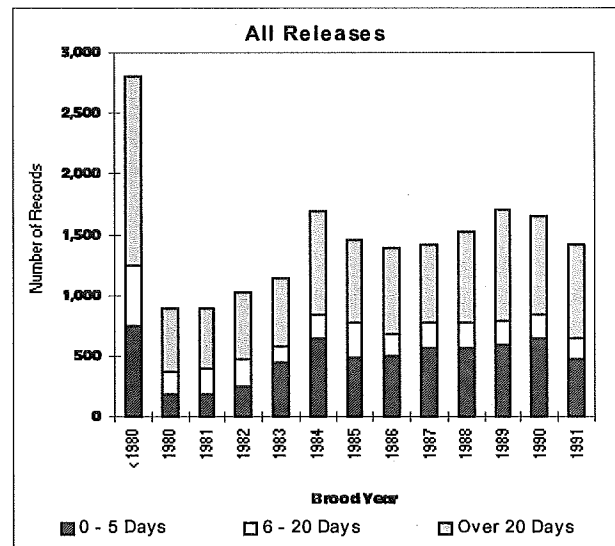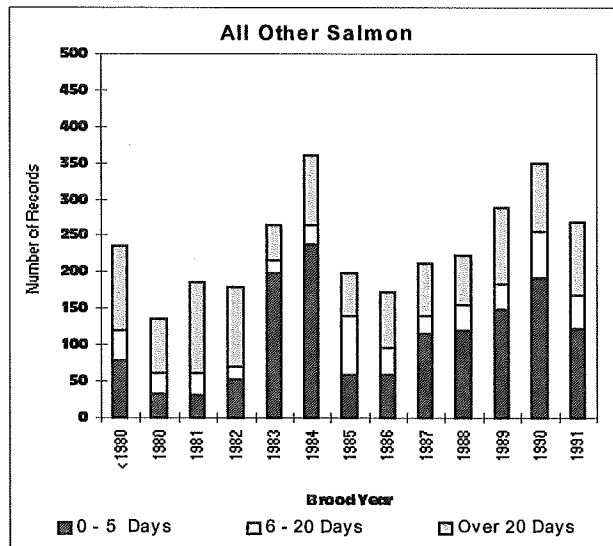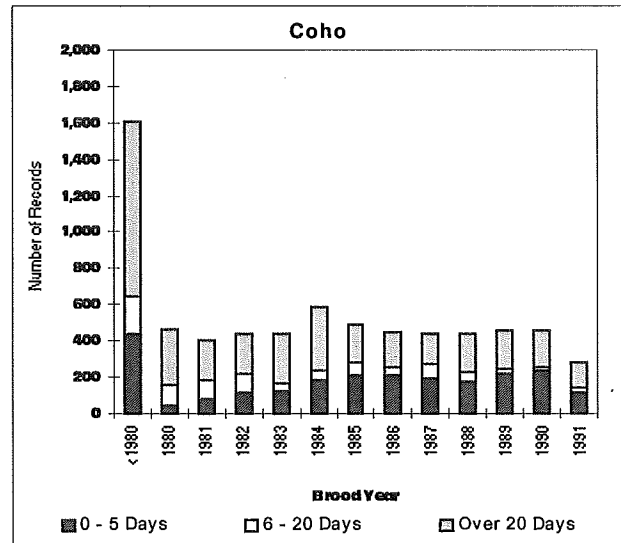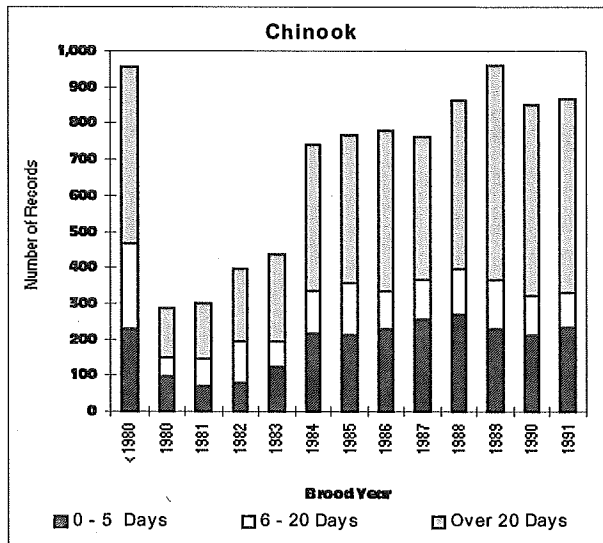
Figure 16. Time interval for measuring tag loss.

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Commercial Chinook Catch Sampled Less Than 15%
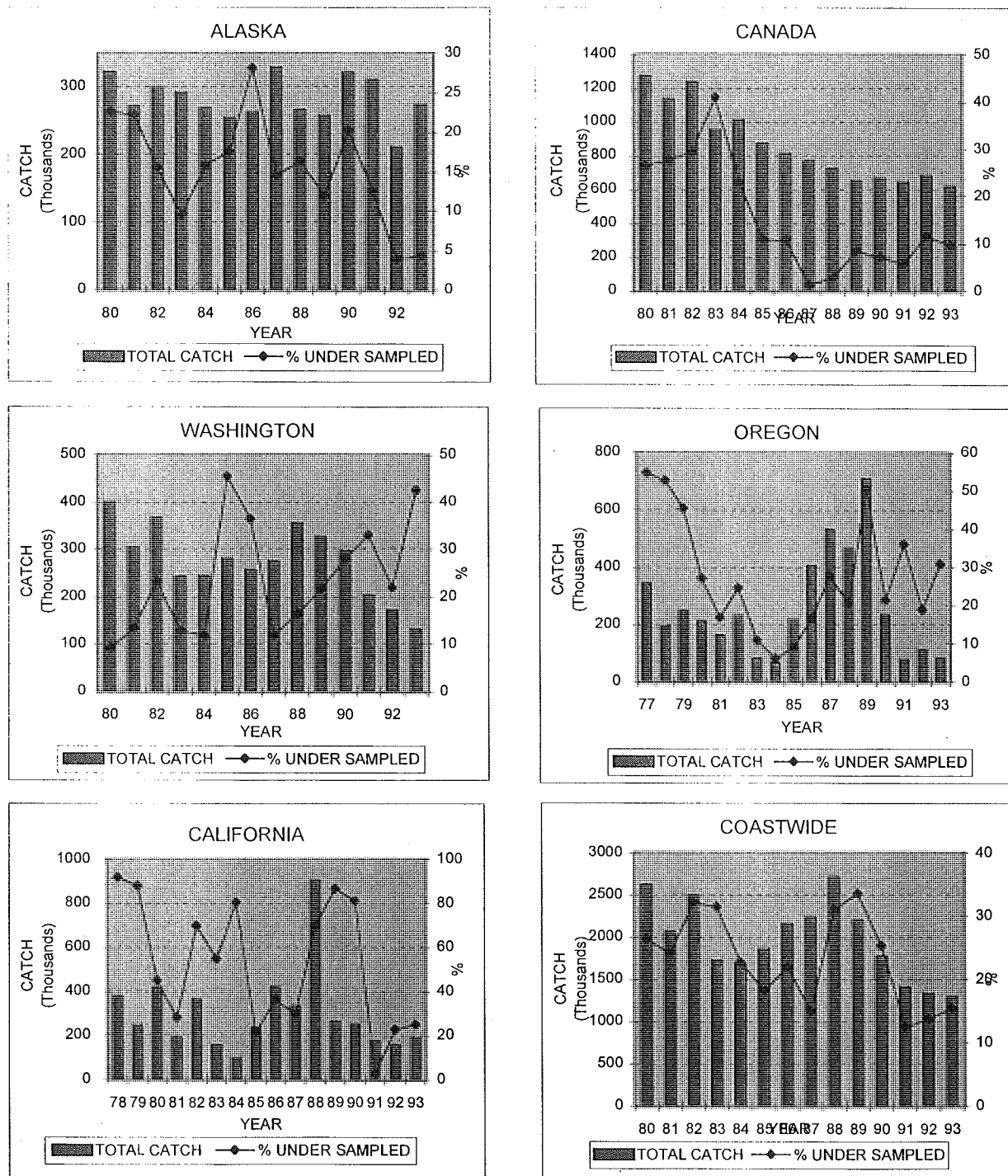
Figure 17. Chinook total commercial catch, percent of catch that is from strata that have no sampling or sampling at less than 15%, and the number of strata that are combined for sampling purposes by region and year.

Commercial Chinook Catch Sampled Less Than 15%
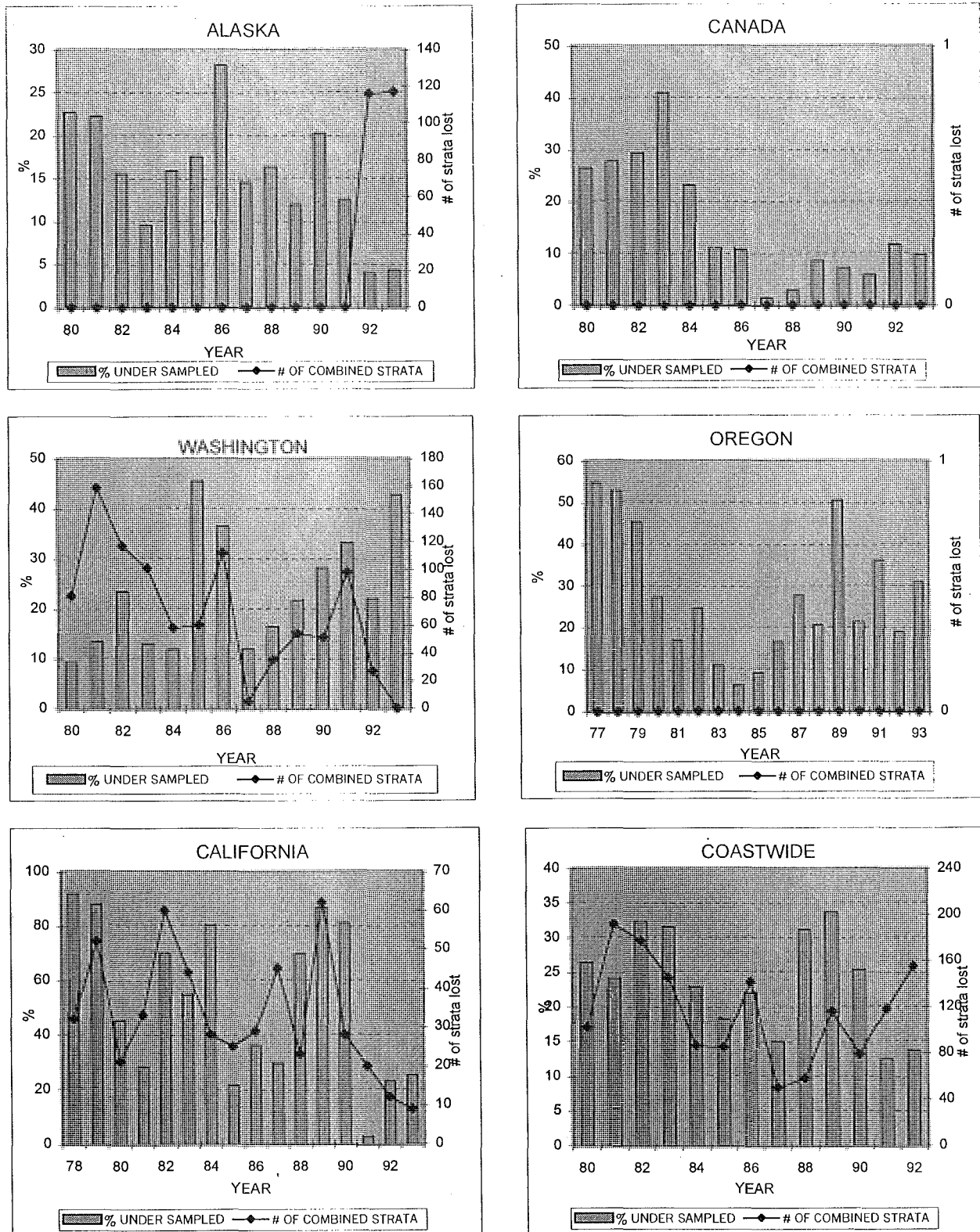
Figure 17. continued.

Commercial Chinook Catch Sampled Less Than 15%
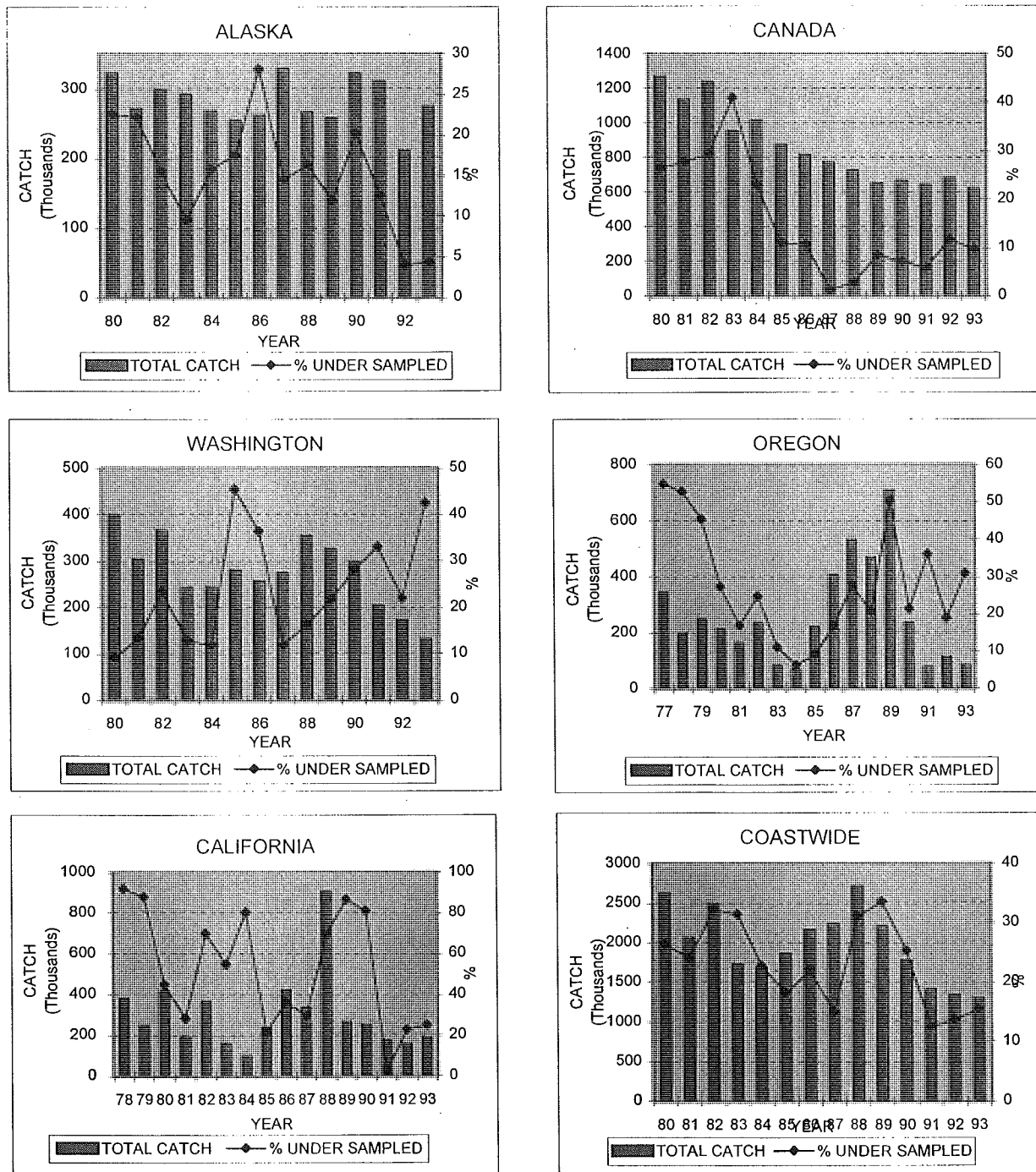
Figure 18. Coho total commercial catch, percent of catch that is from strata that have no sampling or sampling at less than 15%, and the number of strata that are combined for sampling purposes by region and year.

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Commercial Coho Catch Sampled Less Than 15%
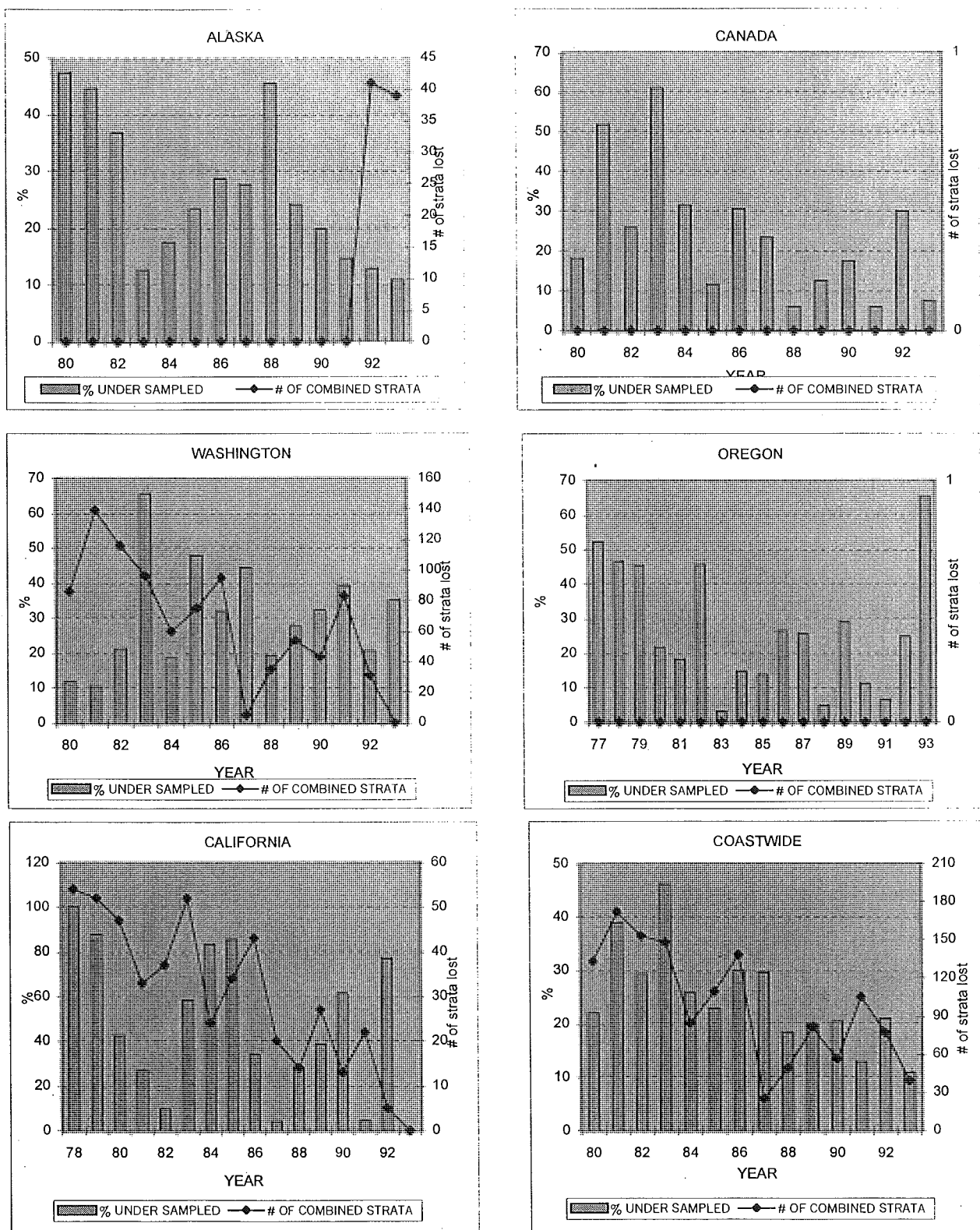
Figure 18. continued.

Commercial Chinook Catch Sampled Less Than 20%
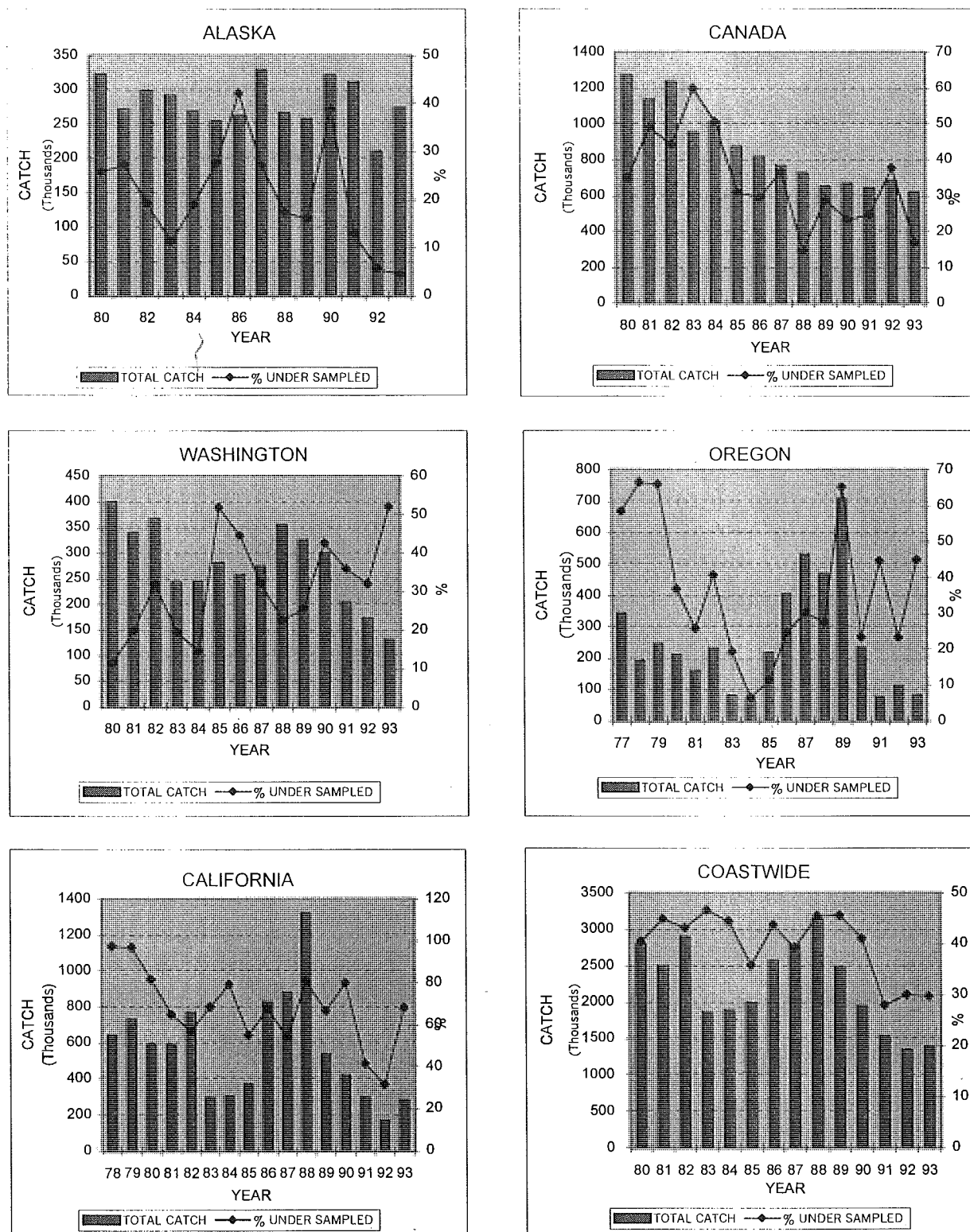
Figure 19. Chinook total commercial catch, percent of catch that is from strata that have no sampling or sampling at less than 20%, and the number of strata that are combined for sampling purposes by region and year.

Commercial Chinook Catch Sampled Less Than 20%
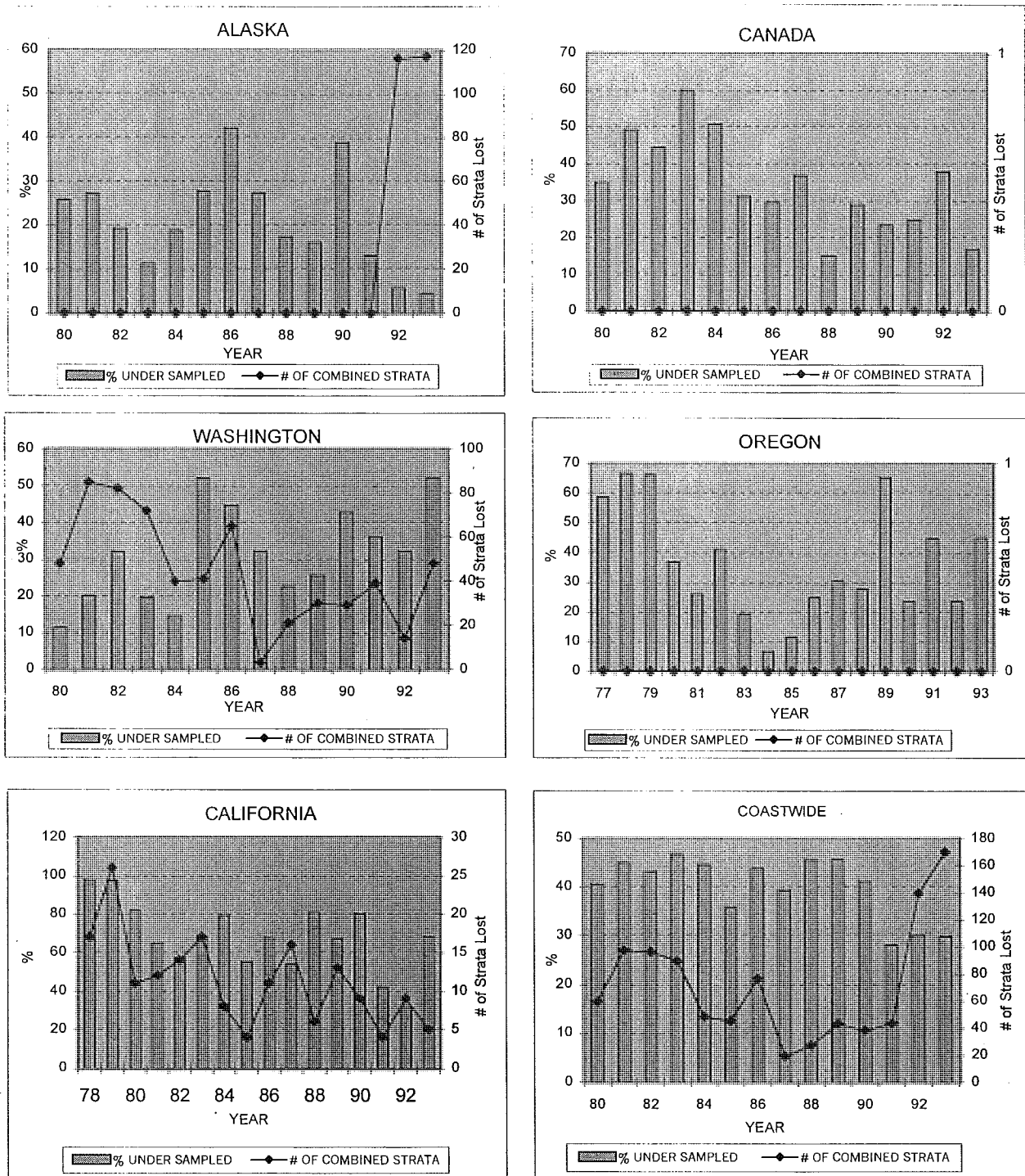
Figure 19. continued.

Commercial Coho Catch Sampled Less Than 20%
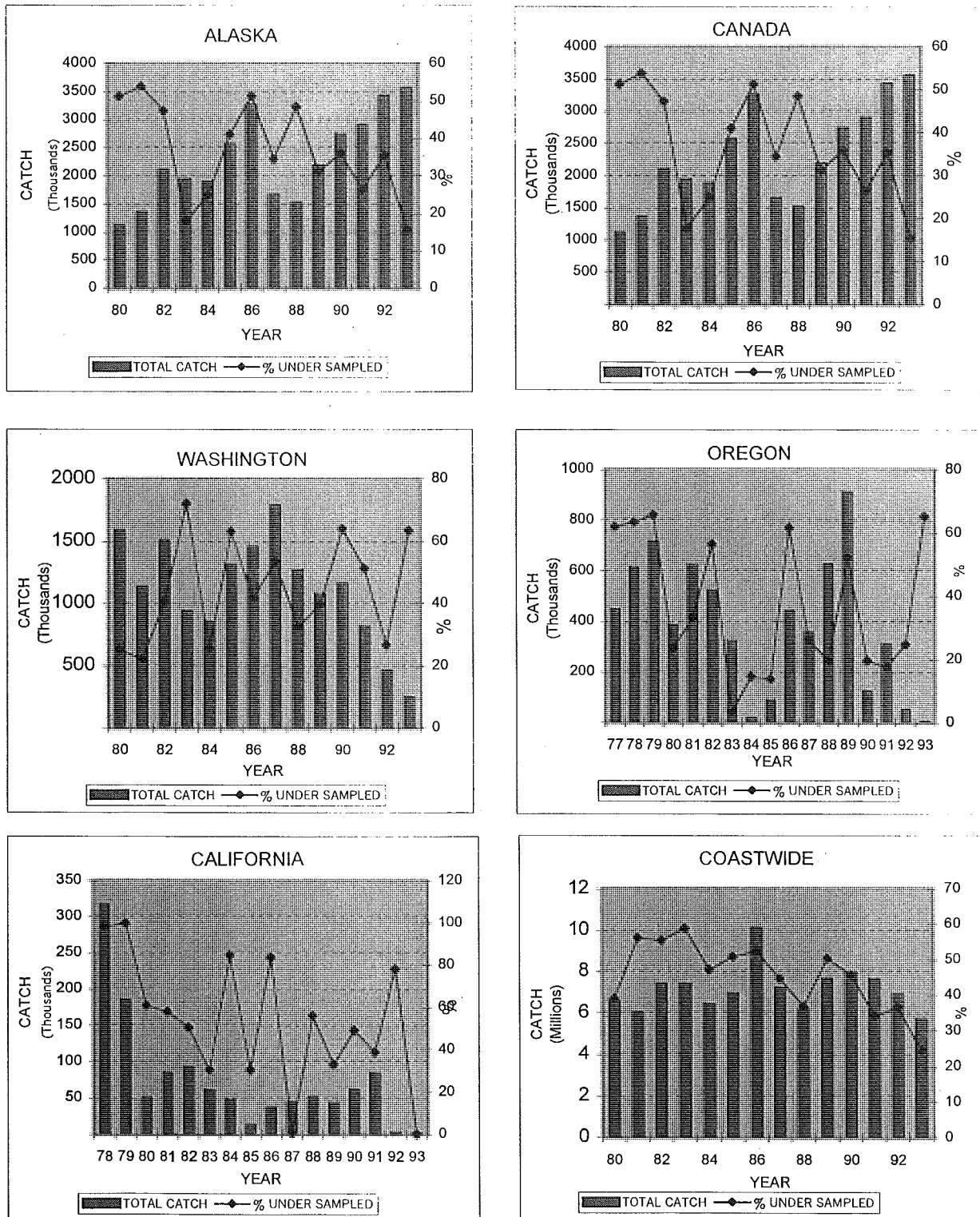
Figure 20. Coho total commercial catch, percent of catch that is from strata that have no sampling or sampling at less than 20%, and the number of strata that are combined for sampling purposes by region and year.

Commercial Coho Catch Sampled Less Than 20%
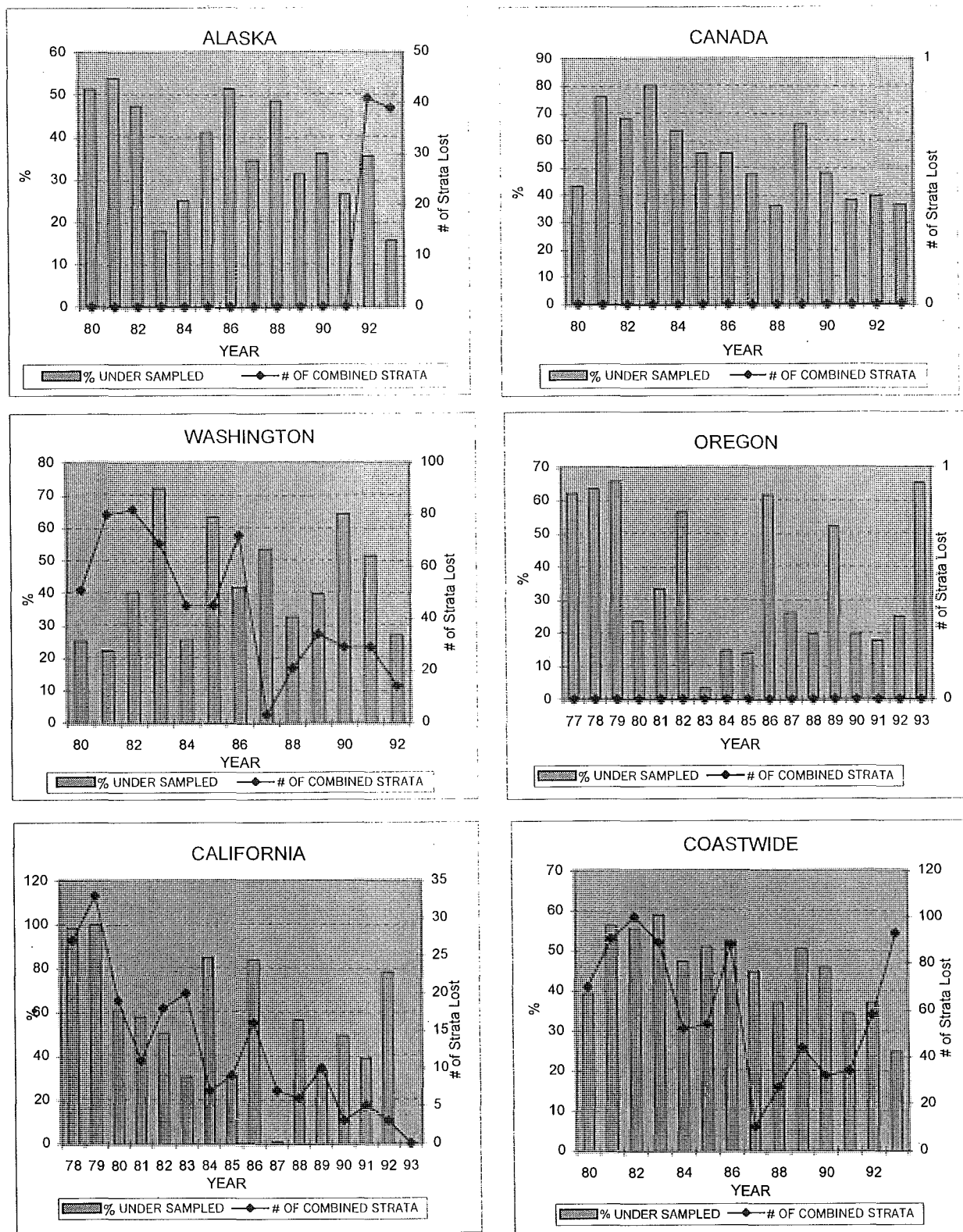
Figure 20. continued.

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V. ISSUES OF CONCERN

CWT release and recovery information is used in the PSC process to calculate survival rates, exploitation rates and fishery contribution rates on a stock-specific basis. The quality and integrity of the CWT database are essential to providing meaningful estimates for stock-specific parameters. Hatchery practices and lack of adequate fishery and escapement sampling programs affect the quality of the information in the database. The potential institution of large-scale selective fisheries may threaten the integrity of the database. Issues of data quality and data integrity are a major concern when judging the application of results of analysis of CWT information.

A. COMPLETENESS OF DATA

Many of the fields in the release file are not required and therefore have not always been reported. Availability of historical records limits how much of the missing data could be retrieved. For current releases, the data for all fields should be being collected and the annual amount of unreported data has decreased over the last ten years. It is often difficult to judge the overall quality of older release data because of the number of unreported fields.

A significant piece of information often missing from recovery records is the estimated number. The estimated number indicates how many fish are represented by that one recovery in the total catch for that stratum, unsampled as well as sampled. Its absence precludes the use of that recovery in most of the analyses described in Section III.

B. HATCHERY PRACTICES

The release information provides a foundation for many statistical analyses. Hatchery practices can affect how the data should be interpreted. Calculation of the total contribution to the fisheries requires estimates of the number of unmarked fish associated with the tag code. The method used to estimate unmarked releases varies between hatcheries and between years. The "book" method tends to overestimate the release number, while the Petersen method tends to underestimate the release number. Physical counts are the most accurate but can cause the greatest stress on the fish, which affects survival. Estimates of tag loss affect the number of marked fish released. If tag loss is not reported, or is measured over too short a time frame, then the number of marked fish released will be overestimated and survival will be underestimated. Other hatchery practices that can affect survival and the interpretation of data between years include changes in time or size at release and the quality of the smolts. The PSC sponsored a Hatchery Practices Workshop in January 1995 to address some of the data quality issues and to promote the cause of standardization.

C. FISHERY AND ESCAPEMENT SAMPLING

The quality of the catch-sample file and the recovery file is compromised by the lack of adequate sampling programs in some fisheries and in escapement. The quality of catch estimates and corresponding expansions varies across fisheries. This is particularly true for sport fisheries. The methods for collecting catch data from sport fisheries include creel surveys and punch cards. Creel surveys are often limited in time and area due to logistical constraints. Punch card estimates rely heavily on the voluntary cooperation of fishers. The number of recoveries from sports fisheries is often very small. Recoveries may be expanded over time periods that are not sampled. In many cases expansions for sport fisheries are not reported and in other cases it is difficult to judge the quality of the reported expansions. The lack of consistency in sport fish sampling makes interpretation of recovery information

difficult. An additional complication is that the handling of lost tags, unreadable tags, and no tags in the calculation of expansion factors varies across agencies.

The most serious concern relating to uncertainty in estimates from CWT analyses is the variation and undersampling across fisheries. The recommended sampling rate is 20%, which is based on estimated needs when sampling for multiple fin clips. Many fisheries are sampled at less than 20% as a result of logistical or budgetary constraints. Additional statistical analysis is needed to determine appropriate sampling levels and to identify potential biases. Other potential biases are generated by differences in counting methods for releases and differences in determining tag loss. Increased sampling and the establishment of quality control programs for both release and catch sampling will lead to better quality data and more useful results.

Similar problems regarding sampling rates occur in the reporting of escapement information, especially in natural production areas. The reporting of escapement information was not emphasized in the original development of the database therefore the quality of escapement information has suffered throughout the years.

D. SELECTIVE FISHERIES

Several alternative approaches for fisheries regulation are under consideration as a means of addressing conservation concerns for wild salmon stocks. One such approach is the implementation of selective fisheries that would allow the retention of fish with externally visible marks while requiring other fish to be released. Some management agencies have initiated mass marking of 1995 brood coho salmon produced by hatchery facilities in anticipation that fishing regulations providing for the selective retention of salmon with missing adipose fins (selective fisheries) may be implemented beginning in 1998.

As of 1994, a missing adipose fin on coho and chinook salmon signifies the presence of a CWT. If a missing adipose fin were used as a mass mark for selective fisheries, substantial changes to the present CWT system would be required. At a minimum, the file structures established for PSC data exchange would need to be modified to accommodate information necessary to maintain the viability[3] of the CWT system. Changes would be necessary for at least the release, catch-sample, and recovery record formats (changes to the catch and effort data exchange format under development by the Data Sharing Committee would also be necessary). Several difficult technical problems with selective fisheries remain unresolved, such as the estimation of correct expansion factors, the allocation of stock-specific impacts when multiple selective fisheries are implemented, standardization of coastwide catch-sampling procedures, modification of cohort analysis procedures and stock/fishery assessment tools, and additional complexities introduced in adult and wild fish tagging studies. These problems must be overcome to maintain the viability of the CWT as a useful assessment tool.

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[3] "Viability" has been defined by the PSC Ad-Hoc Selective Fishery Evaluation Committee as: (1) the ability to use CWT data for assessment and management of wild stocks of coho and chinook salmon; (2) maintaining the program such that the uncertainty in stock and fishery assessments and their applications does not unacceptably increase management risk; and (3) the ability to estimate stock-specific exploitation rates by fishery and age. Pacific Salmon Commission Selective Fishery Evaluation, June 9, 1995.

VI. RECOMMENDATIONS

- The Working Group on Mark-Recovery Statistics should examine recent low survival rates and determine whether existing tagging and sampling rates continue to be appropriate.

- The Technical Committee on Data Sharing should encourage standardization among the various tagging and recovery agencies with respect to the interpretation and use of the fields in the exchange formats.

- The Technical Committee on Data Sharing should routinely monitor the exchanged CWT data to determine which fields are not being reported and by which agencies.

- The Technical Committee on Data Sharing should reconsider its designations of mandatory and optional fields in the exchange formats to ensure that information required for meaningful use of the data is included in the exchange.

APPENDICES

APPENDIX 1. TECHNICAL COMMITTEE ON DATA SHARING MEMBERSHIP

This report was written primarily under the Committee membership of 1993/1994:

Dr. John E. Clark (Co-chair)	Mr. Louis Lapi (Co-chair)
Dr. Kenneth A. Henry	Mr. Marck Hamer
Dr. Ken Johnson	Mr. James H. Bjerring
Dr. Gary S. Morishima	Ms. Margaret Birch
Mr. Mike Matylewich	Ms. Susan Bates
Mr. Joseph Pavel	Mr. Rob Kronlund
Dr. Don Bevan	Ms. Sue Lehmann

The report was finalized under the Committee membership of 1997/1998:

Dr. Norma Jean Sands (Co-chair)	Ms. Susan Bates (Co-chair)
Dr. Ken Johnson	Mr. Marck Hamer
Dr. Gary S. Morishima	Ms. Sue Lehmann
Mr. Mike Matylewich	Mr. Louis Lapi
	Ms. Lia Bijsterveld

APPENDIX 2. EXCHANGE FORMAT SPECIFICATIONS VERSION 3.1

CWT DATA SET DEFINITION, SPECIFICATION, & VALIDATION

Pacific Salmon Commission Format Version 3.1

January 9, 1995

Defined by:
Pacific Salmon Commission Working Group on Data Standards
February 9, 1994

I.   DATA SET DEFINITION for EXCHANGE

CWT data must be exchanged in the form of a PSC Format V3.1 dataset.   An acceptable dataset is defined as follows:

A.   Physical Definition

1.   Files / methods for exchange

All PSC Format data sets must be physically represented in files using the ASCII character set.   Methods of file exchange may be any of the following:

a.   Internet File Transfer Protocol (FTP) transfer using an individual account on the PSMFC computer;   ASCII newline-delimited file only;   transfer mode: binary;   FTP to this address: **psmfc1.psmfc.gov.***

b.   Standard "Kermit" file transfer;   ASCII newline-delimited file only;   Kermit settings: transfer-mode=binary, packet size=1024B.*

c.   Compressed "Kermit & PKZip V2.04g+" file transfer using an individual account on the PSMFC computer;   ASCII newline-delimited; pre-compressed as ".ZIP" file; Kermit settings: transfer-mode=binary, packetsize=1024B. *

d.   8-mm cassette tape; capacity rating: 2.3 GB; ASCII blocked (see part 2 below)

e.   3 *1/2* inch rigid disk; 1.44 MB density; ASCII newline-delimited

f.   5 *1/4* inch floppy disk; 1.2 MB density; ASCII newline-delimited

g.   *1/2* inch, 9 - track reel written at 1600 bpi or 6250 bpi; ASCII blocked (see part 2 below)

2.   Block size definitions

a.   Release Data:

Record Length:	239	
Block Length:	8126	(34 records / block)

b.   Recovery Data:

Record Length:	115	
Block Length:	8050	(70 records / block)

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*.   For information about setting up and using an individual account on the PSMFC computer please consult: "Regional Mark Information System (RMIS) User Manual / Aug 1993).

c. Catch/Sample Data:

Record Length: 122

Block Length: 8174 (67 records / block)

d. Location Data:

Record Length: 195

Block Length: 8190 (42 records / block)

e. Description:

Record Length: 80

Block Length: 8000 (100 records / block)

B. Logical Definition and Extent

1. Flow of data from the PSMFC Regional Mark Processing Center to Canada:

a. Release: All releases

b. Recovery: One Reporting Agency, one Run Year, all data to date where:
---> Reporting Agency is Recovery field 1 (defined in Chapter V.B)
---> Run Year is Recovery field 35

c. Catch/Sample: One Reporting Agency, one Catch Year, all data to date where:
---> Reporting Agency is Catch/Sample field 1 (defined in Chapter V.B)
---> Catch Year is Catch/Sample field 3

d. Location: All locations

e. Description: All descriptions

2. Flow of data from any agency to the PSMFC Regional Mark Processing Center:

a. Release: At most one Reporting Agency, all Release Groups to date.
---> At least: one Reporting Agency, one Release Group where:
---> Reporting Agency is Release field 29 (defined in Chapter V.B.)

b. Recovery: Exactly one Reporting Agency, one Run Year, all data to date where:
---> Reporting Agency is Recovery field 1 (defined in Chapter V.B)
---> Run Year is Recovery field 35

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c. Catch/Sample: Exactly one Reporting Agency, one Catch Year, all data to date where:
                           ---> Reporting Agency is Catch/Sample field 1 (defined in Chapter V.B)
                           ---> Catch Year is Catch/Sample field 3

d. Location: Exactly one Reporting Agency, all Location Codes to date where Reporting Agency is defined in Chapter V.B.

e. Description: Exactly one Reporting Agency, only new Descriptions since last submission where:
                           ---> Reporting Agency is Description field 3 (defined in Chapter V.B)

                           NOTE: The Description file must be sent **with** the corresponding data file(s). That is, it must be sent in the same mail package or network data transfer session.

II.   DATA SET SPECIFICATION AND VALIDATION

A.   Legend

1.   Data Types and Ranges:

The following information pertains to all PSC Format V3.1 data fields:

*   All data are assumed to be printable ASCII characters.

*   All 6-byte date fields are assumed to be of the form 'YYMMDD'.

*   All data specified as "numeric" must contain only ASCII characters in the range: '0' through '9'.

*   Coded values-- even if they contain numbers-- are considered "character" data.

2.   Permissible use of the "@" character:

Certain fields may be filled with the "@" character if the format or code structure is incapable of conveying an appropriate value. However, the following fields are considered "numeric" or "date" fields and must not contain "@" characters.

a. Release fields which must not contain "@" characters:
     Number of Replicates
     Brood Year
     Release Dates
     No. Released with CWT
     No. of Fish that Shed CWT
     No. of Untagged Fish
     Tag Loss Days
     Weight of Fish
     Length of Fish
     Sample Size Tag Loss
     Lower Range of Sequential Series
     Upper Range of Sequential Series

b. Recovery fields which must not contain "@" characters:
     Recovery Date
     Sampling Period Number
     Weight

Length
Replicate Number
Estimation Level
Estimated Number
Sample Length Class
Sequential Table Column No.Sequential Table Row No.
Run Year

c.   Catch/Sample fields which must not contain "@" characters:
Catch Year
Record Creation Date
Sampling Period Number
Sampling Period Range
Number Caught
Number Sampled
Awareness Factor
Number of Tags Recovered and Decoded
Estimated Number
Number of No Tags
Number of Tags Lost
Number Unreadable Tags
Number of Unresolved Tag Code Discrepancies
Number of Lost Heads or Heads not Processed
Sample Size Mark Incidence
Observed Marks in Mark Incidence Sample
Estimation Level
Sample Length Class

d.   Location fields which must not contain "@" characters:
File Creation Date

e.   Description fields which must not contain "@" characters:
Submission Date
File Year
Line Number

3.   Explanation of Columns in Validation Text

a.   PSC Format name   This is the name for the field established by the Pacific Salmon Commission Working Group on Data Standards.

b.   Cols   This is the "field width", that is, the number of columns (bytes) needed for the field.

c. Reqd

May indicate one of the following:

Yes: The field is required for the record to be considered a valid PSC Format record. That is, the field cannot be entirely blank;

No: The field is optional. That is, it can be comprised entirely of blanks signifying "unknown" or "not applicable".

d. Just

May indicate one of the following:

L: The value must be left justified;

R: The value must be right justified;

D: Implies "Don't care". (i.e. justification doesn't matter).

e. Fill

Fill refers only to padding bytes when a data value is present in the field.

Fill may indicate one of the following:

Blank: Unused bytes must contain blanks;

Zero: Unused bytes must contain zeroes;

NA: "Not Applicable". Fill is not applicable when the data value must occupy the entire field -- thus leaving no room for fill.

f. Format

This column contains one of the following:

1)   The data type or a list of all possible values the field may contain. The meaning of each value would be described in the "Validation" column;

2)   A pattern template for the field showing the exact order and required contents of each character in the field.

g. Specification / Validation

This column will contain some combination of the following:

1)   An explanation of the meaning of the field along with any pertinent notes to be aware of when determining a value to go in the field;

2)   A list of meanings corresponding to the values listed in the Format column described in II.A.3.f above;

3)   Ranges permitted in numeric data type fields;

4)   Special values which are required only under certain conditions or are dependent on the contents of other fields;

5)   An explanation of values having complex patterns.

B.   **Release Data**

No	PSC Format name	Cols	Reqd	Just	Fill	Format	Validation..
1a	Tag Code (Cols. 1 - 12)	12	Yes	L	Blank	AGD1D2D3D4	Cols. 1 - 2: Agency Cols. 3 - 4: Data 1 Cols. 5 - 6: Data 2 Cols. 7 - 12: Data 3 and 4 Color coded tags and Rare Earth tags: Report in <u>Alpha</u> only Sequential tags: Report only AG, D1, D2 for release data; Report D3, D4 only in Recovery data file, fields 33, 34 Must have even number of characters Must be unique Must match one of the following patterns: all Numeric all Alpha 1 Alpha then all Numeric all Numeric then '*' then 1 Numeric 1 Alpha then all Numeric then '*' then 1 Numeric all Alpha then '*' then 1 Numeric '##' then 2 Alpha '##' then 2 Alpha then '*' then 1 Numeric '$$' then 2 Alpha '$$' then 2 Alpha then '*' then 1 Numeric Special cases: 'XX0500' 'HF1505' 'HF1515' **See notes below**

NOTES

1:        **Re-use of tag codes is not allowed. In those cases when a tag code is re-used, whether by accident or intentionally, any subsequent recoveries may be regarded as unresolved discrepancies (where Status of Tag (Recovery file, field 19) is '7') as determined by the Reporting Agency.**

2:        In cases where a tag code is re-used, the original tag code must have the suffix '*1' appended and the second occurrence must have the suffix '*2' appended. The n-th occurrence thereafter must have the suffix '*n' appended when added to the Release data file.

No	PSC Format name	Cols	Reqd	Just	Fill	Format	Validation...
1b	Release Identifier (Cols. 1 - 12)	12	Yes	L	Blank	Alpha-Numeric	Required to identify all hatchery release groups **not** represented by CWTs Must be unique Column 1 must be '!'; this is a flag used for identifying unmarked release groups Columns 2 and 3 must match one of these Tag Coordinator Codes (field 20): '01' '02' '03' '04' '05' '06' '07' '08' '09' '10' '12' '13' '14' Columns 4 - 12 are agency defined alpha-numeric text
2	Number of Replicates (Cols. 13 - 14)	2	No	D	Zero	Numeric	Must be numeric in the range: '02' through '07' If a value is present, then Tag Type (field 3) must be ' 9'
3	Tag Type (Cols. 15 - 16)	2	No	R	Blank		Required if Release Identifier (field 1b) does not begin with '!' Must match one of the following: ' 0' =Standard binary (1mm) ' 1' =Half tags (H type) ' 2' =Half tags (B type) ' 3' =6 word half length tags ' 4' =X-ray binary ' 5' =Standard color ' 6' =Solid color (##) ' 7' =Striped color ($$) ' 8' =Rare Earth ' 9' =Embedded replicate '10' =Sequential 6 word binary; If ' 4', then Tag Code (field 1a) must be 'XX0500' If ' 9', then Number of Replicates (field 2) must not be blank If '10', then Lower Range of Sequential Series (field 27) must not be blank and Upper Range of Sequential Series (field 28) must not be blank

No	PSC Format name	Cols	Reqd	Just	Fill	Format	Validation..
4	Species (Col. 17)	1	Yes	D	NA		Must match one of the following:
						'1'	=Chinook
						'2'	=Coho
						'3'	=Steelhead
						'4'	=Sockeye
						'5'	=Chum
						'6'	=Pink
						'7'	=Masu
						'8'	=Cutthroat
5	Run (Col. 18)	1	No	D	NA		Must match one of the following:
						'1'	=Spring
						'2'	=Summer
						'3'	=Fall (includes Type S Coho)
						'4'	=Winter
						'5'	=Hybrid
						'6'	=Landlocked
						'7'	=Late Fall (includes Type N Coho and Upriver Bright Chinook)
6	Brood Year (Cols. 19 - 20)	2	Yes	D	NA	Numeric	Last two digits of **calendar year when majority of run returns to spawn**; if more than one brood present (i.e. wild tagging), then use dominant brood and report mixed stock tagging in Comments (field 25) Must be less than or equal to the current year Must be exactly 2 digits
7	Release Agency (Cols. 21 - 24)	4	Yes	L	Blank	Alpha	Abbreviations for tagging agencies Must contain a code defined in Chapter V.A

No	PSC Format name	Cols	Reqd	Just	Fill	Format	Validation..
8	Release Site Code (Cols. 25 - 43)	19	No	D	Blank	Alpha-Numeric	Hierarchical location code to pinpoint actual Release Site Must exactly match the Location Code (field 1) of Location Type '4' (field 2) in the PSC Location data file All location codes are standardized within a given State or Province, and coordinated by the State/Province (e.g.: ADFG, CDFO, WDFW)
	a. Level 0	(1)				'1' '2' '3' '4' '5' '6' '7'	State or Province =Alaska =British Columbia =Washington =Idaho =Oregon =California =High Seas
	b. Level 1	(1)				'F' 'M'	Water Type =Freshwater =Marine
	c. Level 2	(1)				Alpha-Numeric	Sector; (Special case: Use asterisk for out-of-State/Province Release Sites; use only for those cases where the respective State/Province can not provide a suitable location code)
	d. Level 3	(2)				Alpha-Numeric	Region
	e. Level 4	(4)				Alpha-Numeric	Area
	f. Level 5	(7)				Alpha-Numeric	Location
	g. Level 6	(3)				Alpha-Numeric	Sub-Location

No	PSC Format name	Cols	Reqd	Just	Fill	Format	Validation..
9a	Release Dates (first) (Cols. 44 - 49)	6	No	D	NA	YYMMDD	If the Release occurs on a single day, report that date for both First and Last date fields. If a release occurred over more than one day but only one date is known, then leave the unknown date field (First or Last) blank Must be of the form 'YYMMDD' where: YY must be in the range: '50' through the last 2 digits of the current year MM must be in the range '01' through '12'. May be blank DD must be in the range '01' through the last day of the month referenced by MM. Must be blank if MM is blank. May be blank when MM is not blank This date must be less than or equal to today Release Dates (first) must be <= Release Dates (last)
9b	Release Dates (last) (Cols. 50 - 55)	6	No	D	NA	YYMMDD	If the Release occurs on a single day, report that date for both First and Last date fields. If a release occurred over more than one day but only one date is known, then leave the unknown date field (First or Last) blank Must be of the form 'YYMMDD' where: YY must be in the range: '50' through the last 2 digits of the current year MM must be in the range '01' through '12'. May be blank DD must be in the range '01' through the last day of the month referenced by MM. Must be blank if MM is blank. May be blank when MM is not blank This date must be less than or equal to today Release Dates (last) must be >= Release Dates (first)
10	Release Stage (Col. 56)	1	No	D	NA	'E' 'F' 'G' 'P' 'S' 'A' 'M'	Must match one of the following: =Emergent fry =Fed fry =Fingerling =Pre-smolt =Smolt =Adult =Multiple release stages If 'M' then Comments (field 25) must not be blank

No	PSC Format name	Cols	Reqd	Just	Fill	Format	Validation..
11	Rearing Type (Col. 57)	1	Yes	D	NA		Must match one of the following:
						'H'	=Hatchery reared fish (*includes any wild fish reared in the hatchery)
						'W'	=Wild fish
						'M'	=Mixed hatchery & wild (downstream migrant or marine tagging)
						'U'	=Unknown (unavailable from Release Agency)
							If 'H' then Hatchery/Facility Code (field 22) must not be blank
							If 'W', 'M', or 'U' then Hatchery/Facility Code (field 22) must be blank
12	Type of Release (Col. 58)	1	No	D	NA		Must match one of the following:
						'E'	=Experimental
						'P'	=Production
						'B'	=Both experimental and production
						'O'	=Other
						'K'	=PSC key indicator stocks
						'I'	=Other index streams
13	No. Released with CWT (Cols. 59 - 66)	8	No	R	Blank or Zero	Numeric	Number tagged with CWT corrected for tag loss and mortality; Must be numeric in the range: '0' through '99999999' Must be blank or zero if Release Group (field 1) begins with '!'
14	No. of Fish that Shed CWT (Cols. 67 - 71)	5	No	R	Blank or Zero	Numeric	Number of CWT marked fish that shed tag; (Enter zero if release not CWT'ed) Must be numeric in the range: '0' through '99999'
15	No. of Untagged Fish (Cols. 72 - 80)	9	No	R	Blank or Zero	Numeric	Total representative fish in release without a CWT (field 13) or shed tag (field 14). Total may include non-CWT fin marks, including the special case of Adipose only - no CWT marked steelhead **Report total fish released if release not represented by CWT** Must be numeric in the range: '0' through '999999999'

No	PSC Format name	Cols	Reqd	Just	Fill	Format	Validation...
16	Counting Method (Col. 81)	1	No	D	NA		Method used to determine number of unmarked fish in the given release group.
							Must match one of the following:
						'B'	=Book estimates
						'C'	=Actual physical counts
						'P'	=Petersen estimates
						'W'	=Weight derived estimates
17	Tag Loss Days (Cols. 82 - 84)	3	No	R	Blank or Zero	Numeric	Number of days fish held to measure tag loss; Fish tagged and released the same day are assigned '0' Tag Loss Days
							Must be numeric in the range: '0' through '999'
18	Weight of Fish (Cols. 85 - 90)	6	No	R	Blank or Zero	Numeric (2 implied decimals)	Units = grams/fish
							Must be numeric in the range: '1' through '999999' with two implied decimals
19	Length of Fish (Cols. 91 - 96)	6	No	R	Blank or Zero	Numeric	Units = millimeters (fork length)
							Must be numeric in the range: '1' through '999999'

No	PSC Format name	Cols	Reqd	Just	Fill	Format	Validation..
20	Tag Coordinator Code (Cols. 97 - 98)	2	Yes	R	Zero	Numeric	Reporting coordinator for the release group
							Must match one of the following:
						'01'	=ADFG (S.E. Alaska)
						'02'	=NMFS - Alaska
						'03'	=CDFO
						'04'	=WDFW
						'05'	=ODFW
						'06'	=NMFS - Columbia River
						'07'	=USFWS
						'08'	=CDFG
						'09'	=BCFW
						'10'	=IDFG
						'12'	=ADFG (S. Central AK)
						'13'	=MIC (Metlakatla, AK)
						'14'	=NIFC
21	Expected Survival (Col. 99)	1	No	D	NA		Must match one of the following:
						'N'	=Normal range expected
						'D'	=Fish destroyed; Zero survival assumed
						'W'	=Warning flag for serious problems
							If 'W' then Comments (field 25) must not be blank

No	PSC Format name	Cols	Reqd	Just	Fill	Format	Validation...
22	Hatchery/Facility Code (Cols. 100 - 118)	19	No	D	Blank	Alpha-Numeric	Required if Rearing Type (field 11) is 'H' Hierarchical location code to pinpoint actual site of Hatchery. Must exactly match the Location Code (field 1) of Location Type '3' (field 2) in the PSC Location file Must be blank if Rearing Type (field 11) is 'W', 'M', or 'U' All location codes are standardized within a given State or Province, and coordinated by the State/Province (e.g.: ADFG, CDFO, WDFW)
	a. Level 0	(1)					State or Province
						'1'	=Alaska
						'2'	=British Columbia
						'3'	=Washington
						'4'	=Idaho
						'5'	=Oregon
						'6'	=California
						'7'	=High Seas
	b. Level 1	(1)					Water Type
						'F'	=Freshwater
						'M'	=Marine
	c. Level 2	(1)				Alpha-Numeric	Sector; (Special case: Use asterisk for out-of-State/Province Release Sites; use only for those cases where the respective State/Province can not provide a suitable location code)
	d. Level 3	(2)				Alpha-Numeric	Region
	e. Level 4	(4)				Alpha-Numeric	Area
	f. Level 5	(7)				Alpha-Numeric	Location
	g. Level 6	(3)				Alpha-Numeric	Sub-Location

No	PSC Format name	Cols	Reqd	Just	Fill	Format	Validation...
23	Stock Code (Cols. 119 - 137)	19	No	D	Blank	Alpha-Numeric	Hierarchical coding scheme to pinpoint the stock's location or stream Must exactly match the Location Code (field 1) of Location Type '5' (field 2) in the PSC Location file All location codes are standardized within a given State or Province, and coordinated by the State/Province (e.g.: ADFG, CDFO, WDFW)
	a. Level 0	(1)					State or Province
						'1'	=Alaska
						'2'	=British Columbia
						'3'	=Washington
						'4'	=Idaho
						'5'	=Oregon
						'6'	=California
						'7'	=High Seas
	b. Level 1	(1)					Water Type
						'F'	=Freshwater
						'M'	=Marine
	c. Level 2	(1)				Alpha-Numeric	Sector; (Special case: Use asterisk for out-of-State/Province Release Sites; use only for those cases where the respective State/Province can not provide a suitable location code)
	d. Level 3	(2)				Alpha-Numeric	Region
	e. Level 4	(4)				Alpha-Numeric	Area
	f. Level 5	(7)				Alpha-Numeric	Location
	g. Level 6	(3)				Alpha-Numeric	Sub-Location

No	PSC Format name	Cols	Reqd	Just	Fill	Format	Validation..
24	Format Version Number (Cols. 138 - 140)	3	Yes	D	Zero	Numeric (1 implied decimal)	Format version used to report release data; Must have the value: '031'
25	Comments (Cols. 141 - 220)	80	No	D	Blank	Alpha-Numeric	Permits brief summary of pertinent information regarding release group; First 34 characters will be printed in annual CWT Release Report. Must contain an explanation if Expected Survival (field 21) is 'W'
26	Sample Size Tag Loss (Cols. 221 - 225)	5	No	R	Blank or Zero	Numeric	Number of fish sampled to calculate Tag Loss Days (field 14) Must be numeric in the range: '0' through '99999'
27	Lower Range of Sequential Series (Cols. 226 - 230)	5	No	R	Blank or Zero	Numeric	Smallest value in sequential number series; Field used for Sequential tags only Must be numeric in the range: '0' through '16383' Must be blank unless Tag Type (field 10) is '10'
28	Upper Range of Sequential Series (Cols. 231 - 235)	5	No	R	Blank or Zero	Numeric	Largest value in sequential number series; Field used for Sequential tags only Must be numeric in the range: '0' through '16383' Must be blank unless Tag Type (field 10) is '10'
29	Reporting Agency (Cols. 236 - 239)	4	Yes	R	Blank	Alpha	Must contain a code defined in Chapter V.B Must be the same for all records

C.   **Recovery Data**

No	PSC Format name	Cols	Reqd	Just	Fill	Format	Validation...
1	Reporting Agency (Cols. 1 - 4)	4	Yes	L	Blank	Alpha	Must contain a code defined in Chapter V.B Must be the same for all records
2	Recovery ID (Cols. 5 - 12)	8	Yes	R	Blank	Alpha-Numeric	Unique ID's assigned to each recovery record by the recovery agency Must be unique for a given Reporting Agency (field 1) and Run Year (field 35) Must not contain embedded blanks
3	Recovery Date (Cols. 13 - 18)	6	Yes	L	Blank	YYMMDD	Must be of the form 'YYMMDD' where: YY is Required and must be in range; '70' through the last 2 digits of the current year MM must be in the range '01' through '12'. May be blank DD must be in the range '01' through the last day of the month referenced by MM. Must be blank if MM is blank. May be blank when MM is not blank Example: August 21, 1990 is coded: 900821
4	Nature of Recovery Date (Col. 19)	1	No	D	NA	'R' 'C'	Must match one of the following: =Reported date =Calculated date

No	PSC Format name	Cols	Reqd	Just	Fill	Format	Validation..
5	Sampling Period Type (Col. 20)	1	No	D	NA		Required if Sample Type (field 25) is '1', '2', '4', or '6'
							Required if Sampling Period Number (field 6) present
							Must match one of the following:
						'1'	=Escapement period (across years possible)
						'2'	=Bi-weekly (statistical 2 week)
						'3'	=Semi-monthly (calendar)
						'4'	=Statistical month
						'5'	=Calendar month
						'6'	=Statistical week (beginning Monday)
						'7'	=Week (beginning Sunday)
						'8'	=Seasonal (Use for spring, summer, fall, or winter run periods)
						'9'	{Reserved}
						'A'	=Weekend (Saturday, Sunday & observed holiday(s))
						'B'	=Weekday (Monday - Friday excluding observed holiday(s))
							Sampling Period Type (field 5) and Sampling Period Number (field 6) must match that used in Catch/Sample data file for the given stratum

No	PSC Format name	Cols	Reqd	Just	Fill	Format	Validation...
6	Sampling Period Number (Cols. 21 - 22)	2	No	D	Zero	Numeric	Required if Sampling Period Type (field 5) present
							Required to map across to Sampling Period Range (field 10) in the Catch / Sample data file
							Possible Range:
						n='01'	=Escapement period (across years possible)
						n='01-26'	=Bi-weekly (statistical 2 week)
						n='01-24'	=Semi-monthly (calendar)
						n='01-12'	=Statistical month
						n='01-12'	=Calendar month
						n='01-54'	=Statistical week (beginning Monday)
						n='01-54'	=Week (beginning Sunday)
						n='01-04'	=Seasonal periods
							01=Spring
							02=Summer
							03=Fall
							04=Winter
						n='01-54'	=Weekend beginning Saturday (or Friday if on observed holiday)
						n='01-54'	=Weekday beginning Monday (or first working day following observed holiday)
							Sampling Period Type (field 5) and Sampling Period Number (field 6) must match that used in Catch/Sample data file for the given stratum
7	Species (Col. 23)	1	Yes	D	NA		Must match one of the following:
						'1'	=Chinook
						'2'	=Coho
						'3'	=Steelhead
						'4'	=Sockeye
						'5'	=Chum
						'6'	=Pink
						'7'	=Masu
						'8'	=Cutthroat

No	PSC Format name	Cols	Reqd	Just	Fill	Format	Validation
8	Sample Maturity Class (Col. 24)	1	No	D	NA		Must match one of the following:
						'1'	=Immature (0-Ocean fish)
						'2'	=Jacks (1-Ocean fish)
						'3'	=Adults
						'4'	=Mixed (adult, jack and immature)
9	Sex (Col. 25)	1	No	D	NA		Must match one of the following:
						'F'	=Female
						'M'	=Male
10	Weight (Cols. 26 - 28)	3	No	R	Blank or Zero	Numeric (1 implied decimal)	Weight in Kilograms
							Must be numeric in the range: '1' through '999'
							These fields must all have values or must all be blank:
							10 -- Weight
							11 -- Weight Code
							12 -- Weight Type
11	Weight Code (Col. 29)	1	No	D	NA		Must match one of the following patterns:
						'1'	=Round
						'2'	=Dressed, head on
						'3'	=Dressed, head off
							These fields must all have values or must all be blank:
							10 -- Weight
							11 -- Weight Code
							12 -- Weight Type

No	PSC Format name	Cols	Reqd	Just	Fill	Format	Validation...
12	Weight Type (Col. 30)	1	No	D	NA		Must match one of the following patterns:
						'1'	=Actual weight
						'2'	=Calculated weight (Sample size may be unknown)
							These fields must all have values or must all be blank:
							10 -- Weight
							11 -- Weight Code
							12 -- Weight Type
13	Length (Cols. 31 - 34)	4	No	R	Blank or Zero	Numeric	Length in millimeters
							Must be numeric in the range: '1' through '9999'
							These fields must all have values or must all be blank:
							13 -- Length
							14 -- Length Code
							15 -- Length Type
14	Length Code (Col. 35)	1	No	D	NA		Must match one of the following patterns:
						'0'	=Fork length (**preferred measurement**)
						'1'	=Mid-eye to fork
						'2'	=Mid-eye to caudal peduncle
						'3'	=Total length
						'4'	=Head length: Eye to opercula
						'5'	=Head length: Tip of snout to opercula
							These fields must all have values or must all be blank:
							13 -- Length
							14 -- Length Code
							15 -- Length Type

No	PSC Format name	Cols	Reqd	Just	Fill	Format	Validation...
15	Length Type (Col. 36)	1	No	D	NA		Must match one of the following patterns:
						'1'	=Actual length
						'2'	=Calculated length (Sample size may be unknown)
							These fields must all have values or must all be blank:
							13 -- Length
							14 -- Length Code
							15 -- Length Type
16	Tag Code (Cols. 37 - 48)	12	No	L	Blank	AGD1D2D3D4 Alpha-Numeric	Required to be a valid Release if Status of Tag (field 19) is '1' **For Sequential Tags Only:** The Sequential Table column and row information stored in Data 3 and Data 4 is not reported here but rather in fields 33 and 34
17	Replicate Number (Cols. 49 - 50)	2	No	R	Zero	Numeric	Replicate number if the tag code represents a replicate release group; A blank is permissible if the replicate number is unreadable Must be numeric in the range: '01' through '07' Must be blank if Tag Type (field 18) is not '9'
18	Tag Type (Cols. 51 - 52)	2	No	R	Blank		Required if Status of Tag (field 19) is '1' Must match one of the following:
						'0'	=Standard binary (1mm)
						'1'	=Half tags (H type)
						'2'	=Half tags (B type)
						'3'	=6 word half length tags
						'4'	=X-ray binary
						'5'	=Standard color
						'6'	=Solid color (##)
						'7'	=Striped color ($$)
						'8'	=Rare Earth
						'9'	=Embedded replicate
						'10'	=Sequential 6 word binary
							If ' 4', then Tag Code (field 16) must be 'XX0500'

No	PSC Format name	Cols	Reqd	Just	Fill	Format	Validation..
19	Status of Tag (Col. 53)	1	Yes	D	NA		Must match one of the following:
						'1'	=Tag read OK
						'2'	=No tag
						'3'	=Tag lost before read
						'4'	=Tag not readable
						'7'	=Unresolved discrepancy (see note below)
						'8'	=Head not processed
							If '1', then Tag Code (field 16) must not be blank

NOTE: The following instances may warrant a status of "Unresolved discrepancy":
  1) If the Tag Code has been re-used (contains "*") and may; therefore, have more than one possible release
  2) If the Tag Code does not match a Release Group in the Release data file
  3) Species of recovered fish does not match that in Release data file
  4) Age of fish is illogical (where Age is the difference between Recovery Date Year and Brood Year)
  5) Replicate Number exceeds that of the Tag Code in the Release data file
  6) Tag Code shows up in recovery when Release record has Expected Survival of "D" (Destroyed)
  Records classified as "Unresolved discrepancy" are still subject to all other validation requirements

No	PSC Format name	Cols	Reqd	Just	Fill	Format	Validation...
20	Sampling Site (Cols. 54 - 57)	4	No	L	Blank	Alpha-Numeric	Port of landing, hatchery, etc.
21	Estimation Level (Col. 58)	1	No	D	NA		Level of resolution at which expansion is made. Required if Estimated Number (field 24) is greater than '0' Must match one of the following:
						'2'	=Level 2 (Sector)
						'3'	=Level 3 (Region)
						'4'	=Level 4 (Area)
						'5'	=Level 5 (Location)
						'6'	=Level 6 (Sub-Location)

No	PSC Format name	Cols	Reqd	Just	Fill	Format	Validation..
22	Recovery Site Code (Cols. 59 - 77)	19	Yes	D	Blank	Alpha-Numeric	Hierarchical coding scheme rendering multiple levels of resolution to Recovery Site Must exactly match the Location Code (field 1) of Location Type '1' (field 2) in the PSC Location file All location codes are standardized within a given State or Province, and coordinated by the State/Province (e.g.: ADFG, CDFO, WDFW)
	a. Level 0	(1)					State or Province
						'1'	=Alaska
						'2'	=British Columbia
						'3'	=Washington
						'4'	=Idaho
						'5'	=Oregon
						'6'	=California
						'7'	=High Seas
	b. Level 1	(1)					Water Type
						'M'	=Marine
						'F'	=Freshwater
	c. Level 2	(1)				Alpha-Numeric	Sector: (Special Case: Use Aterisk for out-of-state/Provicen Release Sites; use only for those cases where the respective State/Province can not provide a suitable code)
	d. Level 3	(2)				Alpha-Numeric	Region
	e. Level 4	(4)				Alpha-Numeric	Area
	f. Level 5	(7)				Alpha-Numeric	Location
	g. Level 6	(3)				Alpha-Numeric	Sub-Location

No	PSC Format name	Cols	Reqd	Just	Fill	Format	Validation..
23	Fishery Code (Cols. 78 - 79)	2	Yes	D	NA	Alpha-Numeric	Standardized PSC Fishery Code required Must have a value defined in Chapter III.B Must match the value in corresponding Catch/Sample data file, Fishery Code (field 11)
24	Estimated Number (Cols. 80 - 84)	5	No	R	Blank or Zero	Numeric (2 implied decimals)	Estimated number of fish with given tag code in the catch represented by this recovery, as estimated by the reporting agency Must be blank if this recovery is used to adjust the Estimated Number of other recoveries Must be numeric in the range: '0' through '99999'

No	PSC Format name	Cols	Reqd	Just	Fill	Format	Validation...
25	Sample Type (Col. 85)	1	Yes	D	NA		Must match one of the following:
						'1'	In-sample recoveries from a sampled fishery with known catch; Estimated Number (field 24) is non-zero. (If sample size is zero, Estimated Number (field 24) is blank); Also used to report unsampled catch
						'2'	Voluntary recoveries from a sampled fishery with known catch; Awareness estimates are available; Estimated Number (field 24) is non-zero. (e.g., Puget Sound Sport)
						'3'	Voluntary recoveries from an unsampled fishery. Awareness approximations may be possible yielding non-zero Estimated Numbers (field 24). Otherwise Estimated Number (field 24) is blank. (e.g., Hoh River freshwater sport fishery)
						'4'	In-sample or voluntary recoveries from a sampled fishery with unknown catch; Estimated Number (field 24) is blank. (e.g., Stream Survey)
						'5'	Voluntary or select recoveries from a sampled fishery with known catch and no awareness estimates available; Use of these recoveries leads to double counting; Estimated Number (field 24) is zero only (e.g., commercial voluntary recoveries); see also Note #3 below
						'6'	Mark Incidence - Indirect Sample: Voluntary recoveries from indirectly sampled sport fishery; Estimated Numbers (field 24) are calculated from observed marks in mark incidence sample size (see fields 24 and 25 in Catch/Sample data format)
						'7'	Pass-Through Sample: Recoveries that are selectively removed from certain in-river sampling programs. The unmarked migrant fish are subject to subsequent destination sampling. Estimated Number (field 24) is one (1) only; see also Note #3 below

No	PSC Format name	Cols	Reqd	Just	Fill	Format	Validation..

NOTES:

1) Four keys are used to distinguish the type of sample:

        a) Sample: In-sample or Voluntary

        b) Fishery: Sampled or Unsampled

        c) Catch: Known or Unknown

        d) Awareness: Available or Unavailable

2) Awareness estimates (Sample Type 2) are based on current year's data, while awareness approximations (Sample Type 3) are based on extrapolations of data from previous years.

3) "Pass-Through" Sampling (Sample Type 7)

In certain sampling programs, unmarked fish are released while marked fish are killed and snouts removed. The unmarked fish are subject to subsequent destination sampling and the lack of reporting would result in underestimation of the tag codes. Such tag recoveries should therefore be reported as Sample Type '7' with no catch/sample record provided. Sampled fish are selectively removed with an Estimated Number (field 24) of one (1).

No	PSC Format name	Cols	Reqd	Just	Fill	Format	Validation..
26	Record Type (Col. 86)	1	No	D	NA	Numeric	Indicates recovery record If present, must have the value: '2'
27	Gear Code (Cols. 87 - 88)	2	No	R	Zero	Alpha-Numeric	Agency gear code: Does not need to match Catch/Sample codes (Code used by Agency "in-house" to identify its individual fisheries). Must Contain a code Chapter III.B
28	Format Version Number (Cols. 89 - 91)	3	Yes	D	Zero	Numeric (1 implied decimal)	Format version used to report recovery data Must have the value: '031'
29	Run (Col. 92)	1	No	D	NA		Use when sample is stratified by entry run timing (e.g., freshwater sport fisheries where runs can be identified by morphological differences). Must match one of the following:
						'1'	=Spring
						'2'	=Summer
						'3'	=Fall
						'4'	=Winter
						'5'	=Hybrid
						'6'	=Landlocked
						'7'	=Late Fall
							Comments: Fall: Includes Type S Coho Late Fall: Includes Type N Coho and Upriver Bright Chinook
30	Sample Length Class (Cols. 93 - 100)	8	No	D	Zero	Numeric	Length interval range (mm) Example: 800 - 900 mm. length interval coded as 08000900 Must be numeric in the range: '0' through '99999999' The number represented by the first 4 bytes must be less than or equal to the number represented by the last 4 bytes

No	PSC Format name	Cols	Reqd	Just	Fill	Format	Validation..
31	Sample Sex Class (Col. 101)	1	No	D	NA		Must match one of the following:
						'F'	=Female
						'M'	=Male
32	Sampling Agency (Cols. 102 - 105)	4	No	L	Blank	Alpha	Agency responsible for sampling or collecting and tag recovery; May differ from Reporting Agency (field 1)
							Must contain a code defined in Chapter V.C
33	Sequential Table Column No (Cols. 106 - 108)	3	No	R	Zero	Numeric	Value in "Data 3"; Corresponds to column number in Sequential Numbers Table. **Used for sequential tags only**
							Must be numeric in the range: '0' through '127'
							If present, then Tag Type (field 18) must be '10'
34	Sequential Table Row No. (Cols. 109 - 111)	3	No	R	Zero	Numeric	Value in "Data 4"; Corresponds to row number in Sequential Numbers Table; **Used for sequential tags only**
							Must be numeric in the range: '0' through '127'
							If present, then Tag Type (field 18) must be '10'
35	Run Year (Cols. 112 - 115)	4	Yes	D	NA	YYYY	Must match Catch Year (field 3) of corresponding Catch/Sample data file.
							For recoveries without an associated catch/sample, report same year as recoveries with an associated catch/sample
							Must be the same for all records
							Must be exactly 4 digits

D.   Catch / Sample Data

No	PSC Format name	Cols	Reqd	Just	Fill	Format	Validation...
1	Reporting Agency (Cols. 1 - 4)	4	Yes	L	Blank	Alpha	Must match Reporting Agency (field 1) of corresponding Recovery data file Must contain a code defined in Chapter V.B Must be the same for all records
2	Record Type (Col. 5)	1	No	D	NA	Numeric	Indicates Catch/Sample record. If present, must have the value: '1'
3	Catch Year (Cols. 6 - 7)	2	Yes	D	NA	YY	Calendar year when catch made. For escapement which crosses year boundaries, it is year when majority of run returns Must match Run Year (field 35) of corresponding Recovery data file Must be exactly 2 digits

4	Status of Record (Col. 8)	1	Yes	D	NA	
						'F'
						'P'
							Must match one of the following:
							        =Finalized data
							        =Preliminary data

5	Record Creation Date (Cols. 9 - 14)	6	Yes	D	NA	YYMMDD	Date when Catch/Sample record last updated (Year-Month-Day) Must not be greater than today

6	Species (Col. 15)	1	Yes	D	NA	
						'1'
						'2'
						'3'
						'4'
						'5'
						'6'
						'7'
						'8'
							Must match one of the following:
							        =Chinook
							        =Coho
							        =Steelhead
							        =Sockeye
							        =Chum
							        =Pink
							        =Masu
							        =Cutthroat

No	PSC Format name	Cols	Reqd	Just	Fill	Format	Validation..
7	Sample Maturity Class (Col. 16)	1	No	D	NA		Must match one of the following patterns:
						'1'	=Immature (0-Ocean fish)
						'2'	=Jack (1-Ocean fish)
						'3'	=Adult
						'4'	=Mixed (adult, jack, and immature)
8	Sampling Period Type (Col. 17)	1	Yes	D	NA		Must match one of the following:
						'1'	=Escapement period (across years possible)
						'2'	=Bi-weekly (statistical 2 week)
						'3'	=Semi-monthly (calendar)
						'4'	=Statistical month
						'5'	=Calendar month
						'6'	=Statistical week (beginning Monday)
						'7'	=Week (beginning Sunday)
						'8'	=Seasonal (Used for spring, summer, fall or winter run periods).
						'A'	=Weekend (Saturday, Sunday & observed holiday(s))
						'B'	=Weekday (Monday - Friday excluding observed holiday(s))
							Sampling Period Type (field 8) and Sampling Period Number (field 9) must match that used in Recovery data file for the given stratum

No	PSC Format name	Cols	Reqd	Just	Fill	Format	Validation..

9	Sampling Period Number (Cols. 18 - 19)	2	Yes	D	Zero	Numeric
						n='01'
						n='01 - 26'
						n='01 - 24'
						n='01 - 12'
						n='01 - 12'
						n='01 - 54'
						n='01 - 54'
						n='01 - 04'
						
						n='01-54'
						n='01-54'
							Possible range
							=Escapement period (across years possible)
							=Bi-weekly (statistical 2 week)
							=Semi-monthly (calendar)
							=Statistical month
							=Calendar month
							=Statistical week (beginning Monday)
							=Week (beginning Sunday)
							=Seasonal periods
							  01=Spring
							  02=Summer
							  03=Fall
							  04=Winter
							=Weekend beginning Saturday (or Friday if on observed holiday)
							=Weekday beginning Monday (or first working day following observed holiday)
							Sampling Period Type (field 8) and Sampling Period Number (field 9) must match that used in Recovery data file for the given stratum

10	Sampling Period Range (Non-Standard Estimations) (Cols. 20 - 23)	4	No	R	Zero	Numeric	Beginning and ending sampling period numbers for situations where catch data are pooled across time periods: Applies to estimated number calculations only (i.e. other reported numbers are pertinent only to the time period reported) Example: Weeks 7 through 12 coded "0712" Digits 1 and 2 must define a valid Sampling Period Number (field 9) Digits 3 and 4 must define a valid Sampling Period Number (field 9) The number represented by digits 1 and 2 must be less than the number represented by digits 3 and 4
11	Fishery Code (Cols. 24 - 25)	2	Yes	D	NA	Alpha-Numeric	Standardized PSC Fishery Code required Must have a value defined in Chapter III.B Must match the value in corresponding Recovery data file Fishery Code (field 23)

No	PSC Format name	Cols	Reqd	Just	Fill	Format	Validation..
12	Catch Area Code (Cols. 26 - 44)	19	Yes	D	Blank	Alpha-Numeric	Hierarchical location code to pinpoint Catch Area Must exactly match the Location Code (field 1) of Location Type '2' (field 2) in the PSC Location file All location codes are standardized within a given State or Province, and coordinated by the State/Province (e.g.: ADFG, CDFO, WDFW)
	a. Level 0	(1)					State or Province
						'1'	=Alaska
						'2'	=British Columbia
						'3'	=Washington
						'4'	=Idaho
						'5'	=Oregon
						'6'	=California
						'7'	=High Seas
	b. Level 1	(1)					Water Type
						'M'	=Marine
						'F'	=Freshwater
	c. Level 2	(1)				Alpha-Numeric	Sector; (Special case: Use asterisk for out-of-State/Province Release Sites; use only for those cases where the respective State/Province can not provide a suitable location code)
	d. Level 3	(2)				Alpha-Numeric	Region
	e. Level 4	(4)				Alpha-Numeric	Area
	f. Level 5	(7)				Alpha-Numeric	Location
	g. Level 6	(3)				Alpha-Numeric	Sub-Location

No	PSC Format name	Cols	Reqd	Just	Fill	Format	Validation..
13	Sample Type (Col. 45)	1	Yes	D	NA		Must match one of the following:
						'1'	In-sample recoveries from a sampled fishery with known catch; Estimated Number (field 18) is non-zero.; (If sample size is zero, Estimated Number (field 18) is blank); Use also to report unsampled catch
						'2'	Voluntary recoveries from a sampled fishery with known catch; <u>Awareness esti mates</u> are available; Estimated Number (field 18) is <u>non-zero</u>. (e.g., Puget Sound Sport)
						'4'	In-sample or voluntary recoveries from a sampled fishery with unknown catch; Estimated Number (field 18) is <u>blank</u>. (e.g., Stream Survey with no escapement estimate)
						'6'	<u>Mark Incidence - Indirect Sample</u>: Voluntary recoveries from indirectly sampled sport fishery; Estimated Num- bers (field 18) are calculated from observed marks in mark incidence sample size (see fields 24 and 25 in Catch/Sample data format)

NOTES:
1) Four keys are used to distinguish the type of sample:
      a) Sample: In-sample or Voluntary
      b) Fishery: Sampled or Unsampled
      c) Catch: Known or Unknown
      d) Awareness: Available or Unavailable

2) Awareness Factors (field 16) (Sample Type 2) are based on current year's data

No	PSC Format name	Cols	Reqd	Just	Fill	Format	Validation...
14	Number Caught (Cols. 46 - 53)	8	No	R	Blank or Zero	Numeric	Total catch of species for this area-period-fishery-age class stratum Must be blank if catch is unknown and Recovery Sample Type (Recovery field 25) is '4' May be blank if Recovery Sample Type (Recovery field 25) is '3' Must be numeric in the range: '0' through '99999999'
15	Number Sampled (Cols. 54 - 61)	8	No	R	Blank or Zero	Numeric	Number of fish examined for adipose fin mark. Must be numeric in the range: '0' through '99999999'
16	Awareness Factor (Cols. 62 - 65)	4	No	R	Blank or Zero	Numeric (3 implied decimals)	Estimation factor used for voluntary recoveries in sport fisheries Must be numeric in the range: '0' through '9999'
17	Number of Tags Recovered and Decoded (Cols. 66 - 70)	5	No	R	Blank or Zero	Numeric	Number of observed tags recovered and decoded in the sampling stratum; (i.e., Status of Tag (Recovery field 19) is '1') Must be numeric in the range: '0' through '99999'
18	Estimated Number (Cols. 71 - 75)	5	No	R	Blank or Zero	Numeric (2 implied decimals)	Estimated number of fish in the catch represented by the individual recovery Must be numeric in the range: '0' through '99999'
19	Number of No Tags (Cols. 76 - 79)	4	No	R	Blank or Zero	Numeric	Number of heads lacking tag in sampling stratum; (i.e., Status of Tag (Recovery field 19) is '2') Must be numeric in the range: '0' through '9999'
20	Number of Tags Lost (Cols. 80 - 82)	3	No	R	Blank or Zero	Numeric	Number of lost tags in sampling stratum; (i.e., Status of Tag (Recovery field 19) is '3') Must be numeric in the range: '0' through '999'
21	Number Unreadable Tags (Cols. 83 -85)	3	No	R	Blank or Zero	Numeric	Number of unreadable tags in sampling stratum; (i.e., Status of Tag (Recoveryf field 19) is '4') Must be numeric in the range: '0' through '999'

No	PSC Format name	Cols	Reqd	Just	Fill	Format	Validation..
22	Number of Unresolved Tag Code Discrepancies (Cols. 86 - 88)	3	No	R	Blank or Zero	Numeric	Number of tag recoveries in sampling stratum which could not be assigned to a tag code (i.e., Status of Tag (Recovery field 19) is '7') Must be numeric in the range: '0' through '999'
23	Number of Lost Heads or Heads Not Processed (Cols. 89 - 93)	5	No	R	Blank or Zero	Numeric	Number of lost heads or heads not processed (i.e., no data) in sampling stratum; (i.e., Status of Tag (Recovery field 19) is '8') Must be numeric in the range: '0' through '99999'
24	Sample Size Mark Incidence (Cols. 94 - 98)	5	No	R	Blank or Zero	Numeric	Number of fish sampled for marks in sport fishery but heads not taken; Use only with Sample Type 6 (see field 13). Must be numeric in the range: '0' through '99999'
25	Observed Marks in Incidence Sample (Cols. 99 - 102)	4	No	R	Blank or Zero	Numeric	Number of observed marks (e.g., Ad clips) in sport fishery but heads not taken; Use only with Sample Type 6 (see field 13). Must be numeric in the range: '0' through '9999'
26	Format Version Number (Cols. 103 - 105)	3	Yes	D	Zero	Numeric (1 implied decimal)	Format version used to report Catch/Sample data Must have the value: '031'
27	Estimation Level (Col. 106)	1	No	D	NA	'2' '3' '4' '5' '6'	Required if Estimated Number (field 18) is present Level of resolution at which estimation is made: =Level 2 (Sector) =Level 3 (Region) =Level 4 (Area) =Level 5 (Location) =Level 6 (Sub-Location) Must be numeric in the range: '2' through '6'

No	PSC Format name	Cols	Reqd	Just	Fill	Format	Validation...
28	Run (Col. 107)	1	No	D	NA		Use when sample is stratified by entry run timing (e.g., freshwater sport fisheries where runs can be identified by morphological differences)
							Must match one of the following:
						'1'	=Spring
						'2'	=Summer
						'3'	=Fall
						'4'	=Winter
						'5'	=Hybrid
						'6'	=Landlocked
						'7'	=Late Fall
							Comments:
							Fall: Includes Type S Coho
							Late Fall: Includes Type N Coho and Upriver Bright Chinook
29	Sample Length Class (Cols. 108 - 115)	8	No	D	Zero	Numeric	Length interval range (mm)
							Example: 800 - 900 mm. length interval coded as 08000900
							Must be numeric in the range: '0' through '99999999'
							The number represented by the first 4 bytes must be less than or equal to the number represented by the last 4 bytes
30	Sample Sex Class (Col. 116)	1	No	D	NA		Must match one of the following:
						'F'	=Female
						'M'	=Male
31	Sampling Agency (Cols. 117 - 120)	4	No	L	Blank	Alpha	Agency responsible for sampling and tag recovery; May differ from Reporting Agency (field 1)
							Must contain a code defined in Chapter V.C

No	PSC Format name	Cols	Reqd	Just	Fill	Format	Validation...
32	Escapement Estimation Method (Cols. 121 - 122)	2	No	R	Blank	Numeric	Identifies the methodology used to estimate the natural spawning escapement. (e.g. method used to determine the "number caught" in spawning ground carcass sampling); For use if Fishery Code (field 11) is 54 (Spawning Ground) and Sample Type (field 13) is 1
							Must contain a code defined in Chapter IV.B

E.   Location Data

No	PSC Format name	Cols	Reqd	Just	Fill	Format	Validation..
1	Location Code (Cols. 1 - 19)	19	Yes	D	Blank	Alpha-Numeric	19 character code used to identify hatchery, release site, recovery site, catch area, or stock; Coding based on hierarchical scheme to give multiple levels of resolution (for example see Hatchery / Facility Code (field 22) in Release data file). **(See notes below.)**
							Must be unique within a given Location Type (field 2)
							The first character must be numeric in the range: '1' through '7'
							The first character must have the same value for all records
							The second character must match one of the following: 'M' 'F'
							If the third character is an asterisk ('*'), then characters 1 and 2 of Description (field 3) must contain one of the following: 'AK', 'BC', 'WA', 'ID', 'OR', 'CA', 'HS', 'FO'

NOTES:
1) General usage of location codes
  Standardized location codes are maintained for a State or Province by the State/Province fisheries agency (i.e., ADFG, CDFO, WDFW, IDFG, ODFW, and CDFG).   These codes must be used by all other agencies within that jurisdiction.

2) Reporting of location codes
  When reporting a Location data set, report only those Location Codes for which your reporting agency is responsible.
  Do not report codes maintained by another reporting agency.

3) Usage of asterisk ('*') in byte 3 of location code
  Use of the asterisk ('*') is restricted to only these situations:
  a) If a code from the external State/Province cannot be provided due to sampling or timing problems;
  b) If the location is in a foreign (i.e. non-North American) country--thus cannot be provided.
  Wherever possible, use those codes already provided by the external State/Province.

No	PSC Format name	Cols	Reqd	Just	Fill	Format	Validation..
	(Col. 20 - Blank)						
2	Location Type (Col. 21)	1	Yes	D	NA		Type of Location Code
							Must match one of the following:
						'1'	=Recovery site
						'2'	=Catch area (code must match Recovery Site code at Estimation Level)
						'3'	=Release facility (i.e., Hatchery, etc.)
						'4'	=Release site
						'5'	=Stock
	(Col. 22 - Blank)						
3	Description (Cols. 23 - 123)	101	Yes	L	Blank	Alpha-Numeric	Name of location plus appropriate description as needed
							If byte 3 of the location code is an asterisk ('*'), (i.e., out-of-State/Province sites), the description must begin with one of the following 2-character abbreviations indicating actual origin. In such cases, the State or Province must be different than that coded in level 0 of the location code
						'AK'	= Alaska
						'BC'	= British Columbia
						'CA'	= California
						'FO'	= Foreign
						'HS'	= High Seas
						'ID'	= Idaho
						'OR'	= Oregon
						'WA'	= Washington

No	PSC Format name	Cols	Reqd	Just	Fill	Format	Validation..
4	File Creation Date (Cols. 124 - 129)	6	Yes	D	NA	YYMMDD	Must have the same value for all records Must be greater than File Creation Date of previously-submitted Location data file Date when Location data file created Must be a legal date of the form 'YYMMDD' Must not be greater than today
5	Format Version Number (Cols. 130 - 132)	3	Yes	D	Zero	Numeric (1 implied decimal)	Format version used to report Location data; Must have the value: '031'
6	Short Description (Cols. 133 - 152)	20	Yes	L	Blank	Alpha-Numeric	Concise description of the location Must be unique within: 1) State or Province (i.e. byte 1 (level 0) of Location Code (field 1)). 2) Location Type (field 2)
7	PSC Region Code (Cols. 153 - 157)	5	No	L	Blank	Alpha	The geographic region or area corresponding to a major river, coastal area, or passage within the State or Province which encompasses the location given by Location Code (field 1) **(see note below)** Must match code defined in Chapter VI.A
8	PSC Basin Code (Cols. 158 - 162)	5	No	L	Blank	Alpha-Numeric	The geographic basin or district corresponding to at least one sub-division within the given PSC Region Code (field 7) which encompasses the location given by Location Code (field 1) **(see note below)** See explanation in Chapter VI.B

NOTE: PSC Region Code is currently specified only for Hatcheries, Release Sites, and Stocks (i.e. where Location Type (field 2) is '3', '4', '5'. PSC Region Code is specified in Chapter V.D and should be provided where possible. PSC Basin Code is not currently specified.

No	PSC Format name	Cols	Reqd	Just	Fill	Format	Validation......
9	EPA Reach (Cols. 163 - 180)	18	No	L	Blank	Alpha-Numeric	For USA Territories (**see note below**): Must not contain embedded blanks
10	Latitude (Cols. 181 - 187)	7	No	D	Zero	Alpha-Numeric	The global latitude of the Location Code (field 1) These fields must both have values or must both be blank: 10 -- Latitude 11 -- Longitude
	a. Degrees Lat.	(2)					Must be numeric in the range: '00' through '90'
	b. Minutes Lat.	(2)					Must be numeric in the range: '00' through '59'
	c. Seconds Lat.	(2)					Must be numeric in the range: '00' through '59'
	d. Hemisphere Lat.	(1)				'N'	=Northern hemisphere
						'S'	=Southern hemisphere
							See explanation in Chapter VI.D
11	Longitude (Cols. 188 - 195)	8	No	D	Zero	Alpha-Numeric	The global longitude of the Location Code (field 1) These fields must both have values or must both be blank: 10 -- Latitude 11 -- Longitude
	a. Degrees Lon.	(3)					Must be numeric in the range: '000' through '179'
	b. Minutes Lon.	(2)					Must be numeric in the range: '00' through '59'
	c. Seconds Lon.	(2)					Must be numeric in the range: '00' through '59'
	d. Hemisphere Lon.	(1)				'W'	=Western hemisphere
						'E'	=Eastern hemisphere
							See explanation in Chapter VI.E

NOTE: EPA Reach pertains to any Location Codes (field 1) of any Location Type (field 2) which can be associated with a freshwater transport or shoreline EPA Reach Number. When provided, EPA Reach (field 9) should be assigned either the complete (17-character) EPA Reach Number or the most specific portion of the EPA Reach Number possible to describe the location. **See explanation in Chapter VI.C** .

F.   Description Data

No	PSC Format name	Cols	Reqd	Just	Fill	Format	Validation...
1	Submission Date (Cols. 1 - 8)	8	Yes	D	NA	YYYYMMDD	This date refers to the date the Reporting Agency submitted the data Description file Must be uniform for all records in Data Description File Must be a legal date of the form 'YYYYMMDD' Must be greater than Submission Date (field 1) of previously submitted Description file Must not be greater than today
2	File Type (Cols. 9 - 10)	2	Yes	D	NA	 'RL' 'RC' 'CS' 'LC'	Type of data file to which Data Description (field 6) pertains Must match one of the following: =Release (tagged and/or untagged) =Recovery =Catch/Sample =Location
3	Reporting Agency (Cols. 11 - 14)	4	Yes	L	Blank	Alpha	Must contain a code defined in Chapter V.B
4	File Year (Cols. 15 - 18)	4	No	D	NA	YYYY	Required if File Type (field 2) is 'RC' or 'CS' Must contain Run Year (Recovery field 35) if File Type is 'RC' Must contain Catch Year (Catch/Sample field 3) if File Type is 'CS' Must be blank if File Type (field 2) is 'LC' or 'RL'
5	Line Number (Cols. 19 - 20)	2	Yes	R	Zero	Numeric	Line (record) number of current Data Description (field 6) Must begin with the value '01' for each Data Description Must be numeric and consecutive in the range: '01' through '99'
6	Data Description (Cols. 21 - 80)	60	Yes	L	Blank	Alpha-Numeric	Textual description to further explain meaning of data for one File Type (field 2). May span multiple lines (up to 99) in which case fields 1 - 4 must be repeated for each line

III.   CODING FOR FISHERIES

A.   Overview

Codes	Gear
10-19	Troll
20-29	Net and Seine
40-49	Sport
50-59	Escapement
60-69	Test Fisheries
70-79	Juvenile Sampling
80-89	High Seas
90-99	Miscellaneous

B.   Detailed Coding

1.   '10' Series: Troll

Code	Fishery		Gear Codes and Fisheries	
10	Ocean Troll (Non-Treaty)	ADFG	11	Commercial Troll
		CDFG	00	Commercial Troll
		CDFO	30	Troll General
		ODFW	10	Ocean Troll
		WDFW	41	Troll (Non-Treaty)
11	Ocean Troll - Day Boat	CDFO	32	Troll - Day Boat
		WDFW	33	Troll - Day Boat
12	Ocean Troll - Trip	WDFW	34	Troll - Trip Boat
13	Ocean Troll - Freezer Boat	CDFO	31	Troll - Freezer Boat
14	Ocean Troll - Ice Boat	CDFO	33	Troll - Ice Boat
15	Treaty Troll	WDFW	40	Treaty Troll
16	Terminal Troll	NMFS (AK)	73	Terminal Troll

			ADFG	01	Other Source Troll Gear
19		Other			

2. '20' Series: Net and Seine

Code	Fishery		Gear Codes and Fisheries		
20	Ocean Gillnet (Non-Treaty)		ADFG	13	Commercial Gillnet
			CDFO	10	Gillnet
21	Columbia River Gillnet		ODFW	13	Columbia River Gillnet
22	Coastal Gillnet		QDNR	16	Coastal Net
			WDFW	14	Non-Treaty Gillnet (coast)
23	Mixed Net and Seine		CDFO	15	Mixed Net
			WDFW	11	Dip Bag Net
				13	Beach Seine
				14	Non-Treaty Gillnet (inside)
				16	Set Net
				17	Treaty Gillnet
				19	Non-Treaty Purse Seine
				20	Reef Net
				29	Treaty Purse Seine
				51	Treaty Trap
				52	Mixed Net
24	Freshwater Net		CDFO	45	Freshwater Net (mixed)
25	Commercial Seine		ADFG	12	Commercial Seine
			CDFO	20	Seine
26	Terminal Seine		NMFS (AK)	77	Terminal Seine
27	Freshwater Seine		ODFW	36	River Seine (non-Columbia)
28	Other Net		ADFG	04	Other Source Gillnet
29	Other Seine		ADFG	02	Other Source Seine

3.   '40' Series: Sport

Code	Fishery		Gear Codes and Fisheries	
40	Ocean Sport	ADFG	20	Sport
		ADFG	--	Marine Boat
		CDFG	03	Sport
		CDFO	07	Sport
		ODFW	11	Ocean Sport
		WDFW	95	Marine Sport
41	Sport (Charter)	CDFG	01	Sport - Charter
		WDFW	31	Sport - Charter
42	Sport (Private)	CDFG	02	Sport - Skiff
		WDFW	32	Sport - Kicker Boat
43	Sport (Jetty)	WDFW	36	Jetty
44	Columbia River Sport	ODFW	12	Columbia River Sport
45	Estuary Sport	ADFG	--	Marine Roadside
		ODFW	32	Estuary Sport
		WDFW	42	Puget Sound Sport
46	Freshwater Sport	ADFG	--	Freshwater Sport
		CDFO	47	Freshwater Sport
		ODFW	14	Spring Sport
		ODFW	26	Deschutes River Sport
			27	Freshwater Sport
			40	Mid-Columbia River Sport
		WDFW	51	Freshwater Sport
		FWS	51	Creel Survey
47	Freshwater Sport Snag	WDFW	59	Freshwater Sport Snagging
48	Terminal Sport	ADFG	--	Terminal Sport
		NMFS (AK)	76	Terminal Sport
49	Other			

4.   '50' Series: Escapement

Code	Fishery		Gear Codes and Fisheries		
50	Hatchery	ADFG	40	Rack Returns	
		CDFG	50	Hatchery	
		CDFO	40	Hatchery Rack	
		NMFS (AK)	50	Hatchery Returns	
		ODFW	21	ODFW Hatcheries	
			22	Other Oregon Hatcheries	
			23	Oregon Private hatcheries	
		FWS	50	Hatchery Returns	
		WDFW	50	Hatchery	
51	Fish Screens	CDFG	51	Fish Screen	
52	Fish Trap (Freshwater)	ADFG	04	Other Source Trap Gear	
		CDFG	52	Fish Trap	
		CDFO	42	Trap	
		NMFS (AK)	52	Fish Trap	
		ODFW	24	Fish Trap	
		WDFW	52	Fish Trap	
53	Wild Broodstock Collection (formerly Gaff)	CDFO	43	Wild Broodstock Collection	
		WDFW	53	Wild Broodstock Collection	
		NIFC	53	Wild Broodstock Collection	
54	Spawning Ground	ADFG	40	Escapement Survey	
		CDFG	54	Spawning Ground	
		CDFO	41	Spawning Ground	
		NMFS (AK)	54	Spawning Ground	
		ODFW	18	Spawning Ground Survey	
		WDFW	54	Spawning Ground	
55	Treaty Ceremonial	ODFW	16	Ceremonial	
56	Treaty Subsistence	ADFG	50	Subsistence	
		ODFW	20	Subsistence	
57	Mixed Wild Broodstock and Hatchery Returns	NIFC	54	Mixed Wild Broodstock and Hatchery Returns	
			59	Other	

5.   '60' Series: Test Fisheries

Code	Fishery		Gear Codes and Fisheries	
60	Test Fishery Troll	ADFG	61	Test Fishery Troll
61	Test Fishery Net	ADFG ODFW	63 15	Test Fishery Gillnet Columbia River Test
62	Test Fishery Seine	ADFG	62	Test Fishery Seine
63	Test Fishery Trap	ADFG	64	Test Fishery Trap
64	Test Fishery Unknown Multiple Gear	ADFG	60	Test Fishery Unknown Multiple Gear
65	Dead Fish Survey	ODFW	65	Dead Fish Survey
69	Other			

6.   '70' Series: Juvenile Sampling

Code	Fishery		Gear Codes and Fisheries	
70	Juvenile Sampling - Troll (Marine)	NMFS (AK)	05	Juvenile Sampling - Troll
71	Juvenile Sampling - Gillnet (Marine)	NMFS (AK)	04	Juvenile Sampling - Gillnet
72	Juvenile Sampling - Seine (Marine)	NMFS (AK) NMFS (CR) ODFW	12 O 19	Juvenile Sampling - Seine Outmigrant Sampling - Ocean OSU Experimental Ocean Purse Seine
73	Juvenile Sampling - Seine (Freshwater)	NMFS (CR) NMFS (CR) ODFW	C S 28	Outmigrant Sampling - Columbia River Outmigrant Sampling - Snake river Juvenile Sampling - Freshwater
79	Other			

7.   '80' Series: High Seas

Code	Fishery	Gear Codes and Fisheries		
80	Groundfish Observer (CA/OR/WA)	NMFS (AK)	80	Groundfish Observer (CA/OR/WA)
81	Groundfish Observer (Gulf of Alaska)	NMFS (AK)	81	Groundfish Observer (Gulf of Alaska)
82	Groundfish Observer (Bering Sea/Aleutians)	NMFS (AK)	82	Groundfish Observer (Bering Sea/Aleutians)
83	Foreign Research Vessels	NMFS (AK)	90	Japanese Research Vessels
84	Foreign Mothership Vessels	NMFS (AK)	91	Japanese Mothership Vessels
85	Ocean Trawl By-Catch	ODFW / ODFW	30 / 33	Ocean Trawl By-Catch / Pacific High Seas
86	Land Based Salmon	NMFS (AK)	86	Land Based Salmon
87	Squid Gillnet By-Catch	NMFS (AK)	87	Squid Gillnet By-Catch
89	Other			

8.   '90' Series: Miscellaneous

Code	Fishery	Gear Codes and Fisheries		
90	Multiple Gear	ADFG	00	Other Sources - Unknown/Multiple Gear
91	PNP Cost Recovery	ADFG	30	PNP Cost Recovery
92	Columbia River Shad	ODFW	17	Columbia River Shad
93	Set-Line (Sturgeon)	ODFW	31	Columbia River Set Line (Sturgeon)
94	Fish Trap (Marine)	ADFG	14	Commercial Trap (Marine)
99	Other			

IV.   **CODING FOR ESCAPEMENT ESTIMATION METHOD**

A.   Overview

Codes	Method
10-19	Passage Counts
20-29	Live Counts
30-39	Carcass Counts
40-49	Live and Dead Counts Combined
50-59	Redd Counts
60-69	Mark-Recapture Counts
70-79	Electronic Counts
90-99	Miscellaneous

B.   **Detailed Coding**

1.   '10' Series: Passage Counts

Code	Method
10	Total direct count of run passed through weir/trap/ladder
11	Partial direct count of run with extrapolation for unsampled periods
12	Partial direct count of run with no extrapolation for unsampled periods
13	Total count past dam with passage adjustments (e.g. boat locks, fall-backs)
14	Extrapolation from dfferences in counts between dams (minus other escapement and harvest)

2.   '20' Series: Live Counts (fish on spawning grounds)

Code	Method
20	Counts with extrapolation for entire period (e.g. 'area under the curve' derived from fish days/stream life)
21	Peak count
22	Index area peak count with expansion factors from a baseline year study
23	Index area peak count with expansion factors from another index stream or baseline year

3.   '30' Series: Carcass Counts

Code	Method
30	Cumulative count
31	Peak count
32	Index area peak count with expansion factors from a baseline year study
33	Index area peak count with expansion factors from another index stream

4.   '40' Series: Live and Dead Counts

Code	Method
40	Cumulative count (cumulative carcasses plus live fish from last survey)
41	Peak count
42	Index area peak count with expansion factors from a baseline year study
43	Index area peak count with expansion factors from another index stream

5.   '50' Series: Redd Counts

Code	Method
50	Cumulative redd count for entire area
51	Index area cumulative counts with supplemental area counts
52	Index area cumulative counts with supplemental areas and expansions for unsurveyed areas
53	Counts of visible redds with extrapolation for entire period (e.g. 'area under the curve' derived from total redd days/visible redd life)
54	Counts of visible redds/date with expansion factors from a baseline year study

6.   '60' Series: Mark/Recapture Estimates

Code	Method
60	Lower river marking with upstream recapture
61	Carcass mark/recapture

7.   '70' Series: Electronic Counts

Code	Method

70	Conductivity sensing counter
71	Sonar counter
72	Radar counter
73	Hydroacoustic estimate

8.   '90' Series: Miscellaneous

Code	Method
90	Estimate based on past hatchery/natural escapement rations
91	Estimate based on hatchery/natural ratio from harvest or test fishery
92	Estimate based on estimated harvest rate in a terminal fishery
99	Other (method not described by codes)

V.   CODING FOR AGENCIES

In general, updating the definitions of fields requires a formal format revision. The process of format revision, which requires multilateral concurrence, is time consuming and expensive. The fields addressed in this chapter have been identified as being especially dynamic. New values are needed on a regular basis; therefore, the requirement for format revision is waived for these fields for purposes of adding new values. This chapter may be updated after informal review and consent from the overseeing body. However, changes of substance such as new field sizes, formats, or meanings are still subject to the formal format revision process.

A.   Release Agency

Field: Release Agency
File: Releases
Current as of: January 9, 1995
Authorized: PSC Working Group on Data Standards

Release Agency must match one of these:

'AAI'	Alaska Aquaculture, Inc.
'ADFG'	Alaska Department of Fish and Game
'AFSP'	Aboriginal Fishery Strategy Program (BC)
'AKI'	Armstrong Keta, Inc. (AK)
'ANAD'	Anadromous Inc. (OR)
'BCFW'	British Columbia Fish and Wildlife
'BHSR'	Burnt Hill Salmon Ranch (now OPSR) (OR)
'BURR'	Burro Creek Farms (AK)
'CDFG'	California Dept. of Fish and Game
'CDFO'	Canada Dept. of Fisheries and Oceans - Operations
'CDFR'	Canada Dept. of Fisheries and Oceans - Research
'CEDC'	Clatsop Economic development Council (OR)
'CERA'	Ceratodus Fisheries (OR)
'CHEH'	Chehalis Tribe (WA)
'CIAA'	Cook Inlet Aquaculture Association (AK)
'COOP'	Cooperative - agency releases
'DIPC'	Douglas Island Pink and Chum, Inc. (AK)
'DOMS'	Domsea Farms Inc. (OR-WA)
'EBMD'	East Bay Municipal Utilities District (CA)
'ELWA'	Lower Elwha S'Klallam Tribe (WA)
'FWS'	U.S. Fish and Wildlife Service
'H&H'	Harris & Hugie Company (OR)
'HECK'	C.W. Heckard Company (OR)
'HOH'	Hoh Tribe (WA)
'HSU'	Humboldt State University (CA)
'HVT'	Hoopa Valley Tribe (CA)

'IDFG'	Idaho Department of Fish and Game
'JAME'	Jamestown S'Klallam Tribe (WA)
'KAKE'	Kake Non-Profit Fisheries Corp. (AK)
'KETA'	Keta Company (OR)
'KRAA'	Kodiak Regional Aquaculture Association (AK)
'LUMM'	Lummi Tribe (WA)
'MAKA'	Makah Tribe (WA)
'MIC '	Metlakatla Indian Community (AK)
'MUCK'	Muckleshoot Tribe (WA)
'NBS '	National Biological Survey
'NISQ'	Nisqually Tribe (WA)
'NLNS'	Nehalem Land & Salmon (OR)
'NMFC'	National Marine Fisheries Service (Columbia River)
'NMFS'	National Marine Fisheries Service (AK)
'NOOK'	Nooksack Tribe (WA)
'NSRA'	Northern Southeast Regional Aquaculture Assn. (AK)
'OAF '	Oregon Aquafoods, Inc.
'ODFW'	Oregon Department of Fish and Wildlife
'OPSR'	Oregon-Pacific Salmon Ranch (formerly BHSR)
'OSU '	Oregon State University
'PGAM'	Port Gamble S'Klallam Tribe (WA)
'PGHC'	Port Graham Hatchery Corporation
'PNPT'	Point No Point Treaty Council (WA)
'PPWR'	Puget Power (WA)
'PUYA'	Puyallup Tribe (WA)
'PWSA'	Prince William Sound Aquaculture Assn. (AK)
'QDNR'	Quinault Department of Natural Resources (WA)
'QUIL'	Quileute Tribe (WA)
'SHOL'	Shoalwater Tribe (WA)
'SIUF'	Siuslaw Fisheries (OR)
'SJ '	Sheldon Jackson College (AK)
'SKOK'	Skokomish Tribe (WA)
'SOF '	Silverking Oceanic Farms (CA)
'SPOK'	Spokane Tribe (WA)
'SQAX'	Squaxin Island Tribe (WA)
'SSC '	Skagit System Cooperative (WA)
'SSRA'	Southern Southeast Regional Aquaculture Assn. (AK)
'STIL'	Stillaguamish Tribe (WA)
'SUQ '	Suquamish Tribe (WA)
'TULA'	Tulalip Tribes (WA)
'UA '	University of Alaksa
'UI '	University of Idaho

'USFS'	U.S. Forest Service
'UW '	College of Fisheries, University of Washington
'VFDA'	Valdez Fisheries Development Association (AK)
'WDFW'	Washington Department of Fish & Wildlife
'WREG'	Washington Regional Enhancement Groups
'YAKA'	Yakama Tribe (WA)

B.   Reporting Agency

Field:	Reporting Agency
Files:	Releases, Recoveries & Catch/Sample
Current as of:	January 9, 1995
Authorized:	PSC Working Group on Data Standards

Reporting Agency must match one of these:

'ADFG'	Alaska Department of Fish and Game
'CDFG'	California Dept. of Fish and Game
'CDFO'	Canada Dept. of Fisheries and Oceans - Operations
'FWS '	U.S. Fish and Wildlife Service
'IDFG'	Idaho Department of Fish and Game
'MIC '	Metlakatla Indian Community (AK)
'NIFC'	Northwest Indian Fisheries Commission
'NMFC'	National Marine Fisheries Service (Columbia River)
'NMFS'	National Marine Fisheries Service (AK)
'ODFW'	Oregon Department of Fish and Wildlife
'QDNR'	Quinault Department of Natural Resources (WA)
'WDFW'	Washington Department of Fish & Wildlife

C.   Sampling Agency

Field:	Sampling Agency
Files:	Recoveries & Catch/Sample
Current as of:	January 9, 1995
Authorized:	PSC Working Group on Data Standards

Sampling Agency must match one of these:

'ADFG'	Alaska Department of Fish and Game
'BCFW'	British Columbia Fish & Wildlife
'CDFG'	California Dept. of Fish and Game
'CDFO'	Canada Dept. of Fisheries and Oceans - Operations

'ELWA'	Lower Elwha S'Klallam Tribe (WA)
'FWS '	U.S. Fish and Wildlife Service
'HOH '	Hoh Tribe (WA)
'IDFG'	Idaho Department of Fish and Game
'LUMM'	Lummi Tribe (WA)
'MAKA'	Makah Tribe (WA)
'MIC '	Metlakatla Indian Community (AK)
'MUCK'	Muckleshoot Tribe (WA)
'NIFC'	Northwest Indian Fisheries Commission (WA)
'NISQ'	Nisqually Tribe (WA)
'NMFC'	National Marine Fisheries Service (Columbia River)
'NMFS'	National Marine Fisheries Service (AK)
'ODFW'	Oregon Department of Fish and Wildlife
'PGAM'	Port Gamble S'Klallam Tribe (WA)
'PNPT'	Point No Point Treaty Council (WA)
'PUYA'	Puyallup Tribe (WA)
'QDNR'	Quinault Department of Natural Resources (WA)
'QUIL'	Quileute Tribe (WA)
'SHOL'	Shoalwater Tribe (WA)
'SKOK'	Skokomish Tribe (WA)
'SPOK'	Spokane Tribe (WA)
'SQAX'	Squaxin Island Tribe (WA)
'SSC '	Skagit System Cooperative (WA)
'STIL'	Stillaguamish Tribe (WA)
'SUQ '	Suquamish Tribe (WA)
'TULA'	Tulalip Tribes (WA)
'UW '	College of Fisheries, University of Washington
'WDFW'	Washington Department of Fish & Wildlife

VI.   GEOGRAPHIC CODING

In general, updating the definitions of fields requires a formal format revision. The process of format revision, which requires multilateral concurrence, is time consuming and expensive. The fields addressed in this chapter have been identified as being especially dynamic. New values are needed on a regular basis; therefore, the requirement for format revision is waived for these fields for purposes of adding new values. This chapter may be updated after informal review and consent from the overseeing body. However, changes of substance such as new field sizes, formats, or meanings are still subject to the formal format revision process

A.   PSC Region Code

Field: PSC Region Code
File: Locations
Current as of: January 9, 1995
Authorized: PSC Working Group on Data Standards

PSC Region Code must match one of these:

Alaska	Region:
'NOAK'	Southeast / Northern Outside / Alaska
'SOAK'	Southeast / Southern Outside / Alaska
'NIAK'	Southeast / Northern Inside / Alaska
'SIAK'	Southeast / Southern Inside / Alaska
'CNAK'	Central / Alaska
'WEAK'	Western / Alaska
'AYK'	Arctic - Yukon - Kuskokwim / Alaska
'UNAK'	Unknown / Alaska

British Columbia	Region:
'LWFR'	Lower Fraser River (below Hope + tributaries) / British Columbia
'UPFR'	Upper Fraser River (above Hope + tributaries; excluding Thompson River) / British Columbia
'TOMM'	Thompson River Mainstem / British Columbia
'TOMF'	Thompson River (North & South forks) / British Columbia
'SKNA'	Skeena River / British Columbia
'NASS'	Nass River / British Columbia
'GSVI'	Georgia Strait Vancouver Island / British Columbia
'GSMN'	Georgia Strait Mainland North / British Columbia
'GSMS'	Georgia Strait Mainland South / British Columbia
'SWVI'	Southwest Vancouver Island / British Columbia
'NWVI'	Northwest Vancouver Island / British Columbia
'JNST'	Johnstone Strait / British Columbia
'RIVR'	Rivers & Smith Inlets / British Columbia
'CCST'	Coastal Central / British Columbia
'NCST'	Coastal North / British Columbia

| 'QCI' | Queen Charlotte Islands / British Columbia |
| 'UNBC' | Unknown / British Columbia |

Shared U.S./Canada | **Region:**
| 'TRAN' | Transboundary Rivers (excluding Yukon River) / Alaska & Canada |

California | **Region:**
'NOCA'	Coastal North / California
'CECA'	Coastal Central / California
'SOCA'	Coastal South / California
'KLAM'	Klamath River / California
'SACR'	Sacramento River / California
'SJOA'	San Joaquin River / California
'UNCA'	Unknown / California

Columbia River | **Region:**
'LOCR'	Lower (mouth to Bonneville Dam + tributaries) / Columbia River
'CECR'	Central (Bonneville Dam to McNary Dam + tributaries) / Columbia River
'UPCR'	Upper (above McNary Dam + tributaries; excluding Snake River) / Columbia River
'SNAK'	Snake River / Columbia River
'UNCR'	Unknown / Columbia River

Oregon | **Region**
'NOOR'	Coastal North / Oregon
'SOOR'	Coastal South / Oregon
'UNOR'	Unknown / Oregon

Washington | **Region**
'GRAY'	Coastal South & Grays Harbor / Washington
'NWC'	Coastal North / Washington
'JUAN'	Strait of Juan De Fuca / Washington
'HOOD'	Hood Canal / Washington
'SPS'	Puget Sound South / Washington
'MPS'	Puget Sound Mid / Washington
'STIL'	Stillaguamish & Snohomish Rivers / Washington
'SKAG'	Skagit River / Washington
'NOOK'	Nooksack & Samish Rivers / Washington
'UNWA'	Unknown / Washington

Yukon | **Region**
| 'YUKN' | Yukon River / Yukon |
| 'UNYU' | Unknown / Yukon |

B.   PSC Basin Code

Field: PSC Basin Code
File: Locations
Current as of: January 9, 1995
Authorized: PSC Working Group on Data Standards

Currently, there is no specification for PSC Basin Code

C.   EPA Reach (USA Only)

Field: EPA Reach
File: Locations
Current as of: January 9, 1995
Authorized: PSC Working Group on Data Standards

The EPA Reach Number refers to the U.S. Environmental Protection Agency's "reach file," a national data base of surface water features. The full EPA Reach Number is 17 characters in length. It is based on the U.S. Geological Survey's (USGS) nationwide system of 8 digit Hydrologic-Unit Codes (HUC)s and can be used to identify stream reaches. These reaches can identify locations down to the level of stream intervals and coastal shoreline intervals. EPA Reach (Location field 9) is provided to facilitate the mapping of Location Codes (Location field 1) pertaining to freshwater and shoreline locations. Mapping of most marine locations may not be possible at this time.

To assist with mapping these locations, the following items are available on request from the PSMFC Data Center:

Document:	EPA Reach File Manual
Maps:	USGS Hydrologic Unit Maps (by State)
Maps:	EPA River Reach File Hydrologic Segment Plots (by State)

The parts (components) of the EPA Reach Number that are permissible in the EPA Reach field (Location field 9) are as follows **(See Figures 1 & 2 below)**:

1.   Full EPA Reach Number (17 - char)

          If possible, place the entire EPA Reach Number into the EPA Reach field. This will be possible only for certain types of locations that refer to point locations such as hatchery / facilities, or known release sites. Specific values can be obtained by referring to the maps: EPA River Reach File Hydrologic Segment Plots (by State).

2.   Hydrologic Unit Code (HUC) portion only (8 - char)

          In many cases it will not be possible to map a CWT Location Code (Location field 1) to a 17-character EPA Reach Number. This situation arises when the Location Code refers to an entire river, bay, lake. or other general area. For example, the release site Newakum R [3F21802 230882 R] encompasses many stream reaches within the EPA Reach-coded HUC: [17100103]. In these cases, the solution is to use only part of the EPA Reach Number in the Reach field-- the 8 character HUC. HUC values may be obtained by referring to either of these maps: USGS Hydrologic Unit Maps (by State): EPA River Reach File Hydrologic Segment Plots (by State).

3.   Accounting Unit Code portion only (6 - char)

If the Location Code encompass more than one HUC then use the Accounting Unit Code portion of the HUC. Accounting Unit Code values may be obtained by referring to either of these maps: <u>USGS Hydrologic Unit Maps (by State)</u>: <u>EPA River Reach File Hydrologic Segment Plots (by State)</u>.

4.   Sub-region Unit Code portion only (4 - char)

If the Location Code encompasses more than one Accounting Unit Code then use the Sub-region Unit Code portion of the Accounting Unit Code. All permissible values are listed here. (for assistance, refer to the either of these maps: <u>USGS Hydrologic Unit Maps (by State)</u>: <u>EPA River Reach File Hydrologic Segment Plots (by State)</u>.) EPA Reach must contain one of these:
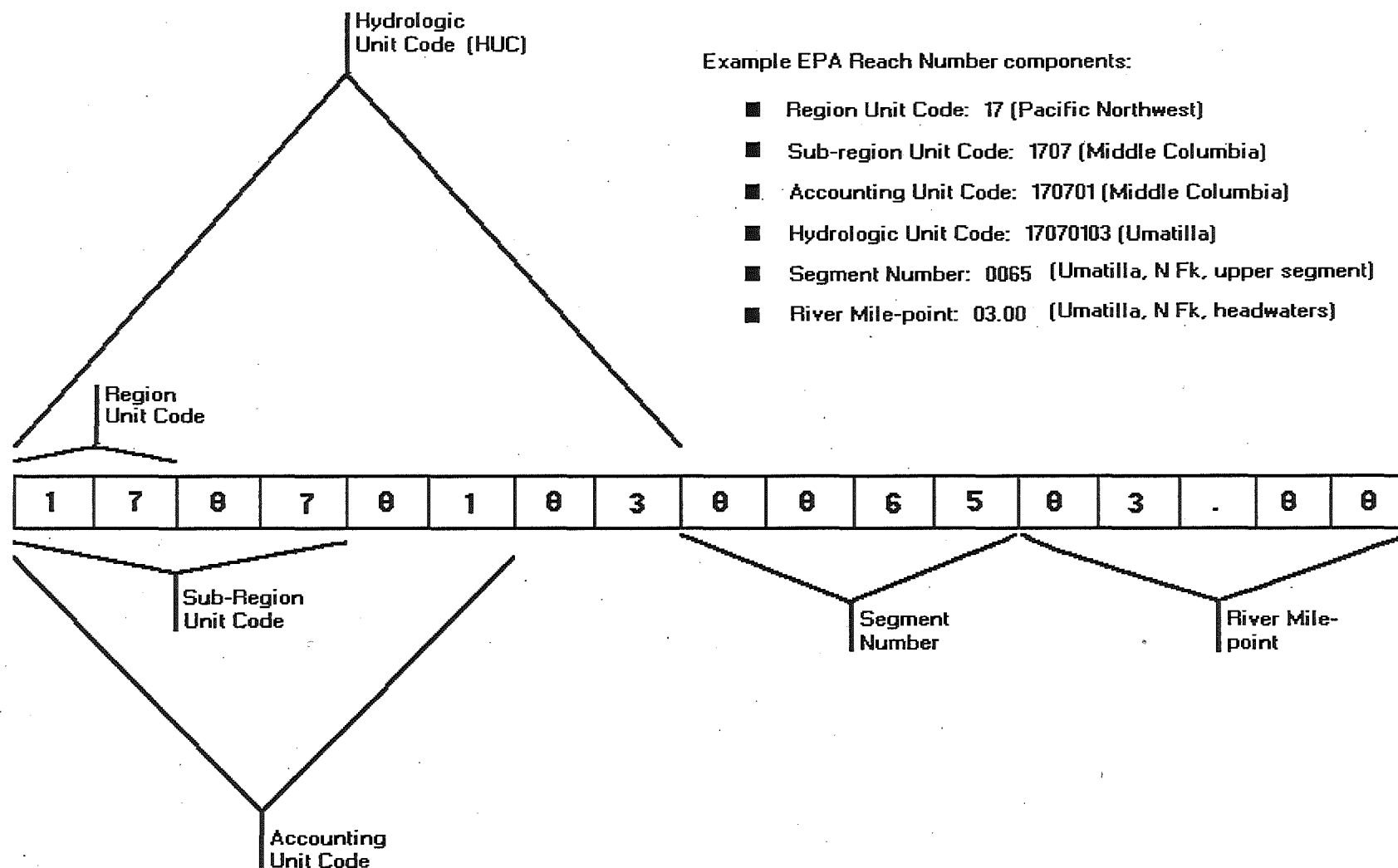
'1701'	Kootenai / Pend Oreille / Spokane sub-region
'1702'	Upper Columbia sub-region
'1703'	Yakima sub-region
'1704'	Upper Snake sub-region
'1705'	Middle Snake sub-region
'1706'	Lower Snake sub-region
'1707'	Middle Columbia sub-region
'1708'	Lower Columbia sub-region
'1709'	Willamette sub-region
'1710'	Oregon-Washington Coastal sub-region
'1711'	Puget sub-region
'1712'	Oregon-Closed Basins sub-region
'1801'	Klamath-North California Coast sub-region
'1802'	Sacramento sub-region
'1901'	Alaska-Southeast sub-region
'1902'	Alaska-Central sub-region
'1903'	Alaska-Kuskokwim sub-region
'1904'	Alaska-Yukon sub-region
'1905'	Alaska-Northwestern sub-region
'1906'	Alaska-Arctic sub-region

5.   Region Unit Code portion only (2 - char)

If the Location Code encompass more than one Sub-region Unit Code then use the Region Unit Code portion of the Sub-region Unit Code. All permissible values are listed here. (for assistance, refer to the either of these maps: <u>USGS Hydrologic Unit Maps (by State)</u>: <u>EPA River Reach File Hydrologic Segment Plots (by State)</u>.) EPA Reach must contain one of these:

'17'	Pacific Northwest region
'18'	California region
'19'	Alaska region

Figure 1: Illustration of EPA Reach Number for mapping of CWT Location Codes (Location field 1) into EPA Reach (Location field 9)

Example EPA Reach Number components:

■ Region Unit Code: 17 (Pacific Northwest)

■ Sub-region Unit Code: 1707 (Middle Columbia)

■ Accounting Unit Code: 170701 (Middle Columbia)

■ Hydrologic Unit Code: 17070103 (Umatilla)

■ Segment Number: 0065 (Umatilla, N Fk, upper segment)

■ River Mile-point: 03.00 (Umatilla, N Fk, headwaters)

Figure 2: Map of EPA Reach Numbers corresponding to illustration in Figure 1 (i.e. Umatilla, N Fk, Headwaters Reach)
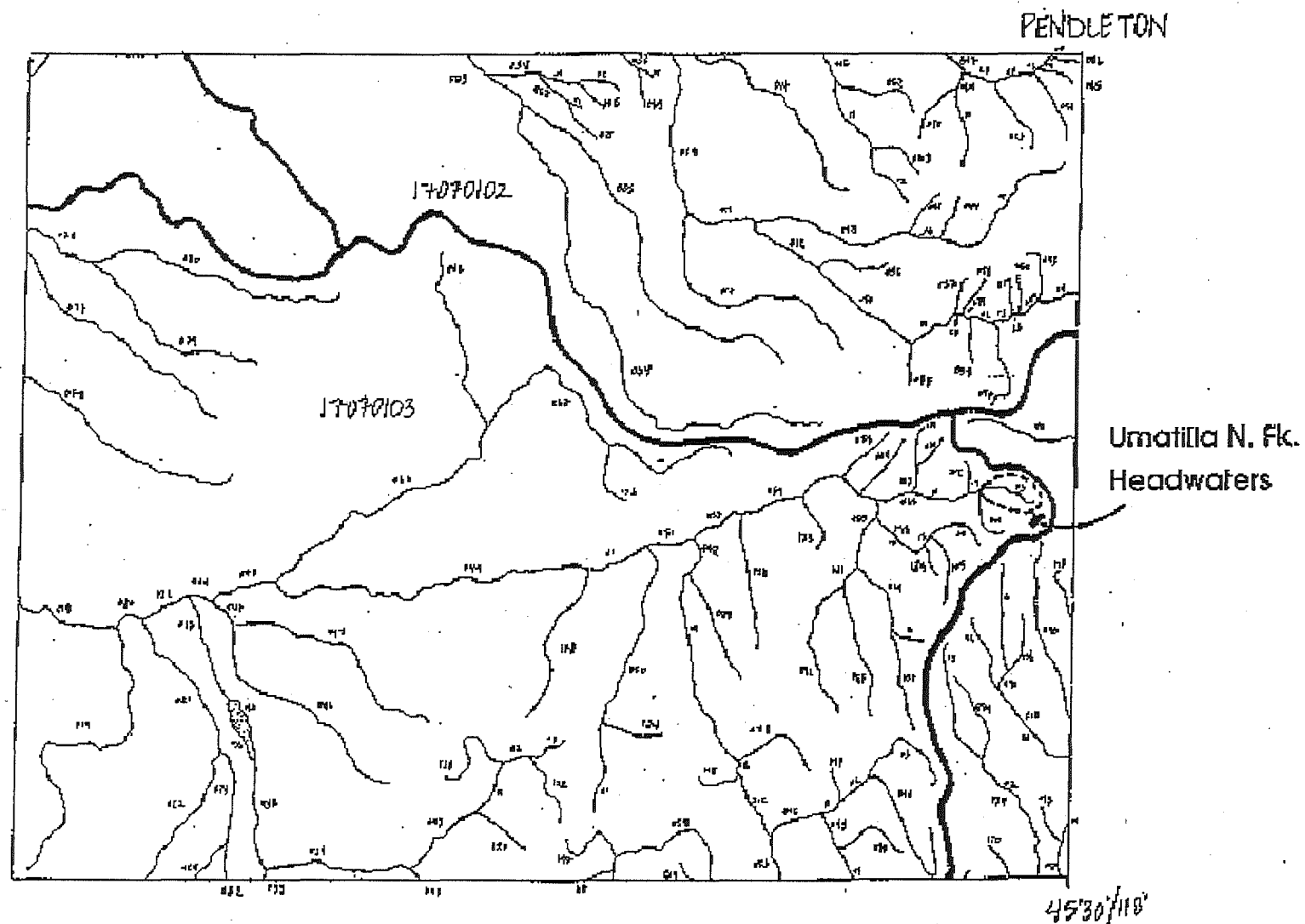
D.   Latitude

Field: Latitude
File: Locations
Current as of: January 9, 1995
Authorized: PSC Working Group on Data Standards

Currently, there are no specific guidelines for mapping Location Code (Location field 1) to global latitude / longitude coordinates.

E.   Longitude

Field: Longitude
File: Locations
Current as of: January 9, 1995
Authorized: PSC Working Group on Data Standards

Currently, there are no specific guidelines for mapping Location Code (Location field 1) to global latitude / longitude coordinates.