

PRODUCTION, CONTRIBUTION, AND CATCH TIMING OF
HATCHERY COHO SALMON WITH COMPARISONS TO WILD COHO SALMON
IN SOUTHEAST ALASKA COMMERCIAL FISHERIES.



By

Mark Stopha

Regional Information Report¹ 1J00-12

Alaska Department of Fish and Game
Division of Commercial Fisheries
Southeast Region
Juneau, Alaska

February 2000

¹ The Regional Information Report Series was established in 1987 to provide an information access system for all unpublished divisional reports. These reports frequently serve diverse ad hoc informational purposes or archive basic uninterpreted data. To accommodate timely reporting of recently collected information, reports in this series undergo only limited internal review and may contain preliminary data, this information may be subsequently finalized and published in the formal literature. Consequently, these reports should not be cited without prior approval of the author or the Commercial Fisheries Management and Development Division.

TABLE OF CONTENTS

LIST OF TABLES	3
LIST OF FIGURES.....	4
AUTHOR.....	6
ACKNOWLEDGEMENTS	6
PREFACE	7
INTRODUCTION.....	7
Wild Coho Production in Southeast Alaska.....	7
Hatchery Coho Production in Southeast Alaska	8
Release Site Selection	8
Broodstock Selection.....	8
Age at Release.....	8
Management of Coho Salmon Harvests in Southeast Alaska	9
DATA ANALYSES	10
RESULTS.....	11
Hatchery Releases	11
Regionwide Summary	11
Southern Inside Releases.....	11
Chatham Strait Releases.....	11
Central Inside Releases	12
Northern Inside Releases.....	12
Southern Outside and Central Outside Areas.....	12
Hatchery Contributions	12
Regional Summary	12
Regional Hatchery Contributions By Gear	13
Drift Gillnet.....	13
Purse Seine	13
Troll.....	13
Relative Hatchery Harvest By Gear.....	14
Hatchery Stock Return Timing By Gear	14
Drift Gillnet.....	14
Purse Seine	15
Troll.....	15
Wild Stock Escapements.....	16
Precision of Hatchery Contribution Estimates	17
Drift Gillnet.....	17
Purse Seine	17
Troll.....	17
Implications for Fisheries Management.....	17
DISCUSSION	18
LITERATURE CITED	20

LIST OF TABLES

	<u>Page</u>
Table 1. Annual Southeast Alaska commercial and recreational coho harvests and the Alaska hatchery contribution to the catch, 1960-1998.	21
Table 2. Releases (in thousands) of coho salmon by stock, facility, and release site, 1979-1998.	23
Table 3. Contribution of Southeast Alaska hatcheries, other Alaska hatcheries, and non-Alaska hatcheries to the troll, drift gillnet, and purse seine commercial fisheries, 1994-1998.	27
Table 4. Southeast Alaskan hatchery contribution, by release site, to Southeast Alaska drift gillnet fisheries, 1994-1998.	31
Table 5. Southeast Alaskan hatchery contribution, by release site, to Southeast Alaska purse seine fisheries, 1994-1998.	32
Table 6. Southeast Alaskan hatchery contribution, by release site, to Southeast Alaska troll fishery, 1994-1998.	33
Table 7. The percentage of the total Southeast Alaskan hatchery harvest of coho salmon troll, drift gillnet, and purse seine commercial fisheries, 1994-1998.	34
Table 8. Escapement estimates of coho salmon to escapement indicator streams in Southeast Alaska and Yakutat rivers, 1980-1998.	35
Table 9. Overall coho salmon harvest rates by indicator stock for the Alaska troll fishery and all fisheries combined, 1982-1998.	36

LIST OF FIGURES

	<u>Page</u>
Figure 1. Location of hatcheries producing coho salmon (stars), and release sites of hatchery coho salmon (numbers) in Southeast Alaska. See release site key on following page.....	37
Figure 2. Southeast Alaska troll management areas.	39
Figure 3. Commercial fishing districts in Southeast Alaska.	40
Figure 4. Number of juvenile coho salmon released from Southeast Alaska hatcheries, 1979-1998.	41
Figure 5. Coho catch of the drift gillnet, purse seine, and troll fisheries combined, and the Alaska hatchery percentage of the catch, 1980-1998.	41
Figure 6. Coho catch of the drift gillnet fishery and the Alaska hatchery percentage of the catch, 1980-1998.....	42
Figure 7. Coho catch of the purse seine fishery and the Alaska hatchery percentage of the catch, 1980-1998.....	42
Figure 8. Coho catch of the troll fishery and the Alaska hatchery percentage of the catch, 1980-1998.	43
Figure 9. Catch timing of Central Outside hatcheries in the drift gillnet fisheries, 1994-1998.	43
Figure 10. Catch timing of Southern Inside hatcheries in the drift gillnet fisheries, 1994-1998.	44
Figure 11. Catch timing of Hugh Smith wild stock in drift gillnet fisheries, 1994-1998.	45
Figure 12. Catch timing of Central Inside hatcheries in the drift gillnet fisheries, 1994-1998.....	46
Figure 13. Catch timing of Chatham Strait Area hatcheries in the drift gillnet fisheries, 1992-1996.	47
Figure 14. Catch timing of Northern Inside hatcheries in the drift gillnet fisheries, 1994-1998.	48
Figure 15. Catch timing of Berners River wild stock in drift gillnet fisheries, 1994-1998.....	49
Figure 16. Catch timing of Auke Creek wild stock in drift gillnet fisheries, 1994-1998.....	50
Figure 17. Catch timing of Central Outside hatcheries in the purse seine fisheries, 1994-1998.	51
Figure 18. Catch timing of Ford Arm Lake wild stock in purse seine fisheries, 1994-1998.	51
Figure 19. Catch timing of Southern Outside hatcheries in the purse seine fisheries, 1994-1998.....	52
Figure 20. Catch timing of Southern Inside hatcheries in the purse seine fisheries, 1994-1998.	53
Figure 21. Catch timing of Hugh Smith Lake wild stock in purse seine fisheries, 1994-1998.....	55
Figure 22. Catch timing of Central Inside hatcheries in the purse seine fisheries, 1994-1998.	56
Figure 23. Catch timing of Chatham Strait Area hatcheries in the purse seine fisheries, 1994-1998.	58
Figure 24. Catch timing of Northern Inside hatcheries in the purse seine fisheries, 1992-1996.	60
Figure 25. Catch timing of Berners River wild stock in purse seine fisheries, 1994-1998.....	61
Figure 26. Catch timing of Auke Creek wild stock in purse seine fisheries, 1994-1998.....	62
Figure 27. Catch timing of Central Outside hatcheries within troll harvest areas, 1994-1998.	63
Figure 28. Catch timing of Ford Arm Lake wild stock within troll harvest areas, 1994-1998.	64
Figure 29. Catch timing of Southern Outside hatcheries within troll harvest areas, 1994-1998.....	65
Figure 30. Catch timing of Southern Inside hatcheries within troll harvest areas, 1994-1998.	66
Figure 31. Catch timing of Hugh Smith Lake wild stock within troll harvest areas, 1994-1998.....	67
Figure 32. Catch timing of Central Inside hatchery stocks within troll harvest areas, 1994-1998.	68
Figure 33. Catch timing of Chatham Strait hatchery stocks within troll harvest areas, 1994-1998.....	69
Figure 34. Catch timing of Northern Inside hatchery stocks within troll harvest areas, 1994-1998.	70
Figure 35. Catch timing of Berners River wild stock within troll harvest areas, 1994-1998.....	71
Figure 36. Catch timing of Auke Creek wild stock within troll harvest areas, 1994-1998.....	72
Figure 37. Total run size, catch, escapement and escapement goal range for four wild Southeast Alaska coho salmon indicator stocks, 1982-1998.....	73

LIST OF FIGURES (Continued)

	<u>Page</u>
Figure 38. District 1 gillnet fishery weekly hatchery contributions and 95% confidence interval bounds, weeks 25-31, 1994-1998.	74
Figure 39. District 6 gillnet fishery weekly hatchery contributions and 95% confidence interval bounds, weeks 25-31, 1994-1998.	74
Figure 40. District 11 gillnet fishery weekly hatchery contributions and 95% confidence interval bounds, weeks 25-31, 1994-1998.	75
Figure 41. District 1 gillnet fishery weekly hatchery contributions and 95% confidence interval bounds, weeks 36-39, 1994-1998.	75
Figure 42. District 6 gillnet fishery weekly hatchery contributions and 95% confidence interval bounds, weeks 35-39, 1994-1998.	76
Figure 43. District 11 gillnet fishery weekly hatchery contributions and 95% confidence interval bounds, weeks 36-39, 1994-1998.	76
Figure 44. District 101 purse seine fishery weekly hatchery contributions and 95% confidence interval bounds, 1994-1998.	77
Figure 45. District 102 purse seine fishery weekly hatchery contributions and 95% confidence interval bounds, 1994-1998.	77
Figure 46. District 103 purse seine fishery weekly hatchery contributions and 95% confidence interval bounds, 1994-1998.	78
Figure 47. District 104 purse seine fishery weekly hatchery contributions and 95% confidence interval bounds, 1994-1998.	78
Figure 48. District 105 purse seine fishery weekly hatchery contributions and 95% confidence interval bounds, 1994-1998.	79
Figure 49. District 106 purse seine fishery weekly hatchery contributions and 95% confidence interval bounds, 1994-1998.	79
Figure 50. District 107 purse seine fishery weekly hatchery contributions and 95% confidence interval bounds, 1994-1998.	80
Figure 51. District 109 purse seine fishery weekly hatchery contributions and 95% confidence interval bounds, 1994-1998.	80
Figure 52. District 110 purse seine fishery weekly hatchery contributions and 95% confidence interval bounds, 1994-1998.	81
Figure 53. District 112 purse seine fishery weekly hatchery contributions and 95% confidence interval bounds, 1994-1998.	81
Figure 54. District 113 purse seine fishery weekly hatchery contributions and 95% confidence interval bounds, 1994-1998.	82
Figure 55. District 114 purse seine fishery weekly hatchery contributions and 95% confidence interval bounds, 1994-1998.	82
Figure 56. Troll fishery hatchery contributions by period and 95% confidence interval bounds, 1994-1998.	83

AUTHOR

Mark Stopha is the regional troll fishery management biologist for the Southeast Region of the Alaska Department of Fish and Game, Division of Commercial Fisheries, P.O. Box 240020, Douglas, Alaska 99824. E-mail: Mark_Stopha@fishgame.state.ak.us.

ACKNOWLEDGEMENTS

Pattie Skannes, Scott Kelley, Carol Denton, and Steve McGee provided editorial review of this manuscript. Carol Denton provided hatchery release information and interpretation. John Carlile provided confidence limits of hatchery contribution estimates. Leon Shaul provided wild stock escapement survey caveats. Cori Cashen provided final formatting and publication.

PREFACE

In 1980, the Joint Southeast Alaska Regional Planning Teams (RPT) established a long-range harvest objective (year 2000) of 2.65 million coho salmon, that was 1.5 million fish more than the estimated wild stock production at the time (Joint Southeast Regional Planning Teams, 1981; Table 1). The RPT estimated that the regionwide hatchery production potential at the time was about 550,000 fish, which left a gap of about 1.1 million additional fish required through enhancement and rehabilitation. Nearly 20 years later, wild stock production had increased to 3.4 million fish (1994-1998 average), and hatchery production potential had increased to over 1 million fish. Thus, the hatchery production potential and the harvest objectives of the original RPT plan were met; in fact, the 1.1 million fish gap proposed in 1980 was met through wild stock production alone.

Annual reports have been issued on enhanced chinook production in Southeast Alaska since 1982 (e.g., McGee et al., 1998) to serve as a single source of current information on enhanced chinook salmon production and harvest in Southeast Alaska. This report on enhanced coho production in Southeast Alaska is intended to serve a similar function, and documents the releases by facility and location, returns, and contributions to the commercial catch by time and area. The catch timing of hatchery and wild stocks from the same area are compared, and spawning escapement of wild stocks during recent years of increased hatchery contribution are assessed. Information from this document is intended to provide a basis for examining future trends in hatchery production, contribution of hatchery-produced fish to the commercial fisheries, and impacts on wild stock production and fisheries management from hatchery production.

INTRODUCTION

Wild Coho Production in Southeast Alaska

Coho salmon occur in more than 2,000 streams in Southeast Alaska. Most coho streams are small, with the number of spawners typically ranging from several up to 1,000 fish. Because of the number of these systems, they collectively contribute substantially to overall production. Lake systems are also important and typically produce returns between 1,000 and 8,000 fish. Large populations occur in the Taku, Chilkat, Berners, Stikine, Unuk, and Chickamin Rivers and in most Yakutat area systems. Spawning takes place during the fall and early winter months. Most coho salmon rear in freshwater for one or two years, and virtually all spend no more than one winter in the ocean before returning to spawn as adults. The majority are four-year-old fish and are caught in the year of spawning.

Four wild stocks have been marked with coded-wire-tags (CWT) annually since the early 1980s to provide annual harvest rate estimates. These stocks include Auke Lake near Juneau, the Berners River in lower Lynn Canal, Ford Arm Lake on the outer coast north of Sitka, and Hugh Smith Lake on the mainland southeast of Ketchikan. Fish are tagged in these systems and their contribution to the fisheries is estimated through the department's catch sampling and CWT processing programs. Weirs are operated on the three lake systems to enumerate coho escapements and to estimate the fraction of the returning population marked with CWTs. Escapement to Berners River is determined by intensive foot surveys. Samples for estimating the fraction of the returning population marked with CWTs are collected with beach seines. Escapement estimates for the

Berners River are conservative because a lower river weir is not employed to count all fish entering the system. This results in harvest rate estimates that are likely biased upward.

Hatchery Coho Production in Southeast Alaska

Nineteen hatcheries throughout Southeast Alaska produce coho salmon (Figure 1). Most of these hatcheries are operated as private non-profit corporations funded through commercial landing taxes. All Alaskan hatchery stocks are tagged with CWTs for identification.

Release Site Selection

Release sites have been selected for various reasons over the years (Figure 1). Some early projects were attempts to rehabilitate or enhance wild populations. Present day project plans are developed with the objective of preventing enhanced fish from integrating with wild populations in their native streams in order to avoid potential genetic and disease problems. Terminal harvest areas have been established at many enhanced coho release sites in order to provide an opportunity for 100 percent utilization of adult returns. Several enhancement projects have been associated with new fishpasses where fry are planted in the habitat above a fishpass to accelerate colonization.

Broodstock Selection

Thirty-three wild coho stocks in the Southeast Alaska region have been used for enhancement programs. Gametes are taken from wild stocks, usually for three to five years, during which time a derivative stock is developed with a discrete release site where broodstock can be taken in subsequent years. Exceptions have occurred where hatcheries were built on anadromous streams² (e.g. Klawock River Hatchery) and broodstock consists of wild fish as well as returns of enhanced production. Gametes from five sites outside of the region were imported in the 1970s, prior to the development of the Department's genetics policy which now prohibits such stock moves. Four of these extra-regional stocks were incorporated into hatchery broodstock mixes and may still exert a minor genetic influence.

Age at Release

In this paper, age-0 releases are defined as all juveniles released into freshwater habitat during the year following egg take, up to February 15 of the subsequent year. Most age-0 groups are planted in a natural freshwater habitat in the spring, summer, and fall after emergence from incubators. In some cases, planting of fall release groups has been delayed until the following January or early February, because of ice cover on the recipient lake. These delayed releases are included in the age-0 category in Table 2. Age-0 juveniles are exposed to a natural freshwater rearing environment for a minimum of 2 to 4 months before volitional outmigration.

² No new hatcheries on anadromous streams have been permitted since 1976 (AS 16.10.400(f)), and will not be allowed unless the stream is classified as "suitable for enhancement purposes" by the commissioner.

Numerous age-0 release strategies have been tried with varying degrees of success. Historically, most age-0s have been released directly into a lake or a stream, and most of these fish then volitionally migrate to sea as age-1 smolts, although some may stay for two or three years before migrating to sea. Some recent age-0 releases have incorporated specific culture strategies, including free-ranging lake rearing (e.g. Tent Lake), net pen lake rearing (e.g. Neck Lake), and lake fertilization to increase natural feed (e.g. Deer Lake). Also, age-0 project goals vary from colonization above a new fishpass, to enhancement of an existing anadromous run, to enhanced production from above-barrier habitat in a non anadromous system.

Age-1 releases include all fish reared in a hatchery for approximately one year, until April 1. Fish planted in freshwater after April 1 would be expected to begin downstream migration to saltwater, without a natural freshwater rearing period. The age-1 smolt release is the most common enhanced coho rearing strategy in Southeast Alaska, accounting for an average of 65 percent of annual releases.

Management of Coho Salmon Harvests in Southeast Alaska

Coho salmon are managed by the Alaska Department of Fish and Game (department) inseason to ensure adequate escapement of wild stocks. Fishing time and harvest levels are based on catch rates of commercial fleets, coded-wire-tag information from wild stocks, and escapement indices from a few systems.

The troll fleet harvests the majority of coho salmon in Southeast Alaska (1994-1998 avg. = 61%). The troll fishery is managed inseason with the use of a dock-side sampling program that provides catch per unit of effort (CPUE) information by time and location. The CPUE data is pooled into six management areas (Figure 2), and the weekly catch rates from these areas are compared to long term averages to assess run strength. Most of the troll catch occurs along the outer coast (areas 1, 2, and 3) of Southeast Alaska (Figure 2).

Purse seine, drift gillnet, and set gillnet fleets are managed by fishing district (Figure 3). Fisheries are generally opened weekly by emergency order, with fishing time based on run strength of targeted species. The purse seine fleet harvests coho salmon largely as bycatch to targeted species (chum and pink salmon) in Districts 101, 102, 103, 104, 105, 106, 107, 109, 110, 112, 113, and 114. The drift gillnet fleet harvests coho salmon both in directed fisheries and as bycatch to targeted species (chum, pink, and sockeye). The major coho gillnet fisheries occur in Districts 101, 106, 111, and 115, and are managed for sockeye and hatchery summer chum salmon during June and July, and coho and fall chum salmon in August and September. Other drift gillnet fisheries also occur in Districts 8 and 13, with the District 8 gillnet fishery targeting sockeye, pink, and coho salmon, and the District 13 fishery targeting chum salmon. The set gillnet fisheries near Yakutat harvest coho in directed fisheries in the terminal areas of rivers, and rarely harvest fish of hatchery origin because no hatcheries are located near these fisheries.

Allocation of coho salmon among the commercial fleets is carried out through a management plan established by the Alaska Board of Fisheries. The plan requires the department to compare current catch rates (CPUE) to average rates during the 1971 to 1980 period (base period) for the troll fishery, gillnet fisheries in districts 1, 6, 11, and 15, and the Juneau marine sport fishery. If the troll fishery catch rate is greater than the base period by a larger percentage than the catch rates in the other fisheries during the base period, then the troll fishery is closed in order to maintain historical apportionment of the catch. Of note is that the 1971-1980 base period was a period when virtually no coho hatchery enhancement was present in Southeast Alaska. Inseason estimates are made of both hatchery and wild stock contributions for comparison to catch rates during the base period, and for assessing regional run strength in comparison to the base period. If wild stock catch rates and escapement indices indicate a low coho

return, fishery managers may close any or all fisheries to provide increased passage of mature fish to spawning streams.

DATA ANALYSES

Hatchery release, stock contribution information, and wild stock CWT recovery information were obtained from the ADF&G state Tag Lab (Tag Lab) database. Hatchery release information was compiled for the 1979-1998 period. Most ADF&G releases prior to 1979 were small groups of fish and were not evaluated. Recoveries of hatchery and wild stock tags were expanded by week and district by the Tag Lab to yield estimates of enhanced and wild stock contribution.

Hatcheries were grouped by geographic location to examine timing of these groupings through a specific fishery in a designated fishing location. The hatchery groupings were based on their location within the six reporting areas used for the troll fishery dock-side sampling program, with one exception. The Chatham Strait area (District 109 and 112), which is part of both the Northern Inside and Central Inside areas for trolling, was treated as a separate hatchery geographic area due to the relative isolation of the facilities in this area (Hidden Falls, Mist Cove releases, and Port Armstrong) from others in northern and central Southeast Alaska.

Escapement indices of wild stocks to natal streams were compiled from the Integrated Fisheries Database at the Douglas Regional ADF&G office for stocks with established escapement goals (Clark and Clark, 1994; Clark, Clark and Shaul, 1994; Clark, 1995). Catch and escapement information for the four wild CWT stocks (Hugh Smith Lake, Ford Arm Lake, Berners River, and Auke Lake), is from ADF&G, *in press*.

Only a small percentage of the coho salmon escapements in Southeast Alaska are enumerated or surveyed because of the extremely scattered distribution of stocks and difficult conditions for observation of spawners during the fall months. Variations in environmental conditions and run timing can cause serious problems in obtaining ground and aerial survey escapement estimates that reflect actual spawner abundance. High water events appear to trigger spawning but also adversely affect stream visibility and, therefore, make it difficult or impossible to accurately count fish. Once spawning occurs, stream life is typically very short and post-spawners are quickly removed by predators or flushed downstream by high water. Survey counts are usually higher when fall weather is dry and fish continue to accumulate in streams before spawning occurs. Low peak counts are often associated with seasons when numerous protracted freshets occur in October that bring fish to the spawning areas and then flush out the post-spawners, while at the same time severely limiting survey opportunities. Improved precision can be obtained by conducting multiple surveys throughout the fall. This is feasible for some systems such as those for the Juneau roadside streams, but is more difficult and expensive for remote streams such as the major coho producing systems in southern Southeast Alaska.

For a designated fishery in a designated area, weekly catch timing of each hatchery stock grouping and each CWT wild stock was estimated as the sum of the weekly contribution, across years, divided by the sum of the total contribution to the catch across years, for the period 1994-1998. Catch timing across weeks of hatchery and wild stocks in the drift gillnet and purse seine fisheries was estimated by district for the years 1994-1998. Troll fishery timing was estimated for each of the six management areas for the years 1994-1998. However, during the weeks which the troll fishery usually closes (weeks of August 12 and August 19) were removed from the analyses to eliminate the artificially lower weekly catch apportionment due to decreased fishing time.

Confidence intervals (95%) were calculated for hatchery contribution estimates for the major drift gillnet, purse seine, and troll fisheries for the 1994-1998 period to assess uncertainty surrounding estimates used inseason for management, according to Clark and Bernard (1987). Hatchery contribution estimates and confidence intervals are presented according to how the fisheries are managed.

For gillnet fisheries, two sets of graphs based on fisheries management periods were derived for Districts 101, 106, and 111. The first set included weekly estimates for the period June through early August, which are the catch weeks that are compared to the same period in the troll fishery when determining the need for a mid-August troll closure. The second set included weekly estimates for the periods during which the gillnet fisheries are actively managed for coho salmon (i.e., late-August through late-September for District 101, mid-August through late-September for District 106, and early-August through late-September for District 111). Graphs for the District 115 gillnet fishery were not included because hatchery fish were seldom caught.

Estimates and confidence intervals for the number of hatchery-produced fish harvested in the troll fishery were generated for the entire region, and derived for two periods: 1) the July – mid-August closure period and 2) the mid-August reopening until the end of the summer season in September.

Although the purse seine fleet does not target coho salmon, it does harvest significant numbers of coho salmon as bycatch to targeted salmon species. Therefore, estimates and confidence intervals for the number of hatchery-produced fish harvested by seiners were derived for all weeks of tag recovery.

RESULTS

Hatchery Releases

Regionwide Summary

Hatchery releases of coho salmon increased from 340,000 juveniles in 1979 to over 16.8 million in 1998 (Table 2, Figure 4). More than 10 million coho salmon were released each year beginning in 1987. Juvenile coho salmon were released into the freshwater environment in all months of the year, at various sizes and ages, up through age 3.

Southern Inside Releases

Combined releases from Southern Inside sites comprised more than 50% of total Southeast Alaska enhanced coho production from 1984 to 1995. The largest releases occurred at Tent Lake (age-0) and Tamgas Creek Hatchery (age-1) on Annette Island, and at Neets Bay Hatchery (age-1) in Behm Canal, with 89% of the 1998 Southern Inside releases occurring at these three sites.

Chatham Strait Releases

Much of the Chatham Strait coho production in the 1980s consisted of small releases into non-anadromous lakes, and was less than 10% of total Southeast production at that time. However, the

Chatham Area became a major enhanced coho producer in the past ten years, with Deer Lake becoming the largest age-0 coho project in Southeast Alaska.

The Deer Lake project is a unique age-0 coho release in that it is the only coho lake-rearing project where outmigrant smolts are counted. Therefore, the production is reported as smolts. However, the fish leave the hatchery as fry and rear in a natural environment, as in all other lake rearing projects. The numbers of fry planted in the lake have been used in this section of the report, and are tallied with other age-0 releases.

Age-1 releases from Hidden Falls Hatchery into Kasnyku Bay began in 1990, and the numbers have steadily increased to make it one of the major smolt projects in Southeast Alaska. Smolt releases from Port Armstrong Hatchery make up the rest of the coho salmon released in the Chatham Strait area. Chatham Strait production has comprised an average of 32% of total Southeast production from 1993 through 1998.

Central Inside Releases

Most enhanced coho production in the Central Inside area has been accomplished through stream stocking projects in the mid-1980s and consistent, ongoing releases of smolts from the Crystal Lake hatchery. Since 1986, 100,000 to 200,000 smolts reared at Whitman Lake Hatchery have been released at Earl West Cove annually. The Neck Lake coho rearing project, an age-0 project begun in 1996, has become the largest producer in the Central Inside area.

Northern Inside Releases

Coho have been released at 14 sites in the Northern Inside Area, mostly in small (<100,000 fish) groups. Snettisham Hatchery was the base facility for most enhancement work during the 1980s, with releases into lakes and streams in Speel Arm and in the Juneau vicinity. Since 1990, nearly all of the enhanced coho in the Northern Inside area have come from the Gastineau Hatchery and have been released in the Juneau vicinity.

Southern Outside and Central Outside Areas

Enhanced coho releases from the two outside areas combined have averaged only seven percent of total annual releases in Southeast Alaska since 1987. The vast majority of fish have been age-0 and age-1 releases from Klawock Hatchery into Klawock Lake and River³. Outside area release sites have not been emphasized in the past because returning adults are accessible to a limited number of fisheries.

Hatchery Contributions

Regional Summary

Alaskan hatchery contribution of coho salmon to commercial fisheries was less than 1% of the total harvest of coho salmon in the Southeast region in 1980 (ADF&G, 1998). By 1991, the contribution had reached 20%, with a weighted average of 18% from 1994 through 1998 (Table 3, Figure 5). Hatchery

³ The Klawock facility has had three different operators and three different names since 1993; in this report it is consistently called "Klawock Hatchery."

contributions to the drift gillnet fishery were less than 15% from 1980 through 1989, and ranged from about 12% to 34% from 1994 through 1998 (Figure 6, Table 4). Alaska hatchery contributions to the purse seine fishery were less than 15% from 1980 through 1990, and ranged from 13% to 20% from 1994-1998 (Figure 7, Table 5). Hatchery contributions to the troll fishery were less than 15% from 1980 through 1990, and ranged from 14% to 23% from 1994-1998 (Figure 8, Table 6).

The Neets Bay release site was the largest contributor to commercial fisheries from 1996-1998. The Deer Lake release site contributed the most coho salmon in 1994, and the Tamgas facility in 1995. Contribution from the Kasnyku Bay release site has steadily increased to over 100,000 coho salmon to commercial fisheries in 1996 and 1998.

Contributions from several release sites have decreased in recent years. After peaking at 111,000 fish in 1994, the Gastineau Channel and Sheep Creek release site contributions fell to about 34,000 fish in 1998. Likewise, releases near Klawock (Cable Creek, Klawock Lake, and Klawock River), have declined from 27,000 fish in 1994 to only 100 fish in 1998.

Small numbers of non-Alaskan hatchery coho salmon from Canada, Washington, and Oregon are incidentally harvested. In recent years (1994-1998) fish from these facilities contributed less than 1% of the annual coho catch (Table 3).

Regional Hatchery Contributions By Gear

Drift Gillnet

From 1994-1998, the Southern Inside hatcheries produced 74% of the Alaskan hatchery contribution to the drift gillnet fleet, followed by the Central and Northern Inside areas (13% and 12%, respectively, Table 4). The Neets Bay and Tamgas Creek release sites produced the bulk of the production. Since 1994, the Southeast Alaska hatchery contribution to the drift gillnet catch has ranged from 13% to 34%.

Purse Seine

From 1994-1998, the Chatham Area hatcheries produced 62% of the Alaskan hatchery contribution to the purse seine fleet, followed by the Southern Inside hatcheries (31%, Table 5). Deer Lake and Kasnyku Bay releases were the major contributors to the seine catch. Since 1994, the Southeast Alaska hatchery contribution to the purse seine fleet has ranged from 13% to 20%.

Troll

From 1994-1998, the Southern Inside hatcheries produced 43% of the Alaskan hatchery contribution to the troll fleet, followed by the Chatham Area hatcheries (38%, Table 6). Neets Bay releases were the major contributor to the troll catch, followed by the Deer Lake and Kasnyku Bay release sites. Since 1994 the Southeast Alaska hatchery contribution to the troll fleet has ranged from 14% to 23%.

Relative Hatchery Harvest By Gear

During the 1994-1998 period, the troll fleet harvested the majority (66%) of Alaska hatchery-produced coho salmon, followed by the drift gillnet fleet (18%), and the purse seine fleet (16%) (Table 7). By hatchery return, the troll fleet harvested their largest proportion from the Central Outside returns, and the least from the Southern Inside returns. The drift gillnet fleet harvested their largest proportion from the Central Inside returns, and virtually none from the Southern Outside, Central Outside, or Chatham Area stocks. The purse seine fleet harvested their largest proportion from the Chatham Area stocks, and the least from the Northern Inside, Central Inside, and Central Outside stocks.

Hatchery Stock Return Timing By Gear

Drift Gillnet

From 1994-1998, Central Outside area hatchery tags were recovered in only two drift gillnet districts (Figure 9). Most tag recoveries were from the District 113 fishery, where contributions peaked between August 19 and September 11. The District 115 fishery showed only one week (September 17) of tag recoveries. Only one wild stock tag from Ford Arm Lake, located in the Central Outside area, was recovered in the drift gillnet fisheries (week of August 26 in the District 106 fishery).

Hatchery tags from fish released in the Southern Inside Area were recovered in the District 101, 106, and 108 fisheries (Figure 10). Contributions peaked in the District 101 fishery in mid-September and in the District 106 fishery about a week earlier than District 101. The District 108 fishery showed recoveries in early July and late August. Wild stock coho tags from Hugh Smith Lake, located in the Southern Inside area, were recovered primarily from District 101 and 106 fisheries, with catch timing in these fisheries similar to that of the Southern Inside hatcheries (Figure 11).

Central Inside hatcheries showed contributions to the District 101, 106, 108, and 115 fisheries (Figure 12). Most of the tag recoveries were from the District 106 fishery, which showed a peak contribution in July. The District 108 fisheries showed a peak contribution in late August through mid-September. Tag recoveries in the District 101 fishery occurred in September and October, and one tag was recovered in the District 115 fishery in July.

Few tags from hatcheries located in the Chatham Strait area were recovered in the drift gillnet fisheries (Figure 13). Tags were recovered in Districts 101, 106, 111, and 115, with the majority of the tags recovered in District 115.

Northern Inside area hatchery tags were recovered in Districts 101, 106, and 111, and 115, with most recoveries in the District 111 and 115 fisheries (Figure 14). Catch timing peaked in both fisheries in September. Wild stock tag recoveries from Berners River and Auke Lake, both located in the Northern Inside area, in the drift gillnet fisheries were primarily from the District 111 and 115 fisheries, with peak catch timing also in September (Figures 15 and 16).

Purse Seine

Tags from hatcheries located in the Central Outside area were recovered primarily in the District 113 purse seine fishery, with other recoveries in Districts 104 and 109 (Figure 17). Recoveries in District 113 were consistent from late July through mid-September. Purse seine fishery tag recoveries from the Ford Arm Lake wild stock were primarily from the District 113 fishery, with peak catch timing in mid-August (Figure 18).

Southern Outside hatchery tags were recovered primarily in District 104, with two tags also recovered in District 103 (Figure 19). Catch timing in District 104 peaked in late July through mid-August.

The Southern Inside hatcheries made contributions to all purse seine fishery districts except District 110, with Districts 101, 104, and 102 showing the largest numbers of tag recoveries (Figure 20). District 101 peaked in late August through September, District 102 in late August and early September, and District 104 peaked in August through early September. Tag recoveries in the other districts were also in August and September fisheries. Hugh Smith wild stock tags were recovered in 8 districts, with most of the tag recoveries from the District 104 fishery, which showed a peak catch timing in August (Figure 21).

Central Inside hatcheries contributed to most districts (Figure 22). However, the largest number of tag recoveries for any district was just 20 tags in the District 110 fishery.

Chatham Strait hatcheries also contributed to most districts, with most recoveries from Districts 109, 112, and 114 (Figure 23). Contribution to the District 109 and 114 fisheries peaked in late August, with a mid-July through early August peak in District 112.

Northern Inside hatcheries contributed to 8 districts, but only District 112 and 114 showed more than 10 tag recoveries (Figure 24). Contributions to the District 112 and 114 fisheries occurred from late July through early September. Wild stock recoveries from Berners River and Auke Lake were primarily from the District 112 and 114 fisheries, with peak catch timing in these districts similar to those of the Northern Inside hatchery releases (Figures 25 and 26).

Troll

Hatchery contributions from each geographic area generally peaked in the Southern Outside and Central Outside areas first, followed by the Northern Outside area, and finally the inside areas. The Northern Inside area extends over a large area from east to west, with both an "outside" fishery area in Cross Sound and an "inside" fishery in eastern Icy Straits and Lynn Canal. This area tended to show an early season peak of hatchery catches from the Cross Sound area, and a later season peak as hatchery stocks and fishing effort moved to inside areas.

Central Outside contributions peaked in late July and early August. Catches in the Southern Outside fishery also peaked in late July and early August, while those in the Northern Outside fishery peaked in the first half of August (Figure 27). The catch timing in the Central Outside fishery was protracted over most of the season. Contributions to the Central Inside fishery occurred from mid-July through mid-August, whereas contributions to the Northern Inside fishery showed no consistent catch timing, and the Southern Inside fishery showed few tag recoveries. Coho salmon from Ford Arm Lake were caught in Northern and Central Outside fisheries, and in the Northern and Central Inside fisheries, with catch timing in the outside fisheries similar to that of the Central Outside hatchery stocks (Figure 28).

The catch timing for hatchery stocks produced in the Southern Outside area showed a peak in the Central Outside fishery in mid-July, and in the Southern Outside fishery in late July (Figure 29). Catches in the Central Inside fishery were protracted over July and August. Few tags were recovered in the Northern Outside, Northern Inside, and Southern Inside fisheries.

Contributions of stocks from the Southern Inside hatcheries peaked from mid-July through mid-August in the Southern Outside fishery, with slightly later peaks in the Northern Outside, Central Outside, Northern Inside, and Central Inside fisheries (Figure 30). Contributions to the Southern Inside fishery peaked in September. Tag recoveries from Hugh Smith Lake wild stock were made in all troll areas from 1994 through 1998, indicating a catch timing similar to the Southern Inside hatchery stocks (Figure 31).

Fish from Central Inside hatcheries occurred in all areas throughout the summer season (Figure 32). The Central Outside, Central Inside, and Southern Outside fisheries had the most tag recoveries. Northern Outside catches peaked in September, Southern Outside catches peaked in late July and early August, and Central Outside catches were consistent across the season. Northern Inside catches peaked in early August, Central Inside catches peaked in late August, and Southern Inside catches showed no consistent trend.

All Outside and the Northern and Central Inside fisheries showed peak catches of fish from hatcheries in the Chatham area from mid-July through late August (Figure 33). Hatchery fish originating from the Chatham area were virtually absent in the Southern Outside area in September. Only one tag was recovered in the Southern Inside fishery.

Fish from hatcheries in the Northern Inside area peaked in July in the Southern Outside fishery, then were nearly absent by the second week in August (Figure 34). Catches in the Central Outside fishery occurred from mid-July through mid-September, with a peak in late August. Catches in the Northern Outside fishery peaked from early-August through mid-September. The Northern Inside catches peaked in late August and early September, while catches in the Central Inside area showed peaks in early August. Only one tag was recovered in the Southern Inside fishery. The Berners River wild stock showed catch timing in each area of recovery similar to that of stocks from hatcheries in the Northern Inside area (Figure 35). Auke Lake wild stock coho salmon showed similar catch timing to the Northern Inside hatchery stocks in the Central Outside, Northern Inside, and Central Inside troll fisheries (Figure 36). No tags were recovered from the Berners River stock in the Southern Inside fishery, or the Auke Creek stock in either Southern area fishery.

Wild Stock Escapements

Since 1982, trends in coho escapements of the four coded-wire-tagged indicator stocks generally fluctuated with total return (Figure 37). These systems, in addition to the other systems in the region with established escapement goals, have generally met or exceeded those goals during the same period (Table 8). Harvest rates by the troll fishery and all fisheries have fluctuated over the years, with no clear trend in relation to the hatchery contribution to the fisheries (Table 9).

Precision of Hatchery Contribution Estimates

Drift Gillnet

During June and July, confidence intervals around hatchery contribution estimates in the District 1 gillnet fishery were generally narrow, and the hatchery contribution was generally low (Figure 38). For the District 6 fishery, confidence intervals were fairly wide at higher hatchery contribution estimates (Figure 39). The District 11 fishery showed hatchery fish present in only six weeks during the 1994-1998 period, with variable confidence interval widths and low contribution (< 10%) during weeks of higher harvests (Figure 40).

During the later season periods, when gillnet fisheries are managed for coho salmon, hatchery contribution estimates in the District 1 fishery were high in many weeks (>60%), with wide confidence intervals (Figure 41). Upper bounds of the confidence intervals for the District 6 hatchery contribution were generally below 60% (Figure 42). Likewise, most of the upper bounds of the confidence intervals for the District 11 hatchery contribution were generally below 50% (Figure 43).

Purse Seine

Hatchery contribution estimates for purse seine fisheries showed varying degrees of variability (Figures 44-55). In most districts, hatchery contributions and confidence intervals were relatively low, particularly as weekly catches increased. An exception was District 9, which produced large weekly catches (up to about 70,000 fish), hatchery contributions above 30%, and wide confidence intervals around many estimates.

Troll

For the troll fishery, confidence intervals widths were small, with a general reduction in variability around hatchery estimates as the catch increased (Figure 56).

Implications for Fisheries Management

The accuracy of hatchery contribution estimates for the troll fishery is adequate for wild stock management at current levels of hatchery production. However, contribution estimates for the District 1 late season period and the District 106 early season period gillnet fisheries, and the District 109 purse seine fishery were not acceptable because of the relatively high hatchery contribution levels and the inherent variability in the error estimation. In District 101, Tamgas Creek accounted for 34% of the hatchery contribution, followed by 24% from Neets Bay, and 21% from Nakat Inlet. Average tagging ratios from these facilities (1994-1998) averaged 44, 34, and 8, respectively. In District 106, Neets Bay accounted for 50% of the hatchery contribution, followed by 18% from Neck Lake, and 11% from Tamgas Creek. Tagging ratios from these facilities averaged 33, 13, and 29, respectively. In District 109, Deer Lake releases, which were transported from the Medvejie Creek hatchery, accounted for 74% of the hatchery contribution, followed by 14% from Hidden Falls, and 7% from Port Armstrong. Tagging ratios from these facilities averaged 62, 26, and 34, respectively. To protect wild stocks and improve management precision of coho returns, tagging rates for coho releases from Tamgas Creek, Neets Bay, Neck Lake, and Deer Lake should be increased in light of the variability and magnitude of hatchery contributions to the drift gillnet and purse seine fisheries.

DISCUSSION

During the 1990s, annual hatchery production of coho salmon reached an all-time high, with fishery contributions averaging about 20%. For the most part, wild stock escapements during this period of high hatchery production have met or exceeded goals. Catch timing of hatchery stocks tends to reflect the catch timing of wild stocks originating from the same area, particularly in fisheries in the outside areas, where most of the coho salmon harvest occurs.

Hatchery enhancement that increases commercial fisheries production obviously has the positive impact of adding more fish to the holds of commercial fishers, the creels of sport anglers, and the nets of personal use and subsistence fishers. However, hatchery production can also complicate fisheries management. The Alaska Department of Fish and Game is charged to both maintain sustained yield populations of wild stocks and provide harvest opportunity for hatchery stocks. The troll fishery, in particular, presents added challenges, since most of the harvest occurs over an extended period in highly mixed stock areas of the outer coast.

The objectives of the Comprehensive Plan developed in 1980 have been achieved in recent years, and would have been even in the absence of hatchery production. In the years following the plan's development, the Northern Southeast Regional Planning Team (RPT)(NSERPT 1985), and Wilbur and Frohne (1989) all urged caution in expanding hatchery production to levels that could harm wild stocks. The RPT selected 25% as the most reasonable and acceptable maximum level for enhancement in the pink salmon seine fishery, which harvests mixed stocks of pink salmon prior to stock segregation, not unlike the troll coho fishery along the outer coast (NSERPT 1985).

Wilbur and Frohne (1985) did not establish an enhancement guideline, but provided several options for consideration in planning for enhancement, including 1) switching or enhancement of fisheries management data sources; 2) inseason separation of hatchery and wild stocks; 3) manipulation of hatchery stock timing to temporally precede or follow an established fishery; 4) reduction of fishing effort at traditional locations, and relocation of fishing effort to terminal segregated areas where each wild and hatchery stock could be harvested on a stock-by-stock basis; and 5) restriction of hatchery production to levels that would provide fishery enhancement without too greatly jeopardizing the established stocks.

Under option 2, the department currently attempts to address inseason separation of hatchery and wild stocks through the CWT sampling program. However, results of this study indicate large uncertainty around hatchery estimates in some of the drift gillnet and purse seine fisheries, caused primarily by low tagging rates. For option 3, manipulation of hatchery stock timing is currently underway at Neck Lake, where a large early season coho return has been established. The stock for this project was acquired from an early-returning local wild stock. This stock, as well as other local early-returning wild stocks, will likely be present during the time that fisheries are harvesting the early-returning hatchery fish; therefore managers must be vigilant to monitor the harvest and escapement of these wild stocks to avoid overharvest. For option 4, reducing effort in traditional locations would most likely involve reducing trolling on the outer coast, where most of the coho harvest occurs. This would have serious consequences for the troll fishery, because it increasingly depends on the coho harvest as the primary source of summer fishery income due to reduced chinook fishing opportunities as a result of treaty agreements and reallocation of chinook salmon to the sport fishery.

Given a desire to maintain the current troll fishery, and the uncertainty surrounding hatchery contribution estimates in some areas, option 5 of restricting of hatchery production to levels that would provide fishery enhancement without too greatly jeopardizing the established stocks, appears to be a prudent course, using the Comprehensive Plan maximum hatchery contribution of 25% as a guideline. Enhancement of

fisheries data (option 1), such as increased tagging rates or otolith marking, should also be assessed for potential benefits and costs to existing programs.

Hatchery straying to wild populations should also be assessed. Rates of over 40% straying have been reported on Vancouver Island, Canada (Labelle, 1992). Regular monitoring and reporting of straying should be required for all coho hatchery releases. Tagging rates of hatchery releases should be assessed not only for their precision in estimating contributions to the catch, but also for assessing their presence as strays in escapements to wild systems that may average only a few hundred to a few thousand spawners per system annually (e.g., most Sitka area systems).

Increased hatchery production and overall production goals should be assessed for possible risks to wild stocks and for possible impacts to commercial fishers from potential management actions taken to minimize impacts to wild stocks, particularly in light of the Comprehensive Salmon Plan goal of 2.65 having been achieved. Not only do fishers need to know the potential benefits of increased production to their catch, they also must be informed as to the management implications of significant increases in hatchery production and how such increases could change when and where they fish. This document is intended to serve as an initial assessment of the current status of coho production and the contribution of hatchery and wild indicator stocks to the commercial fisheries, and to provide a framework around which an annual report can be issued to update coho production in Southeast Alaska.

LITERATURE CITED

- ADF&G *in press*. Commercial, subsistence, and personal use salmon fisheries, Southeast Alaska-Yakutat Region 1998. Regional Information Report *in press*, Commercial Fisheries Division, Juneau.
- Clark, J. E. and D. R. Bernard. 1987. A compound multivariate binomial-hypergeometric distribution describing coded microwire tag recovery from commercial salmon catches in Southeastern Alaska. Informational Leaflet No. 261. ADF&G, Juneau.
- Clark, J. E., J. H. Clark, and Leon Shaul. 1994. Escapement goals for coho salmon stocks returning to Berners River, Auke Creek, Ford Arm Lake and Hugh Smith Lake in Southeast Alaska. ADF&G, Regional Information Report No. 1J94-26, Douglas, Alaska.
- Clark, J. H. and J. E. Clark. 1994. Escapement goals for the Yakutat area coho salmon stocks. ADF&G, Regional Information Report No. 1J94-14, Juneau.
- Clark, J. H. 1995. Escapement goals for coho salmon stocks returning to streams located along the Juneau road system of Southeast Alaska. ADF&G, Regional Information Report No. 1J95-02, Juneau.
- Joint Southeast Alaska Regional Planning Teams, 1981. Comprehensive Salmon Plan for Southeast Alaska, Phase I. ADF&G, Juneau.
- Labelle, M. 1992. Straying patterns of coho salmon (*Oncorhynchus kisutch*) stocks from Southeast Vancouver Island, British Columbia. Can. J. Fish. Aquat. Sci., Vol. 49, 1992.
- McGee, Steve, C. Denton, B. Bachen, G. Freitag, M. Stopha, D. Gaudet, and F. Thrower. 1998. 1998 Annex. Chinook Salmon Plan for Southeast Alaska. Regional Information Report No. RIR 1J98-24. ADF&G, Division of Commercial Fisheries, Juneau.
- NSERPT (Northern Southeast Regional Planning Team). 1985. Revised Comprehensive Salmon Plan, Phase II: Northern Southeast Alaska. ADF&G, Juneau.
- Wilbur, R. L. and I. Frohne. 1989. Management implications and planning for effective salmon enhancement in mixed wild and enhanced fisheries. ADF&G RIR No. 5J89-13, Juneau.

Table 1. Annual Southeast Alaska commercial and recreational coho harvests and the Alaska hatchery contribution to the catch, 1960-1998. Sport catch estimates were available beginning in 1977. The 1998 sport catch estimate is preliminary.

Year	Total Harvest						Alaska Hatchery Harvest					Hatchery Contribution
	Troll	Purse Seine	Drift Gillnet	Set Gillnet	Sport	Total	Troll	Purse Seine	Drift Gillnet	Sport	Total Hatchery	
1960	396,211	125,871	37,986	119,149		679,217						
1961	399,932	246,524	52,743	128,670		827,869						
1962	643,740	239,382	98,404	170,776		1,152,302						
1963	693,050	316,491	112,776	141,365		1,263,682						
1964	730,766	506,505	172,411	169,780		1,579,462						
1965	695,887	557,005	166,452	122,207		1,541,551						
1966	528,621	452,057	155,922	66,252		1,202,852						
1967	443,677	188,965	134,029	97,211		863,882						
1968	779,500	463,553	202,965	92,005		1,538,023						
1969	388,443	109,956	65,053	32,555		596,007						
1970	267,647	294,574	163,901	30,279		756,401						
1971	391,279	326,264	159,143	37,734		914,420						
1972	791,941	390,343	275,393	46,289		1,503,966						
1973	540,125	129,593	124,349	41,776		835,843						
1974	845,109	166,687	186,583	77,556		1,275,935						
1975	214,170	70,201	102,321	37,403		424,095						
1976	524,762	87,604	156,469	51,743		820,578						
1977	506,845	160,519	183,702	92,214	36,152	979,432						
1978	1,100,902	245,074	223,321	139,500	48,508	1,757,305						

-continued-

Table 2. (page 2 of 2)

Year	Total Harvest						Alaska Hatchery Harvest					
	Troll	Purse Seine	Drift Gillnet	Set Gillnet	Sport	Total	Troll	Purse Seine	Drift Gillnet	Sport	Total Hatchery	Hatchery Contribution
1979	918,845	176,593	83,050	95,873	23,112	1,297,473						
1980	697,181	185,479	112,081	119,684	32,808	1,147,233	3,025	1,545	100	6	4,676	0%
1981	860,898	238,502	119,595	132,579	28,158	1,379,732	16,400	1,829	1,345	20	19,594	1%
1982	1,316,013	431,804	201,337	148,854	53,436	2,151,444	36,565	10,741	15,411	14	62,731	3%
1983	1,276,363	360,287	218,219	81,541	55,403	1,991,813	54,030	10,683	10,794	299	75,806	4%
1984	1,132,637	361,325	199,211	182,256	59,812	1,935,241	70,285	25,063	22,367	8,588	126,303	7%
1985	1,600,294	421,771	332,313	202,783	59,910	2,617,071	112,736	45,515	26,234	485	184,970	7%
1986	2,128,033	588,718	448,723	92,097	58,322	3,315,893	275,527	60,844	52,310	3,432	392,113	12%
1987	1,041,051	131,178	189,301	124,407	50,284	1,536,221	89,992	6,516	14,601	6,374	117,484	8%
1988	500,227	158,434	170,946	205,926	43,688	1,079,221	27,609	12,093	8,740	1,681	50,124	5%
1989	1,415,517	333,116	255,689	176,773	90,789	2,271,884	120,248	23,302	29,426	5,866	178,841	8%
1990	1,832,583	379,334	377,870	148,821	105,212	2,843,820	284,868	42,917	76,041	13,663	417,490	15%
1991	1,719,082	411,854	601,179	166,731	123,946	3,022,792	372,665	53,853	171,027	15,763	613,308	20%
1992	1,929,126	505,135	699,448	290,095	99,939	3,523,743	408,313	110,699	206,991	13,600	739,603	21%
1993	2,395,518	477,006	445,880	237,387	121,874	3,677,665	386,910	35,288	113,496	20,802	556,495	15%
1994	3,461,665	970,098	744,558	343,843	191,860	5,712,024	511,476	123,644	95,919	32,088	763,126	13%
1995	1,750,219	627,472	456,840	295,029	97,128	3,226,688	332,498	111,761	137,529	13,526	595,313	18%
1996	1,906,682	447,003	404,609	227,752	161,615	3,147,661	442,651	73,449	101,902	33,993	651,995	21%
1997	1,170,349	189,054	156,725	322,776	167,641	2,006,545	242,940	39,609	45,278	30,488	358,314	18%
1998	1,636,479	475,171	441,458	197,629	180,000	2,930,737	328,257	93,597	149,398	26,877	598,128	20%
1960-1969	569,983	320,631	119,874	113,997	NA	1,124,485						
1970-1979	610,163	204,745	165,823	65,037	35,924	1,056,545						
1980-1989	1,196,821	321,061	224,742	146,690	53,261	1,942,575	80,642	19,813	18,133	2,676	121,264	5%
1991-1998	1,996,140	512,849	493,837	260,155	143,000	3,405,982	378,214	80,237	127,693	23,392	609,535	18%
1994-1998	1,985,079	541,760	440,838	277,406	159,649	3,404,731	371,564	88,412	106,005	27,394	593,375	18%

Table 2. (page 2 of 4)

Release Area/ Age		Ancestral Stock	Facility	Release Site	Year of Release																					
					79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98		
Chatham Strait Area (continued)																										
1	Sashin - D		Medvejie Cif	Finger Lk							1															
1	Sashin - D		Medvejie Cif	L Rostislaf Lk										84												
1	Sashin Cr		Medvejie Cif	L Rostislaf Lk						108																
1	Sashin - D		Port Armstrong	Jetty Cr											122											
1	Sashin - D		Port Armstrong	Jetty Cr												207	165	82								
1	Sashin - D		Port Armstrong	Port Armstrong														828	642	1,385	952	124				
Chatham Strait Area Total, Age 1					27	62	13	50	96	0	108	40	35	0	181	184	271	334	486	2,479	2,100	2,939	2,453	1,613		
2	Sashin Cr		Little Port Walter	Toledo Harbor			4																			
Central Inside Area																										
0	Clh Mix		Crystal Lake	Crystal Cr					246	318													110			
0	Clh Mix		Crystal Lake	Irish Cr				1,500	777																	
0	Clh Mix		Crystal Lake	Ohmer Cr					147																	
0	Clh Mix		Crystal Lake	Slippery Cr											46											
0	Clh Mix		Crystal Lake	Summer Cr					250	147																
0	Blind Slough		Crystal Lake	Crystal Cr			57																			
0	Clh Mix X St John Cr		Crystal Lake	St John Cr									77	37												
0	Duncan Salt Chuck		Crystal Lake	Crystal Cr		117	15																			
0	Mitchell Cr		Crystal Lake	Mitchell Cr														4	33	34	26					
0	Slippery Cr		Crystal Lake	Slippery Cr								64														
0	St John Cr		Crystal Lake	St John Cr								15														
0	Reflection Lk - D		Whitman Lake	Neck Lk																	609	1250	1,320			
Central Inside Area Total, Age-0:					117	72	0	0	1,996	1,389	0	0	79	0	77	83	0	0	4	33	34	635	1,250	1,430		
1	Big Cr		Burnett Inlet	Burnett Inlet							13	9	5													
1	Big Cr - D		Burnett Inlet	Burnett Inlet										30	58	57	17									
1	Reflection Lk - D		Burnett Inlet	Burnett Inlet																			164			
1	Clh Mix		Crystal Lake	Crystal Cr					197	251	200			362	90	108	96	79	83	108	72	174	106	91	92	
1	Clh Mix		Crystal Lake	Ohmer Cr					201	251	503															
1	Clh Mix		Crystal Lake	Petersburg Area								121														
1	Clh Mix		Crystal Lake	Slippery Cr												16										
1	Blind Slough		Crystal Lake	Crystal Cr					477	63																
1	Blind Slough		Crystal Lake	Ohmer Cr					70																	
1	Duncan Salt Chuck		Crystal Lake	Crystal Cr					11	22																
1	Indian Cr - D		Whitman Lake	Earl West Cov						95			100	227	174	278	223	214	227	204	190	202	206	230	196	
Central Inside Area Total, Age-1:					0	11	569	63	493	502	703	234	598	269	416	377	366	327	312	262	376	311	321	452		
2	Clh Mix		Crystal Lake	Slippery Cr											0.3	7										
Northern Inside Area																										
0	Auke Cr		Auke Creek	Auke Lk		3																				
0	Portage Cr		Crystal Lake	Portage Cr															65							
0	Montana Cr		Crystal Lake	Dredge+Moose											101											
0	Portage Cr		Gunnuk Creek	Portage Cr																		34	35			
0	Game Cr		Medvejie Cif	Suntaheen Cr													57	72	61							
0	Fish Cr		Sheep Creek	Davidson Cr														49	126							
0	Speel - D		Snettisham	Indian Lk							68		104			202										
0	Speel Lk		Snettisham	First Lk		9																				
0	Speel Lk		Snettisham	Indian Lk				1																		
Northern Inside Area Total, Age-0:					12	0	0	1	0	0	68	0	104	0	101	202	57	72	175	126	34	35	0	0		
1	Auke Cr		Auke Creek	Auke Cr			1	1	5	1	5	9	5													
1	Auke Cr		Auke Creek	Salmon Cr																						
1	Pavlof R		Auke Creek	Sheep Cr																		10				

-continued-

Table 2. (page 3 of 4)

Release Area/ Age		Ancestral Stock	Facility	Release Site	Year of Release																			
					79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98
Northern Inside Area (continued)																								
1		Burro Cr Mix	Burro Creek	Burro Cr													6					13	47	
1		Montana - D	Burro Creek	Burro Cr												11								
1		Montana - D	Gastineau	Gastineau Ch									37	546			393	478	380	422	348	426	824	
1		Montana - D	Gastineau	Sheep Cr										533			583	562		611	511			
1		Steep - D	Gastineau	Gastineau Ch												508								
1		Steep - D	Gastineau	Sheep Cr												505			564				576	
1		Montana Cr	Jerry Myers	Taiya Inlet											12									
1		Pullen Cr	Jerry Myers	Taiya Inlet								9	1		9							5		
1		Sashin Cr	Little Port Walter	Auke Cr			5	2	7															
1		Berners R	Salmon Creek	Salmon Cr				48																
1		Montana Cr	Salmon Creek	Salmon Cr				42	23															
1		Montana Cr	Sheep Creek	Sheep Cr									39											
1		Pavlof R	Sheep Creek	Sheep Cr																		7		
1		Steep Cr	Sheep Creek	Auke Bay										19										
1		Steep Cr	Sheep Creek	Gastineau Ch										50										
1		King Salmon R	Snettisham	Speel Arm									44											
1		Montana Cr	Snettisham	Speel Arm									86											
1		Speel - D	Snettisham	Dredge Lk							20		53	50										
1		Speel - D	Snettisham	Fish Cr									53	50										
1		Speel - D	Snettisham	Indian Lk				290																
1		Speel - D	Snettisham	Salmon Cr								20	101											
1		Speel - D	Snettisham	Sheep Cr																			100	
1		Speel - D	Snettisham	Speel Arm				295	234	214	171	572	99											
1		Speel - D	Snettisham	Sweetheart Lk										23										
1		Speel Lk	Snettisham	Speel Arm																				
1		Taiya R	Taiya R	Burro Cr			156	99	15				5											
Northern Inside Area Total, Age-1:					0	157	100	25	751	269	243	205	949	395	46	1,103	1,019	975	1,040	944	1,044	884	1,048	824
2		Auke Cr	Auke Creek	Auke Cr							1													
2		Sashin Cr	Auke Creek	Auke Cr							1													
2		Burro Cr Mix	Burro Creek	Taiya Inlet																				
2		Pullen + Taiya	Burro Creek	Burro Cr																				
2		Pavlof R	Snettisham	Fish Cr												27								
2		Speel - D	Snettisham	Dredge Lk										37	26									
2		Speel - D	Snettisham	Fish Cr										42	20									
2		Speel - D	Snettisham	Sheep Cr										45										
2		Speel - D	Snettisham	Speel Arm										72	71									
Northern Inside Area Total, Age-2:					0	0	0	0	0	0	2	0	0	72	195	73	0	2	0	8	0	0	0	0
3		Speel - D	Snettisham	Twin Lks										5	3									
Southern Outside																								
0		Cable Cr 103-60	Klawock	Cable Cr									7	20	47	70	40	67						
0		Karta R	Klawock	Klawock R																		10		
0		Klawock R	Klawock	Klawock Lk					766	1,183	926	1,005		1,163	1,242	831	641							
0		Klawock R	Klawock	Klawock R				21																
0		Klawock R	Klawock	Tunga Lk							147	199	222	175										
0		Rio Roberts Cr	Klawock	Tunga Lk										2										
Southern Outside Area Total, Age-0:					0	0	0	0	21	766	1,183	1,073	1,211	242	1,387	1,311	871	708	0	0	10	0	0	0
1		Klawock R	Klawock	Klawock Lk					101	855				1,158										
1		Klawock R	Klawock	Klawock R												70				260	354	1,324	622	
Southern Outside Area Total, Age-1:					0	13	37	66	101	855	0	0	0	0	1,158	0	70	0	0	260	354	1,324	0	622

25

-continued-

Table 2. (page 4 of 4)

Release Area/ Age	Ancestral Stock	Facility	Release Site	Year of Release																				
				79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	
Central Outside Area																								
0	Indian R - D	Medvejie Cif	Wrinkleneck Cr													5	2	2	2	2	2			
0	Sealion Cv S End	Medvejie Cif	Sealion Cv Lk				10																	
Central Outside Area Total, Age-0:				0	0	0	10	0	0	0	0	0	0	0	0	0	5	2	2	2	2	2	0	
1	Indian R	Medvejie	Bear Cove													3								
1	Indian R	Medvejie	Deep Inlet											120	101	136								
1	Indian R	Medvejie	Shamrock Bay															57						
1	Indian R - D	Medvejie	Bear Cove															3	5	5	5	7	7	
1	Indian R - D	Medvejie	Deep Inlet															136	50	42				
1	Indian R - D	Medvejie	Shamrock Bay															223	156	170	231	226	40	
1	Falls Cr	Medvejie Cif	Elfendahl Lk					8																
1	Sealion Cove N	Medvejie Cif	Sealion Cv Lk				12				19													
1	Sealion Cove N	Medvejie Cif	Surprise Lk								23													
1	Indian R	Sheldon Jackson	Crescent Bay																					
1	Indian R	Sheldon Jackson	Indian R	3	12			3																
1	Indian R	Sheldon Jackson	Sitka Sound			3	9				7	86	111	98	81	44	55							
1	Indian R - D	Sheldon Jackson	Crescent Bay															31	96	70	47	70	28	
1	Indian R - D	Sheldon Jackson	Sitka Sound						55							1	71							
1	Sashin Cr	Starrigavan	Starrigavan Bay	15																				
1	Starrigavan Mix	Starrigavan	Starrigavan Bay	63																				
Central Outside Area Total, Age-1:				82	12	3	9	15	63	7	128	111	98	81	164	157	209	450	308	288	282	303	75	
Grand Total, Age-0 Releases:				129	72	56	640	2,098	5,561	2,032	1,073	5,602	3,918	3,157	5,466	4,575	4,824	3,742	3,822	4,687	5,423	6,033	5,623	
Grand Total, Age-1 Releases:				212	832	1,802	1,277	2,647	3,421	6,327	6,802	7,355	10,107	8,451	7,702	9,921	9,149	7,242	9,055	9,474	11,357	10,022	8,101	
Grand Total, Age-2 Releases:				0	0	4	0	0	0	2	0	0	72	195	80	0	2	0	8	0	0	0	0	0
Grand Total, Age-3 Releases:				0	0	0	0	0	0	0	0	0	5	3	0	0	0	0	0	0	0	0	0	0
Grand Total-All Releases				340	904	1,862	1,918	4,745	8,983	8,361	7,875	12,957	14,102	11,806	13,248	14,496	13,974	10,984	12,885	14,161	16,780	16,055	13,723	

* - 'D' after a stock name means this is a broodstock derived from that ancestral stock. A derived stock consists of returns to a release site. Derived stocks are F1 and subsequent generations of stock taken from the wild.

Table 3. Contribution of Southeast Alaska hatcheries, other Alaska hatcheries, and non-Alaska hatcheries to the troll, drift gillnet, and purse seine commercial fisheries, 1994-1998.

Region	Site	YEAR					Total	% of Southeast Alaska hatchery contribution
		1994	1995	1996	1997	1998		
Southeast Alaska Hatcheries								
Central Outside	Bear Cove 113-41	359	220	350	111	706	1,747	
	Crescent Bay 113-41	310	834	672	35	80	1,931	
	Deep Inlet 113-41	14,367	6,899	2,597			23,863	
	Shamrock Bay 113-32	39,351	15,611	8,232	1,823	14,995	80,010	
	Sitka Sound 113-41	16					16	
	Wrinklneck Cr113-41	90	29	22	13	111	265	
Central Outside Total		54,493	23,593	11,872	1,982	15,892	107,832	4%
Southern Outside	Cable Cr 103-60	1,311	8				1,320	
	Klawock Lk 103-60	26,637					26,637	
	Klawock R 103-60		830	11,793	2,812	107	15,543	
Southern Outside Total		27,948	838	11,793	2,812	107	43,499	2%
Southern Inside	Bell Island 101-80	56	150				206	
	Herring Cove 101-45	25,853	9,138	13,065	18,189	20,224	86,468	
	Ketchikan Cr 101-47	2,644	1,258	3,849	2,645	2,787	389,336	
	Marx Cr 101-15	49	17	16			82	
	Nakat Inlet 101-11	7,472	6,918	19,445	10,073	8,706	52,614	
	Neets Bay 101-90	156,706	98,467	154,248	101,710	167,759	678,890	
	Old Franks Lks102-60			1,877	517	2,569	4,963	
	Old Franks+Klawock R				1,290	18	1,308	
	Reflection Lk 101-80	507	11				518	
	Rio Roberts 102-70	878	17				895	
	Tamgas Cr	24,033	124,690	102,605	33,988	50,606	335,921	
	Tent Cr 101-25	31,351	51,704	13,739	4,319	13,795	114,908	
	Ward Lk 101-47	1,988	1,783	5,057	2,407	2,781	14,016	
Southern Inside Total		251,536	294,153	313,902	175,137	269,246	1,303,974	47%
Central Inside	Crystal Cr 106-44	13,426	975	1,884	2,202	1,428	19,916	
	Earl West Cov 107-40	29,460	7,657	9,240	7,204	8,646	62,206	
	Mitchell Cr 106-43		49	55	161	155	420	
	Neck Lk 106-30					51,622	51,622	
Central Inside Total		42,886	8,681	11,179	9,567	61,851	134,164	5%
Chatham Area	Deer Lk 109-10	157,931	86,722	95,694	56,043	60,260	456,651	
	Jetty Cr 109-10	2,484					2,484	
	Kasnyku Bay 112-11	61,954	89,350	116,857	42,170	104,727	415,058	
	Port Armstrong109-10		35,740	22,487	33,396	17,989	109,612	
	Slippery Cr 109-43	25					25	
Chatham Area Total		222,394	211,812	235,037	131,609	182,976	983,829	35%
Northern Inside	Davidson Cr 111-32		295	970	190	61	1,516	
	Gastineau Ch 111-40	46,587	9,609	11,513	2,716	7,796	78,221	
	Indian Lk 111-33	66					66	
	Portage Cr 110-16		113	274	51	480	919	
	Sheep Cr 111-40	64,844	21,266	23,351	5,942	26,661	142,064	
	Suntaheen Cr 114-27	1,673	325	332			2,330	
	Taiya Inlet 115-34		329		97	71	498	
Northern Inside Total		113,171	31,937	36,440	8,997	35,069	225,614	8%
Southeast Alaska Hatchery Total:		712,427	571,014	620,224	330,105	565,142	2,798,912	
Other Alaska Hatcheries								
Cook Inlet	Bird Cr 247-60		9		11		20	
	Campbell Cr 247-60	15		23		4	41	
	Campbell+Ship Cr 247	12			11		11	
	Nancy Lk 247-41	6					12	
	Ship Cr 247-50	33	9				6	
	Cook Inlet Total				23	21	4	90

-continued-

Table 3. (page 2 of 4)

Region	Site	YEAR					Total
		1994	1995	1996	1997	1998	
Other Alaska Hatcheries (Continued)							
Prince William Sound	Lake Bay 223-40				139	59	199
	Whittier+Flemming+Lk		1,243				1,243
Prince William Sound Total			1,243		139	59	1,442
Non-Southeast Alaska Hatchery Total:		33	1,252	23	161	63	1,531
Non-Alaska Hatcheries							
British Columbia	R-Angler Cove Lake	21		78	20	5	124
	R-Ashlu Creek	135	48		9	32	224
	R-Atnarko R Lower	3,658	2,064		52		5,773
	R-Babine R Upper	1,012	373	1,217			2,602
	R-Babine River				224	264	489
	R-Big Qualicum River		78	79		64	221
	R-Braverman Creek	468	95	16			579
	R-Bulkley R Upper		31	146	16	56	248
	R-Capilano River		4			23	27
	R-Cecil Creek	947	658				1,606
	R-Chapman Creek						0
	R-Chase River					93	93
	R-Chaster Creek		9				9
	R-Chehalis River/BC	19	153	172	82	51	476
	R-Chilliwack River	153		280		75	508
	R-Chown Brook			7			7
	R-Coates Creek	254				114	368
	R-Coldwater River	15		4			19
	R-Comox Lake		31			41	72
	R-Conuma River		28				28
	R-Cypre River					9	9
	R-Dry Creek/BC	389	3				392
	R-Eagle River		35				35
	R-Fairy Lake	29					29
	R-Frost Lk			2			2
	R-Fukwa Creek	46					46
	R-Glenlion River					35	35
	R-Goldstream Estuary		29				29
	R-Goldstream R		26	6			32
	R-Goodspeed R	3					3
	R-Hartley Bay Creek	182	87				269
	R-Hopedale Slough	3					3
	R-Inch Creek					14	14
	R-Kanaka Creek			19			19
	R-Kincolith River	73	41	489	18	372	993
	R-Kispiox River			297			297
	R-Kitasoo Creek	195	201	207			603
	R-Kitimat Lower	1,797		3,092	901	3,133	8,923
	R-Kitimat River	2,115	2,100	425	150	1,127	5,917
	R-Lang Creek	15					15
	R-Little Campbell R					3	3
	R-Mamquam R	43	38	39		8	127
	R-Marie Lake	129	6	18	15		168
	R-Mclaughlin Bay	135	487	275	771	483	2,151
	R-Mclaughlin Bay Cr	329	122	58	88		597
	R-Mcqueen Creek	1,644	94				1,738
	R-Mosquito Lake/BC		39	83	43	105	270

-continued-

Table 3. (page 3 of 4)

Region	Site	YEAR					Total
		1994	1995	1996	1997	1998	
Non-Alaska Hatcheries (Continued)							
British Columbia	R-Murder Creek		4				4
	R-Napoleon Creek					243	243
	R-Nicomen Slough					13	13
	R-Nitinat River		61	28			89
	R-Orford River					113	113
	R-Pallant Creek	871					871
	R-Puntledge R Upper		116				116
	R-Puntledge River			354			354
	R-Quatse River	26	30				56
	R-Quinsam River	67		145		214	426
	R-Red Bluff Lake	202	181	119			502
	R-Rice Cr			56			56
	R-Robertson Creek		81	636	189	324	1,230
	R-Salmon R/Thompson		11				11
	R-San Juan River		27			3	30
	R-Second Lake/Ccst		144	380	44	188	757
	R-Sewell Hd Creek	5					5
	R-Sliammon River			10		8	19
	R-Snootli Creek					155	155
	R-Sooke River	13					13
	R-Spius Creek					21	21
	R-Squamish River	77	31	21		23	153
	R-Stave River		5				5
	R-Sylvia Lake	615	255	60			930
	R-Tasu + Flat Cr	493	44		314	50	901
	R-Tasu Creek	10				173	183
	R-Tenderfoot Creek	536			46		582
	R-Tenderfoot Lake					134	134
	R-Thorsen Creek				144	276	419
	R-Toboggan Creek	613	94	222	54	97	1,080
	R-Trout Bay	228	461	1,126			1,815
	R-Tseax River		100	24			124
R-Union Pass Lake	15	50	24			89	
R-Whalen Lake			729	32		761	
R-Zymacord R		142	205			347	
British Columbia Total		17,581	8,719	11,147	3,213	8,140	48,799
Oregon	Klaskanine R, N Fk	183					183
	Nehalem R, N Fk	24					24
	Salmon R/OR - Coast					11	11
	Tanner Cr	38					38
	Trask R					17	17
	Umatilla R					19	19
Oregon Total		245				46	291
Washington	Agate Pass Sea Pens					51	51
	Big Quilcene 17.0012					20	20
	Big Soos Cr 09.0072	12					12
	Bob Smith Cr 03.0015		15				15
	Border Cr 21.0200					17	17
	Camp 7 Beaver Pond			14			14
	Chehalis R 22.0190				35		35
Christmas Cr 21.0065			21			21	

-continued-

Table 3. (page 4 of 4)

Region	Site	YEAR					Total
		1994	1995	1996	1997	1998	
Non-Alaska Hatcheries (Continued)							
Washington	Clark Cr 03.1421	3					3
	Cook Cr 21.0429		28	45			73
	Dungeness R 18.0018		31	181			212
	Educket Cr 20.0010		46	24		21	91
	Elwha R 18.0272		38				38
	Fairhaven Net Pens	39	21	14			74
	Fork Cr 24.0356			16		2	17
	Green R 26.0323					2	2
	Guemes Channel				8		8
	Indian Slough 3.0102			23	5		28
	Kapowsin Lk Net Pens					16	16
	Kendall Cr 01.0406			111			111
	Lewis R 27.0168	163				4	167
	Lower Elwha Hatchery			94		204	298
	Lummi Sea Ponds	262	183	464		618	1,527
	Miller Cr 21.0048		6				6
	Nancy Cr 21.0113		10				10
	Padilla Bay		17				17
	Port Gamble Bay Pens			16	9		25
	Possession Bait Pd				3		3
	Quilcene Bay Seapens			25			25
	Quinault Lake (21)	5					5
	Rich Passage		79		10		90
	Salmon R 21.0139			168		125	293
	Satsop R -Ef 22.0360		23			14	37
	Skookum Cr 01.0273			54		191	245
	Soleduck R 20.0096	23	66	62		44	195
	Sooes R 20.0015	12	231	313	30	44	630
	Stevens Cr 22.0064	147	1,126	344		22	1,639
	Susie Cr 21.0124					15	15
	Wallace R 07.0940	49					49
	Willapa Hbr-Bay Cntr	16					16
	Willapa R 24.0251		25				25
Washington Total		730	1,945	1,988	100	1,408	6,171
Hatchery Totals:	Non-Alaska Hatchery Total:	18,556	10,664	13,134	3,313	9,594	55,262
	Alaska Hatchery Total:	712,460	572,266	620,246	330,266	565,205	2,800,443
	Grand Total-All Hatcheries:	731,016	582,930	633,381	333,579	574,799	2,855,705
Southeast Alaska All-Gear Commercial Catch:		5,520,164	3,129,560	2,986,048	1,838,923	2,750,737	16,225,432
Southeast Alaska All-Gear Wild Commercial Catch:		4,789,148	2,546,630	2,352,667	1,505,344	2,175,938	13,369,727
Hatchery Contribution:	Alaska Hatchery	13%	18%	21%	18%	21%	17%
	Non-Alaska Hatchery:	<1%	<1%	<1%	<1%	<1%	<1%
	All Hatcheries:	13%	19%	21%	18%	21%	18%

Table 4. Southeast Alaskan hatchery contribution, by release site, to Southeast Alaska drift gillnet fisheries, 1994-1998.

Region	Site	YEAR					Total	% of Southeast Alaska hatchery contribution
		1994	1995	1996	1997	1998		
Southern Inside	Bell Island 101-80	35	105				139	
	Herring Cove 101-45	4,454	2,579	2,460	4,613	7,449	21,555	
	Ketchikan Cr 101-47	1,627	848	2,250	1,005	1,263	6,993	
	Marx Cr 101-15	5					5	
	Nakat Inlet 101-11	1,655	3,557	5,534	3,326	3,472	17,543	
	Neets Bay 101-90	29,178	22,628	32,853	17,596	49,164	151,419	
	Old Franks Lks102-60			699	144	749	1,592	
	Old Franks+Klawock R				231	18	249	
	Reflection Lk 101-80	407	3				409	
	Rio Roberts 102-70	146	11				157	
	Tamgas Cr	4,059	56,129	36,827	12,311	22,412	131,738	
	Tent Cr 101-25	6,112	24,242	3,528	1,701	5,811	41,393	
	Ward Lk 101-47	1,399	1,470	3,131	1,066	1,718	8,785	
Southern Inside Total		49,076	111,571	87,283	41,992	92,055	381,977	74%
Central Outside	Bear Cove 113-41		36				36	
	Crescent Bay 113-41	17	21				37	
	Deep Inlet 113-41	208	1,396	52			1,656	
	Shamrock Bay 113-32		59			25	84	
	Wrinkleneck Cr 113-41						0	
Central Outside Total		224	1,511	52		25	1,813	<1%
Central Inside	Crystal Cr 106-44	3,198	218	752	284	452	4,903	
	Earl West Cove 107-40	6,055	2,121	1,957	1,754	3,032	14,919	
	Mitchell Cr 106-43			12	23	39	74	
	Neck Lk 106-30					45,519	45,519	
Central Inside Total		9,253	2,339	2,720	2,061	49,042	65,415	13%
Northern Inside	Davidson Cr 111-32		170	556	14	19	758	
	Gastineau Ch 111-40	10,760	5,039	2,397	98	622	18,916	
	Indian Lk 111-33	66					66	
	Sheep Cr 111-40	18,881	11,841	7,355	411	5,381	43,869	
	Suntaheen Cr 114-27	79	42	35			156	
	Taiya Inlet 115-34		166		42		207	
Northern Inside Total		29,786	17,257	10,342	565	6,022	63,972	12%
Chatham Area	Deer Lk 109-10	285				145	430	
	Jetty Cr 109-10	21					21	
	Kasnyku Bay 112-11	376	131	158	58	1,004	1,728	
	Port Armstrong109-10		6				6	
Chatham Area Total		681	137	158	58	1,149	2,184	<1%
Total		89,021	132,815	100,555	44,676	148,294	515,361	
Drift Gillnet Total Coho Harvest:		744,558	456,840	404,609	156,725	441,458	2,204,190	
Hatchery Contribution to Catch:		12%	29%	25%	29%	34%	23%	

Table 5. Southeast Alaskan hatchery contribution, by release site, to Southeast Alaska purse seine fisheries, 1994-1998.

Region	Site	YEAR					Total	% of Southeast Alaska hatchery contribution
		1994	1995	1996	1997	1998		
Southern Inside	Bell Island 101-80	6	12				17	
	Herring Cove 101-45	3,527	1,642	3,017	905	2,843	11,935	
	Ketchikan Cr 101-47	528	234	965	952	1,189	3,869	
	Marx Cr 101-15	10	10	5			25	
	Nakat Inlet 101-11	1,084	931	3,475	155	383	6,028	
	Neets Bay 101-90	17,683	7,640	7,573	2,905	8,368	44,168	
	Old Franks Lks102-60			533	44	980	1,557	
	Old Franks+Klawock R				178		178	
	Reflection Lk 101-80	19					19	
	Rio Roberts 102-70	102					102	
	Tamgas Cr	4,623	24,902	8,367	1,681	7,742	47,315	
	Tent Cr 101-25	5,680	7,137	953	423	2,557	16,750	
	Ward Lk 101-47	266	97	1,041	653	637	2,694	
Southern Inside Total		33,528	42,606	25,930	7,895	24,699	134,657	31%
Southern Outside	Cable Cr 103-60	427					427	
	Klawock Lk 103-60	3,541					3,541	
	Klawock R 103-60		123	2,083	383		2,590	
Southern Outside Total		3,968	123	2,083	383		6,558	1%
Central Outside	Bear Cove 113-41	5	6	32	31	157	231	
	Crescent Bay 113-41	18	246				264	
	Deep Inlet 113-41	455	2,008	492			2,956	
	Shamrock Bay 113-32	1,133	184	32		718	2,068	
	Wrinkleneck Cr113-41	3					3	
Central Outside Total		1,614	2,444	557	31	876	5,521	1%
Central Inside	Crystal Cr 106-44	2,000	127	126	123	265	2,642	
	Earl West Cov 107-40	874	189	139	122	195	1,519	
	Mitchell Cr 106-43		18	6		9	33	
	Neck Lk 106-30					1,299	1,299	
Central Inside Total		2,874	334	271	245	1,768	5,493	1%
Northern Inside	Davidson Cr 111-32				5		5	
	Gastineau Ch 111-40	5,655	104	282	328	459	6,828	
	Portage Cr 110-16			84		116	200	
	Sheep Cr 111-40	5,233		556	502	1,244	7,535	
	Suntaheen Cr 114-27	297					297	
	Taiya Inlet 115-34		10		6		16	
Northern Inside Total		11,185	115	922	840	1,820	14,882	3%
Chatham Area	Deer Lk 109-10	47,943	38,835	27,830	10,321	23,698	148,627	
	Jetty Cr 109-10	442					442	
	Kasnyku Bay 112-11	20,033	21,805	15,016	15,201	39,159	111,214	
	Port Armstrong109-10		5,058	2,013	3,442	3,045	13,558	
Chatham Area Total		68,418	65,699	44,858	28,964	65,903	273,841	62%
Grand Total		121,587	111,320	74,621	38,358	95,065	440,952	
Purse Seine Total Coho Harvest:		970,098	627,472	447,005	189,054	475,171	2,708,800	
Hatchery Contribution to Catch:		13%	18%	17%	20%	20%	16%	

Table 6. Southeast Alaskan hatchery contribution, by release site, to Southeast Alaska troll fishery, 1994-1998.

Region	Site	YEAR					Total % of Southeast Alaska hatchery contribution	
		1994	1995	1996	1997	1998		
Southern	Bell Island 101-80	16	33				49	
Inside	Herring Cove 101-45	17,872	4,917	7,588	12,671	9,932	52,979	
	Ketchikan Cr 101-47	489	176	634	688	335	2,322	
	Marx Cr 101-15	34	7	11			52	
	Nakat Inlet 101-11	4,733	2,430	10,436	6,592	4,852	29,044	
	Neets Bay 101-90	109,845	68,199	113,822	81,209	110,228	483,303	
	Old Franks Lks102-60			645	329	841	1,814	
	Old Franks+Klawock R				881		881	
	Reflection Lk 101-80	81	8				89	
	Rio Roberts 102-70	630	5				635	
	Tamgas Cr	15,351	43,659	57,410	19,996	20,452	156,868	
	Tent Cr 101-25	19,559	20,325	9,259	2,196	5,427	56,765	
	Ward Lk 101-47	322	216	886	688	426	2,538	
Southern Inside Total		168,932	139,976	200,690	125,251	152,492	787,340	43%
Southern	Cable Cr 103-60	884	8				893	
Outside	Klawock Lk 103-60	23,095					23,095	
	Klawock R 103-60		707	9,710	2,429	107	12,953	
Southern Outside Total		23,980	715	9,710	2,429	107	36,941	2%
Central	Bear Cove 113-41	354	178	318	81	549	1,480	
Outside	Crescent Bay 113-41	276	567	672	35	80	1,630	
	Deep Inlet 113-41	13,704	3,495	2,052			19,252	
	Shamrock Bay 113-32	38,217	15,368	8,199	1,823	14,252	77,858	
	Sitka Sound 113-41	16					16	
	Wrinkleneck Cr113-41	87	29	22	13	111	262	
Central Outside Total		52,655	19,637	11,263	1,951	14,992	100,499	5%
Central	Crystal Cr 106-44	8,228	629	1,007	1,795	712	12,371	
Inside	Earl West Cov 107-40	22,531	5,347	7,144	5,328	5,418	45,768	
	Mitchell Cr 106-43		31	37	138	108	314	
	Neck Lk 106-30					4,803	4,803	
Central Inside Total		30,759	6,008	8,188	7,261	11,040	63,256	3%
Northern	Davidson Cr 111-32		125	415	171	42	753	
Inside	Gastineau Ch 111-40	30,171	4,466	8,835	2,291	6,715	52,477	
	Portage Cr 110-16		113	190	51	364	718	
	Sheep Cr 111-40	40,731	9,425	15,440	5,029	20,035	90,660	
	Suntaheen Cr 114-27	1,297	283	297			1,877	
	Taiya Inlet 115-34		153		50	71	275	
Northern Inside Total		72,199	14,565	25,176	7,592	27,227	146,760	8%
Chatham	Deer Lk 109-10	109,704	47,887	67,864	45,722	36,417	307,594	
Area	Jetty Cr 109-10	2,021					2,021	
	Kasnyku Bay 112-11	41,545	67,413	101,683	26,911	64,564	302,116	
	Port Armstrong109-10		30,676	20,474	29,954	14,944	96,048	
	Slippery Cr 109-43	25					25	
Chatham Area Total		153,295	145,977	190,021	102,587	115,924	707,804	38%
Grand Total		501,819	326,878	445,048	247,071	321,783	1,842,599	
Troll Total Coho Harvest:		3,461,665	1,750,219	1,906,682	1,170,368	1,636,479	9,925,413	
Hatchery Contribution to Catch:		14%	19%	23%	21%	20%	19%	

Table 7. The percentage of the total Southeast Alaskan hatchery harvest of coho salmon troll, drift gillnet, and purse seine commercial fisheries, 1994-1998.

Region	YEAR	GEAR CLASS		
		DRIFT	PURSE	TROLL
Southern Inside	1994	20%	13%	67%
	1995	38%	14%	48%
	1996	28%	8%	64%
	1997	24%	5%	72%
	1998	34%	9%	57%
Southern Inside Total		29%	10%	61%
Southern Outside	1994	0%	14%	86%
	1995	0%	15%	85%
	1996	0%	18%	82%
	1997	0%	14%	86%
	1998	0%	0%	100%
Southern Outside Total		0%	12%	88%
Central Outside	1994	0%	3%	97%
	1995	6%	10%	83%
	1996	0%	5%	95%
	1997	0%	2%	98%
	1998	0%	6%	94%
Central Outside Total		1%	5%	94%
Central Inside	1994	22%	7%	72%
	1995	27%	4%	69%
	1996	24%	2%	73%
	1997	22%	3%	76%
	1998	79%	3%	18%
Central Inside Total		35%	4%	62%
Northern Inside	1994	26%	10%	64%
	1995	54%	0%	46%
	1996	28%	3%	69%
	1997	6%	9%	84%
	1998	17%	5%	78%
Northern Inside Total		26%	5%	68%
Chatham Area	1994	0%	31%	69%
	1995	0%	31%	69%
	1996	0%	19%	81%
	1997	0%	22%	78%
	1998	1%	36%	63%
Chatham Area Total		0%	28%	72%
1994-1998 Weighted Average:		18%	16%	66%

Table 8. Escapement estimates of coho salmon to escapement indicator streams in Southeast Alaska and Yakutat rivers, 1980-1998.

Year	Auke Creek	Berners River	Ford Arm Lake	Hugh Smith Lake	Jordan Creek	Montana Creek	Petersen Creek	Steep Creek	Switzer Creek	Akwe River	East/Doame River	Italio River	Kaliakh River	Lost River ^a	Situk River	Tsiu/Tsivat River
1980	698	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5,000	2,000	3,000	3,000	4,400	8,100	18,000
1981	647	N/A	N/A	N/A	N/A	N/A	N/A	515	N/A	5,000	7,200	5,500	5,000	9,120	8,430	20,000
1982	447	7,505	2,662	2,144	N/A	545	320	232	80	3,000	3,200	5,000	8,000	7,100	9,180	40,000
1983	694	9,840	1,944	1,490	184	636	219	171	80	6,000	3,000	2,000	6,000	6,380	5,300	16,500
1984	651	N/A	N/A	1,408	250	581	189	168	123	2,800	8,000	3,600	4,000	6,500	14,000	30,000
1985	942	6,169	2,324	903	72	810	276	186	122	2,400	13,000	5,300	53,500	1,500	6,490	52,000
1986	453	1,752	1,546	1,783	163	60	363	250	54	5,900	2,200	2,700	5,200	3,300	3,162	14,100
1987	668	3,260	1,694	1,118	251	314	204	128	48	N/A	1,300	3,500	N/A	5,000	2,000	8,500
1988	756	2,724	3,028	513	215	164	542	155	51	N/A	5,500	3,500	2,500	1,600	11,000	16,000
1989	502	7,509	2,177	433	133	566	242	222	78	N/A	2,000	4,200	1,000	2,190	5,000	38,000
1990	697	11,050	2,190	870	216	1,711	324	185	82	N/A	2,800	5,700	3,450	9,460	1,630	16,800
1991	804	11,530	2,761	1,826	322	1,415	410	267	227	N/A	1,900	5,000	600	1,175	N/A	16,600
1992	1,020	15,300	3,847	1,426	785	2,512	403	612	93	N/A	3,700	5,550	4,900	4,235	13,820	26,300
1993	859	15,670	4,202	830	322	1,352	112	471	94	N/A	9,500	8,050	N/A	5,436	10,700	17,500
1994	1,253	15,920	3,151	1,679	371	1,829	318	200	198	3,300	9,200	3,700	5,800	6,000	21,960	51,000
1995	460	4,945	2,417	1,781	77	600	280	409	42	900	5,400	9,400	7,325	3,576	18,000	30,000
1996	515	6,050	2,500	950	54	798	263	134	42	N/A	12,000	2,700	220	4,030	6,252	22,000
1997	607	10,050	4,965	732	21	1,018	186	172	67	900	1,500	6,450	N/A	3,904	9,780	22,000
1998	862	6,802	4,965	732	63	1,160	102	149	42	N/A	N/A	500	N/A	1,534	1,840	12,000
Averages:																
1980-1989	646	5,537	2,196	1,224	181	460	294	225	80	4,300	4,740	3,830	9,800	4,709	7,266	25,310
1990-1998	786	10,813	3,444	1,203	248	1,377	266	289	99	1,700	5,750	5,228	3,716	4,372	10,498	23,800
1980-1997	712	8,505	2,898	1,213	219	945	280	257	90	3,520	5,189	4,492	7,366	4,549	8,702	24,595
Escapement Goal Ranges:	200-500	4,000-9,200	1,300 - 2,900	500 - 1,100	100-350	75-200	200-500	100-300	25-75	1,800-5,000	2,500-8,500	1,400-6,500	4,000-14,000	2,200-6,500	3,300-9,800	10,000-29,000

^a Combination of peak counts from Coast Guard L., Lost R., Ophir Creek, and Tawah Creek.

Table 9. Overall coho salmon harvest rates by indicator stock for the Alaska troll fishery and all fisheries combined, 1982-1998.

Year	Auke Lake	Berners River	Ford Arm Lake	Hugh Smith Lake	Weighted Average	Hatchery %
Alaska Troll Fishery:						
1982	20	42	41	46	37	3
1983	31	50	54	35	43	4
1984	34			31	39	7
1985	35	45	51	36	42	7
1986	43	55	61	35	49	12
1987	37	53	45	28	41	8
1988	26	40	48	27	35	5
1989	48	53	62	50	53	8
1990	43	44	57	39	46	15
1991	17	18	53	37	31	20
1992	32	34	56	38	40	21
1993	39	39	62	53	48	15
1994	35	37	60	46	45	13
1995	32	31	48	30	35	18
1996	39	44	53	40	44	21
1997	12	16	48	49	31	18
1998	31	44	49	41	41	20
1982-1997						
Average	33	40	53	39	41	
All Fisheries:						
1982	40	76	44	65	56	3%
1983	44	71	69	62	61	4%
1984	41			65	58	7%
1985	44	75	51	63	58	7%
1986	53	93	62	60	67	12%
1987	44	77	48	52	55	8%
1988	37	82	49	67	59	5%
1989	55	62	65	82	66	8%
1990	53	67	59	81	65	15%
1991	32	67	54	68	55	20%
1992	46	67	59	71	60	21%
1993	46	68	67	81	65	15%
1994	53	78	72	81	71	13%
1995	44	83	67	74	67	18%
1996	55	75	58	76	66	21%
1997	20	35	51	72	45	18%
1998	39	71	56	77	61	20%
1982-1997						
Average	44	72	58	70	61	

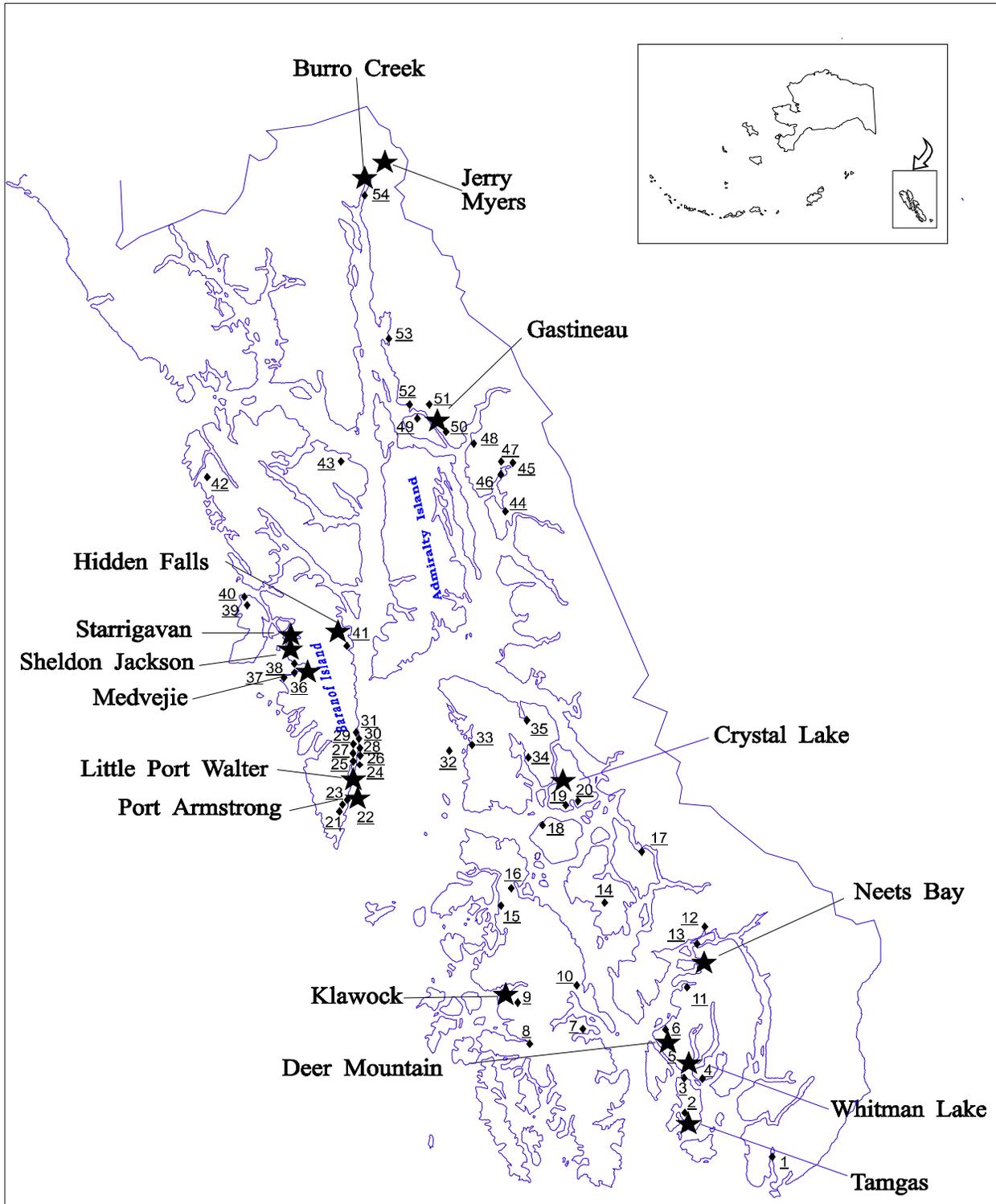


Figure 1. Location of hatcheries producing coho salmon (stars), and release sites of hatchery coho salmon (numbers) in Southeast Alaska. See release site key on following page.

Map #	Release Site
1	Nakat Inlet
2	Tent Lake
3	Annette Bay Creek
4	Bold Island Lake
5	Ward Lake
6	Ketchikan Creek
7	Old Franks Lake
8	Cable Creek
9	Klawock River and Creek
10	Rio Roberts Creek
11	Margaret Lake
12	Reflection Lake
13	Bell Island
14	Burnett Inlet
15	Tunga Lake
16	Neck Lake
17	Earl West Cove
18	St. John Creek
19	Sumner Creek
20	Ohmer Creek
21	Jetty Lake (Port Armstrong)
22	Toledo Harbor
23	Ludvik Lake
24	Osprey Lake
25	L Rostislaf Lake
26	Deer Lake
27	Cliff Lake
28	Banner Lake
29	Fiddle Lake
30	Finger Lake
31	Blanchard Lake
32	Slippery Creek
33	Irish Creek
34	Mitchell Creek
35	Portage Creek
36	Deep Inlet
37	Bear Cove
38	Shamrock Bay
39	Sea Lion Cove Lake
40	Surprise Lake
41	Kasnyku Bay
42	Deer Lake
43	Elfendahl Lake
44	Suntaheen Creek
45	Sweetheart Lake
46	Speel Arm
47	First & Indian Lake
48	Davidson Creek
49	Fish Creek
50	Sheep Creek
51	Dredge & Salmon Creek, Mendenhall River
52	Fritz Cove & Auke Creek
53	Berner's River (wild)
54	Taiya Inlet

Key for release sites shown in Figure 1.

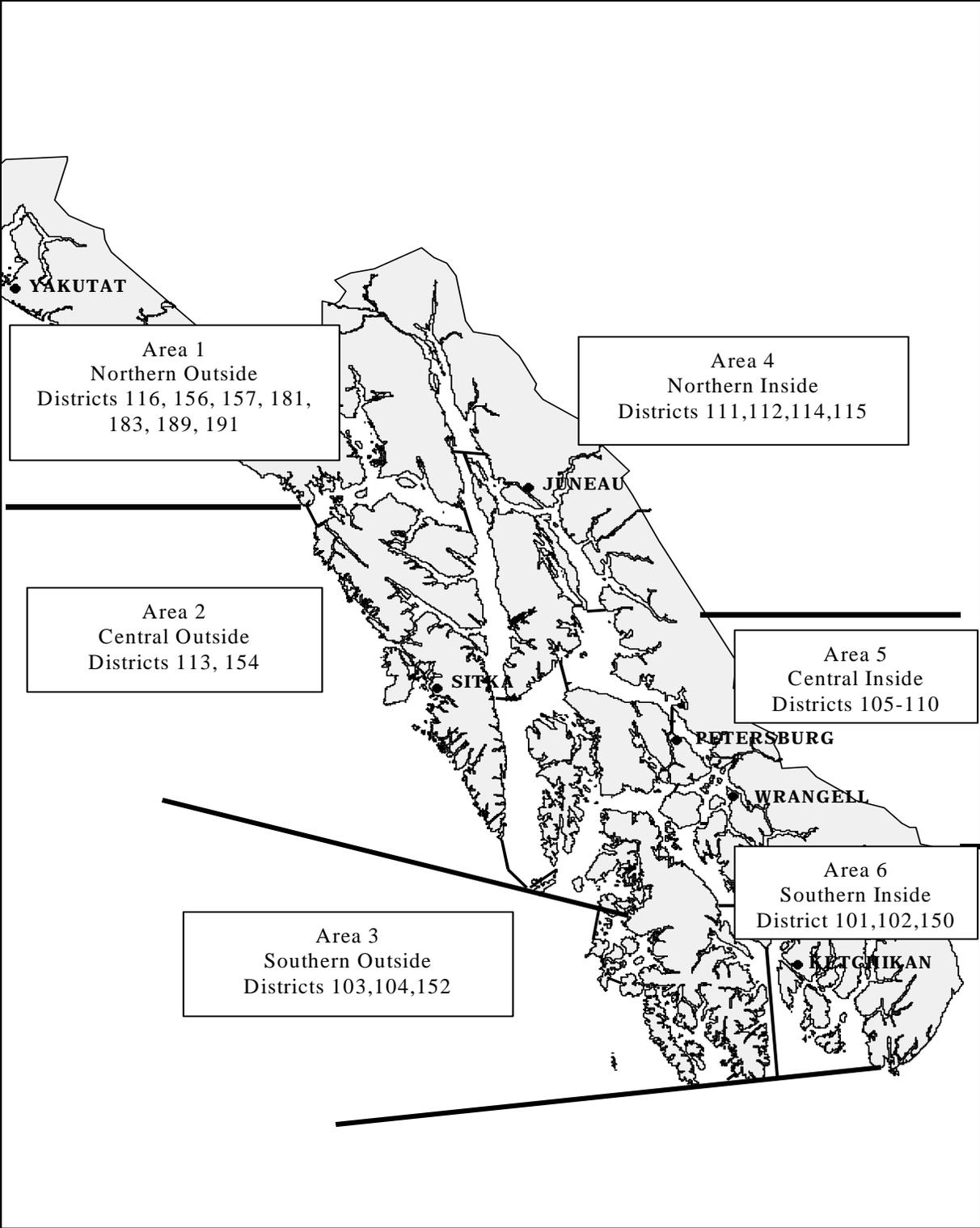


Figure 2. Southeast Alaska troll management areas.

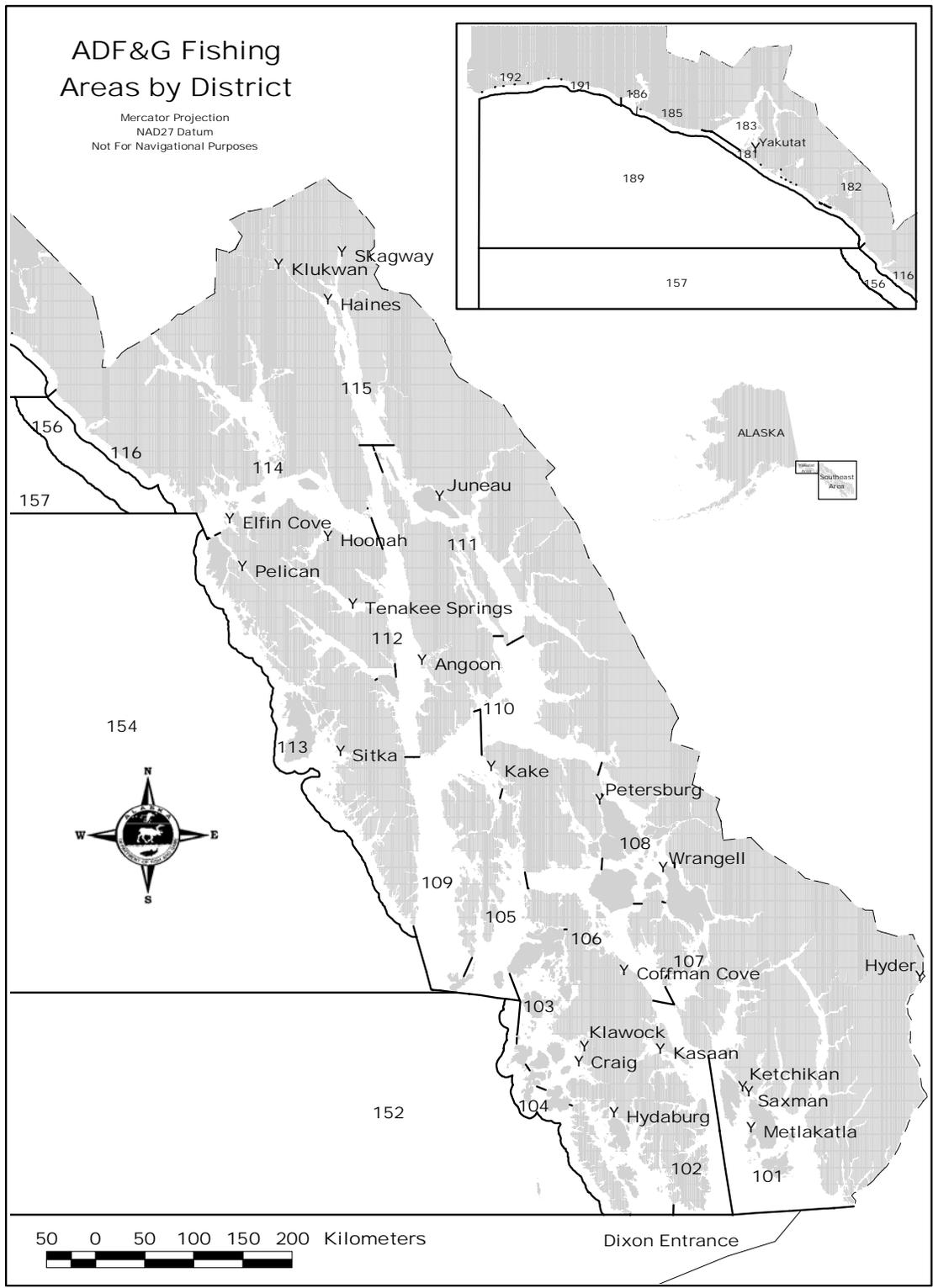


Figure 3. Commercial fishing districts in Southeast Alaska.

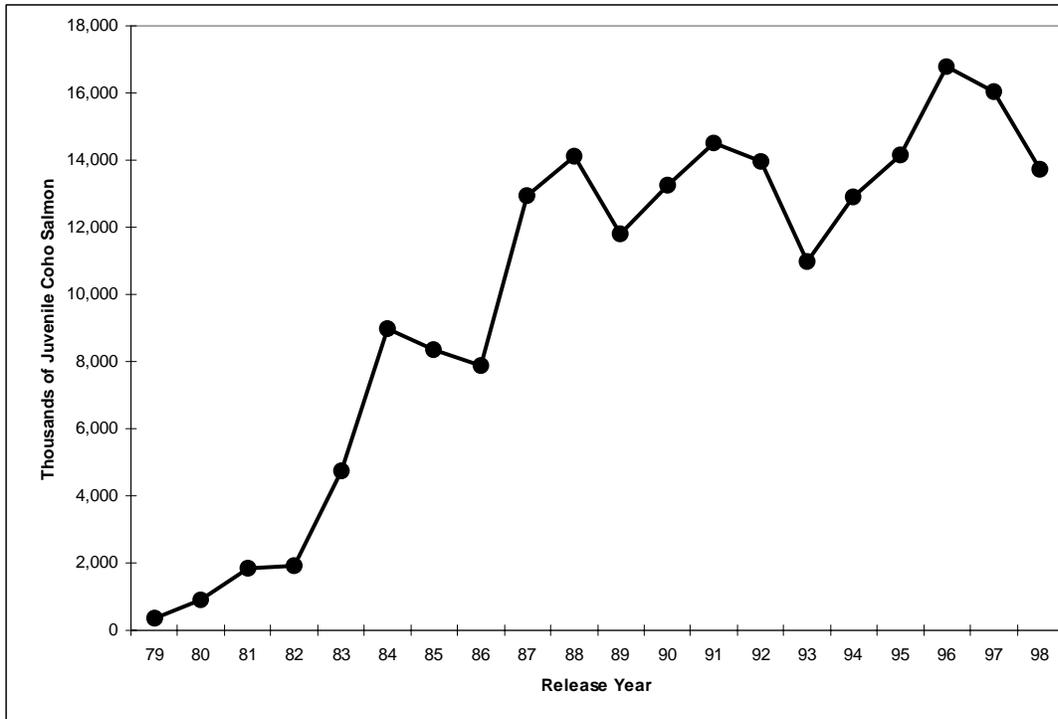


Figure 4. Number of juvenile coho salmon released from Southeast Alaska hatcheries, 1979-1998.

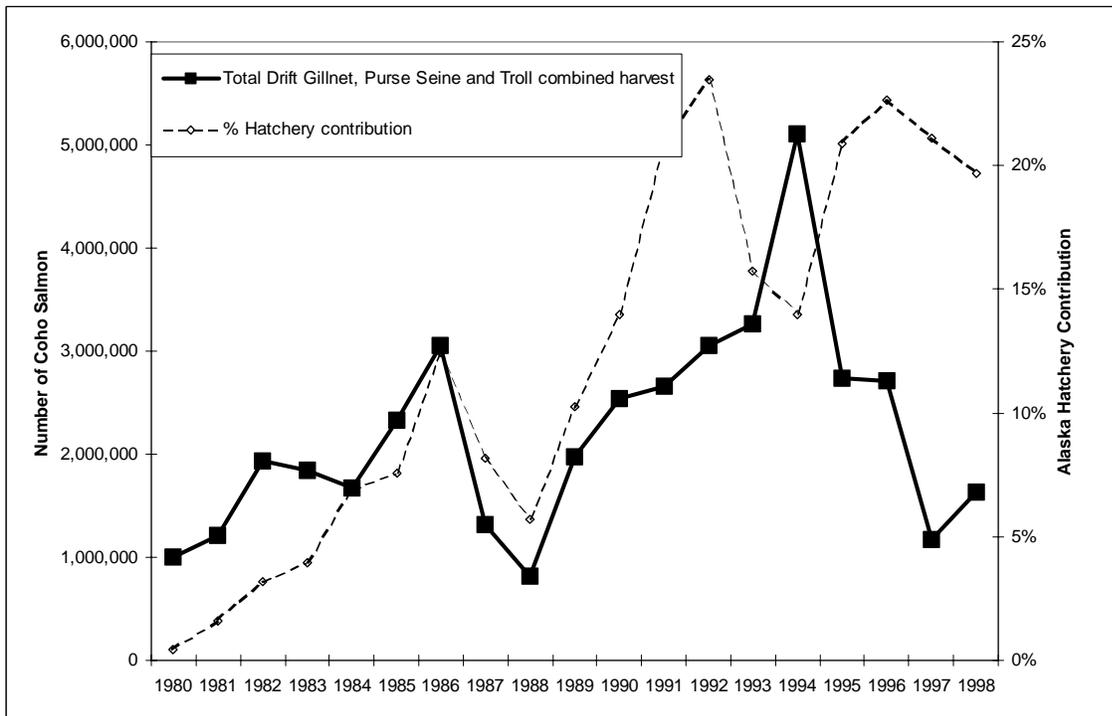


Figure 5. Coho catch of the drift gillnet, purse seine, and troll fisheries combined, and the Alaska hatchery percentage of the catch, 1980-1998.

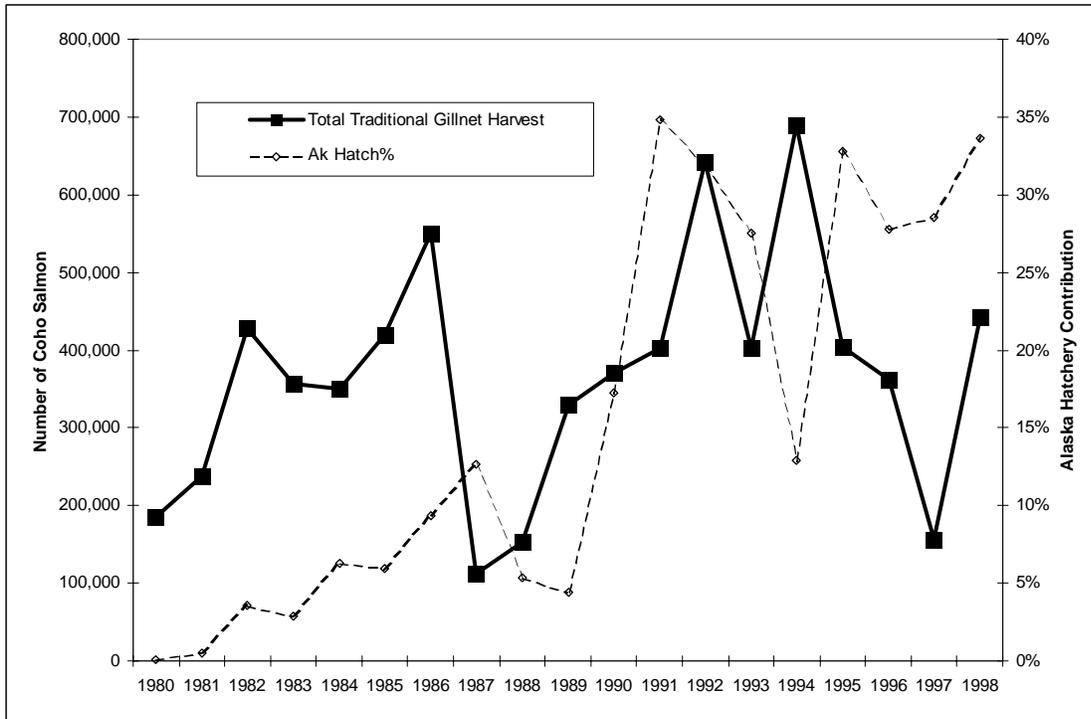


Figure 6. Coho catch of the drift gillnet fishery and the Alaska hatchery percentage of the catch, 1980-1998.

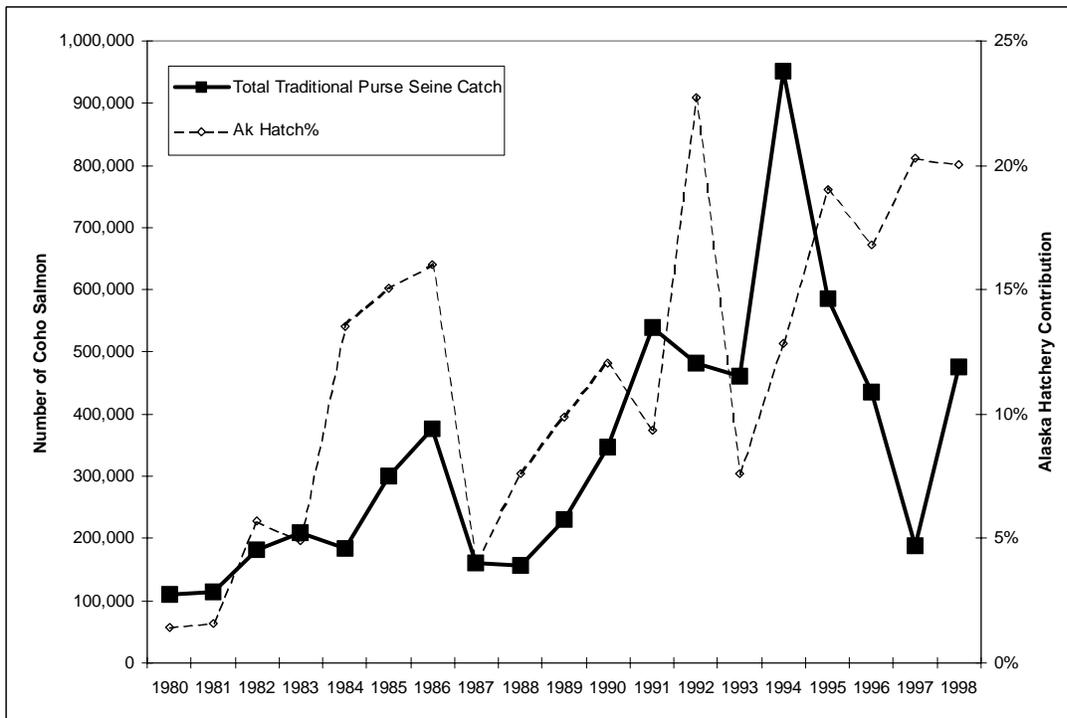


Figure 7. Coho catch of the purse seine fishery and the Alaska hatchery percentage of the catch, 1980-1998.

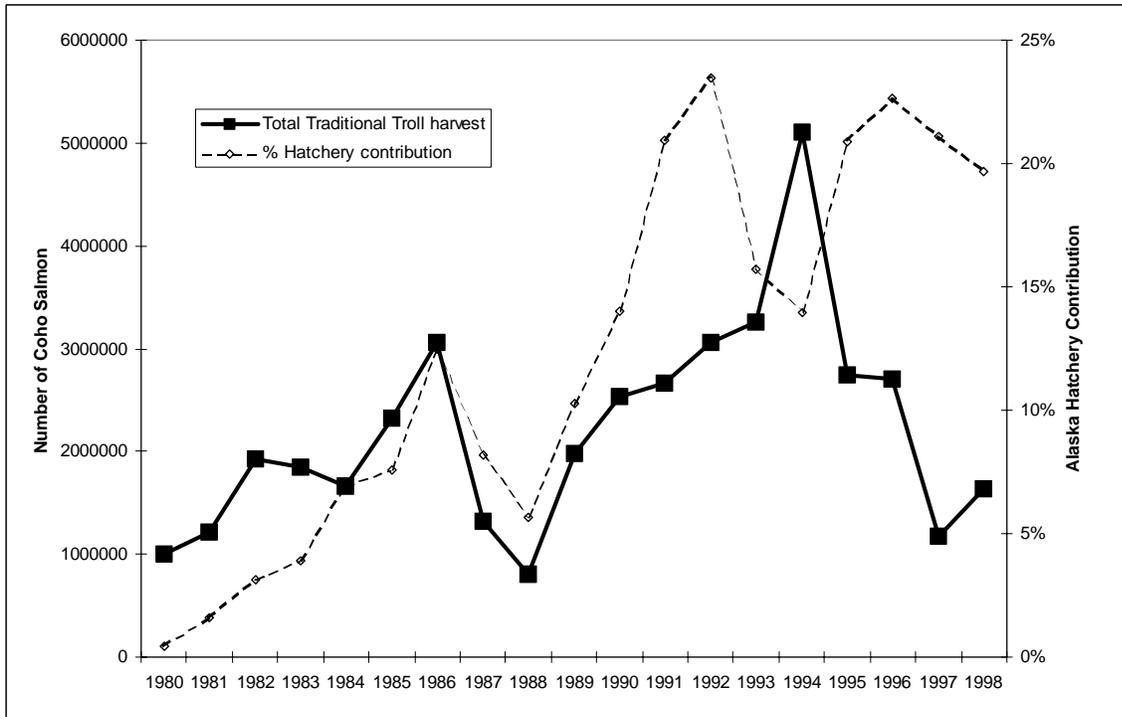


Figure 8. Coho catch of the troll fishery and the Alaska hatchery percentage of the catch, 1980-1998.

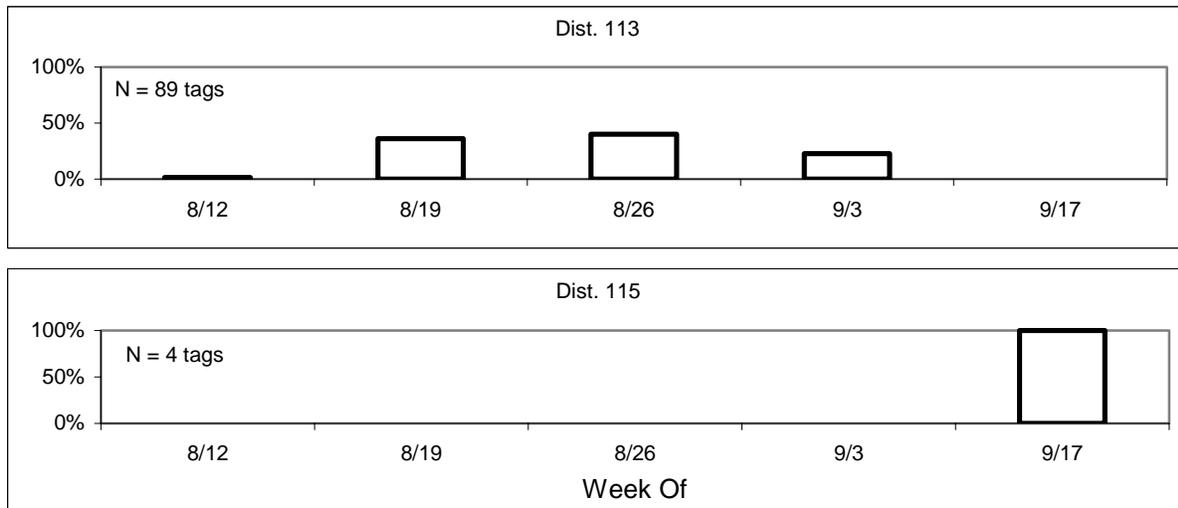


Figure 9. Catch timing of Central Outside hatcheries in the drift gillnet fisheries, 1994-1998.

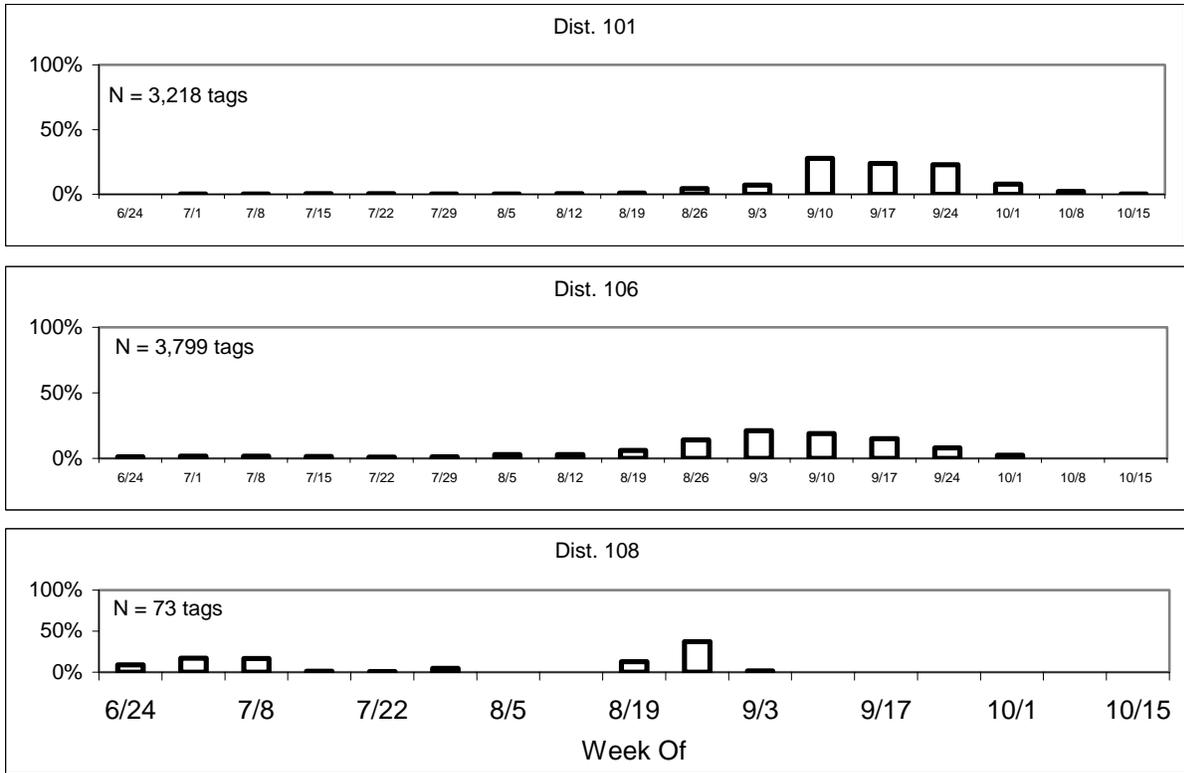


Figure 10. Catch timing of Southern Inside hatcheries in the drift gillnet fisheries, 1994-1998.

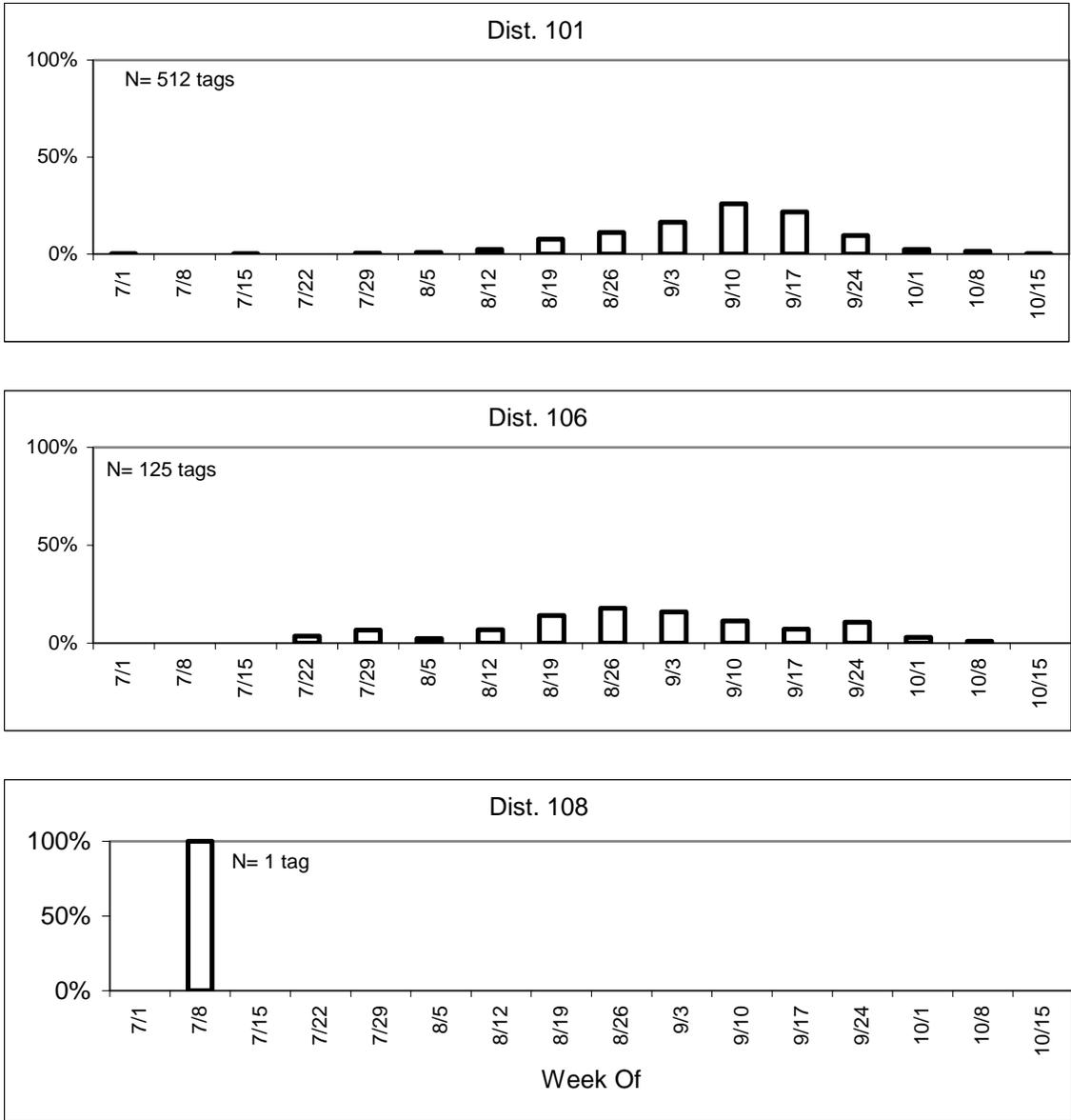


Figure 11. Catch timing of Hugh Smith wild stock in drift gillnet fisheries, 1994-1998.

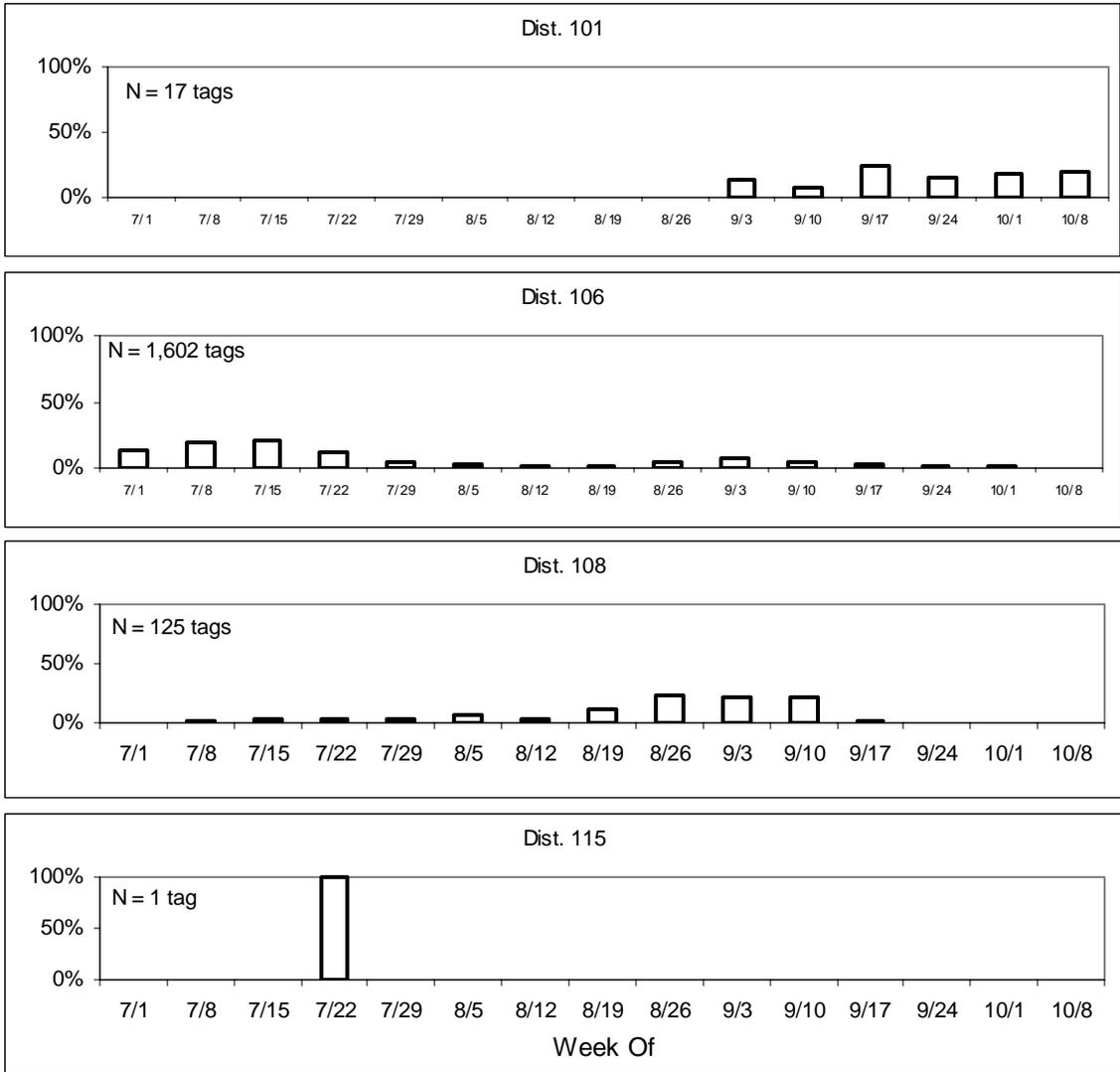


Figure 12. Catch timing of Central Inside hatcheries in the drift gillnet fisheries, 1994-1998.

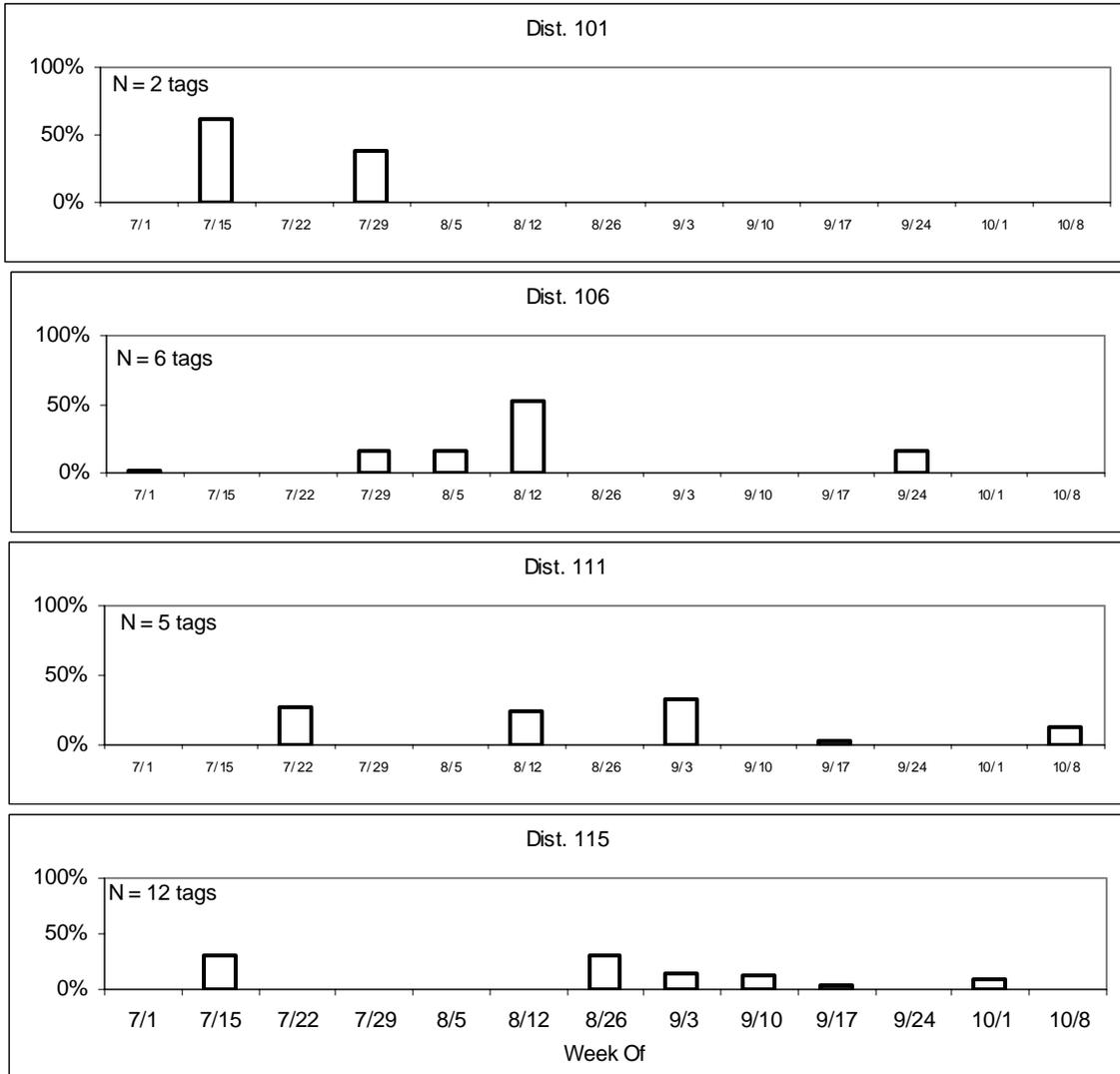


Figure 13. Catch timing of Chatham Strait Area hatcheries in the drift gillnet fisheries, 1992-1996.

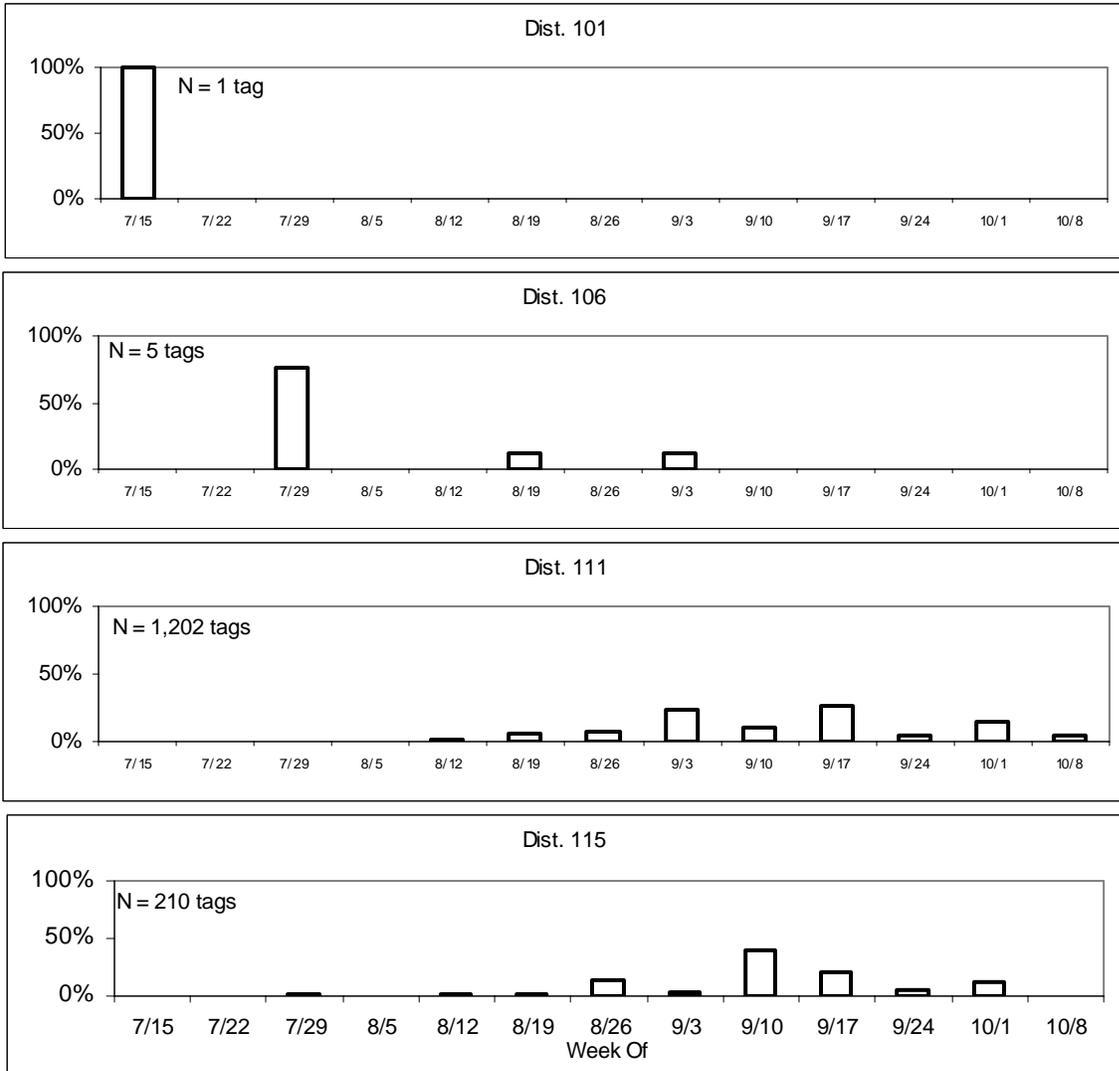


Figure 14. Catch timing of Northern Inside hatcheries in the drift gillnet fisheries, 1994-1998.

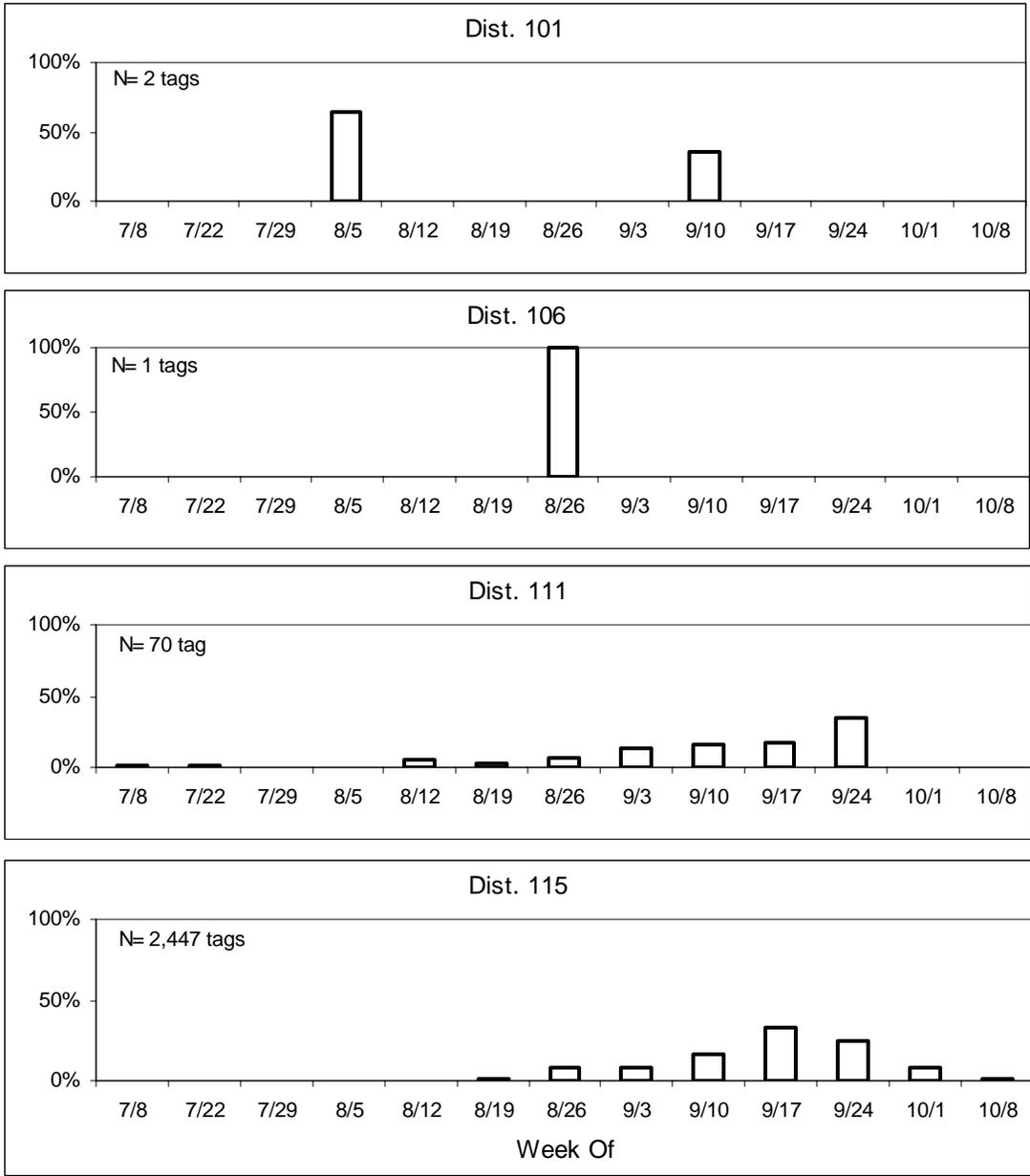


Figure 15. Catch timing of Berners River wild stock in drift gillnet fisheries, 1994-1998.

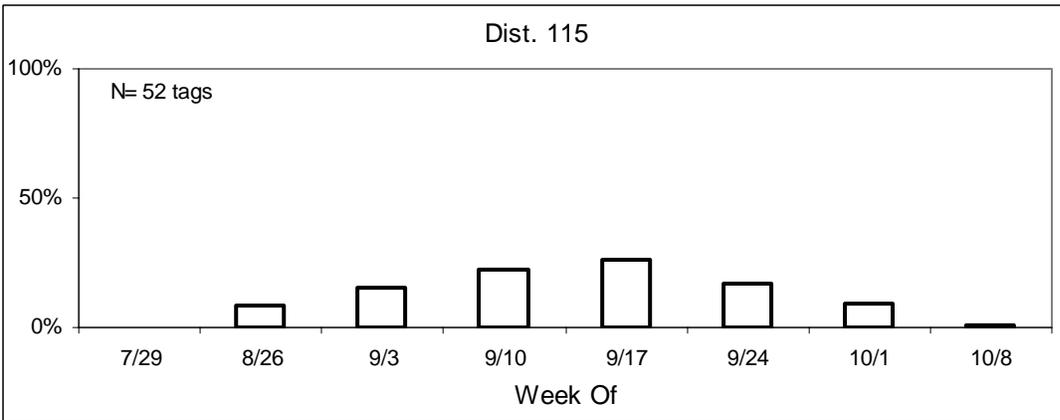
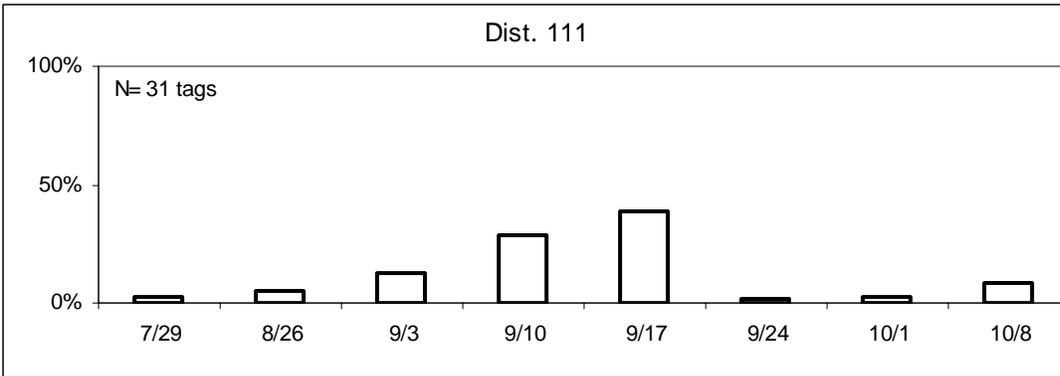
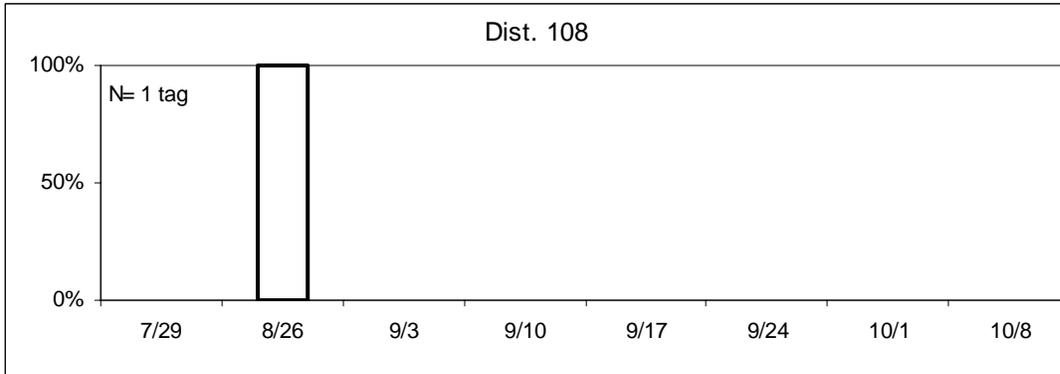


Figure 16. Catch timing of Auke Creek wild stock in drift gillnet fisheries, 1994-1998.

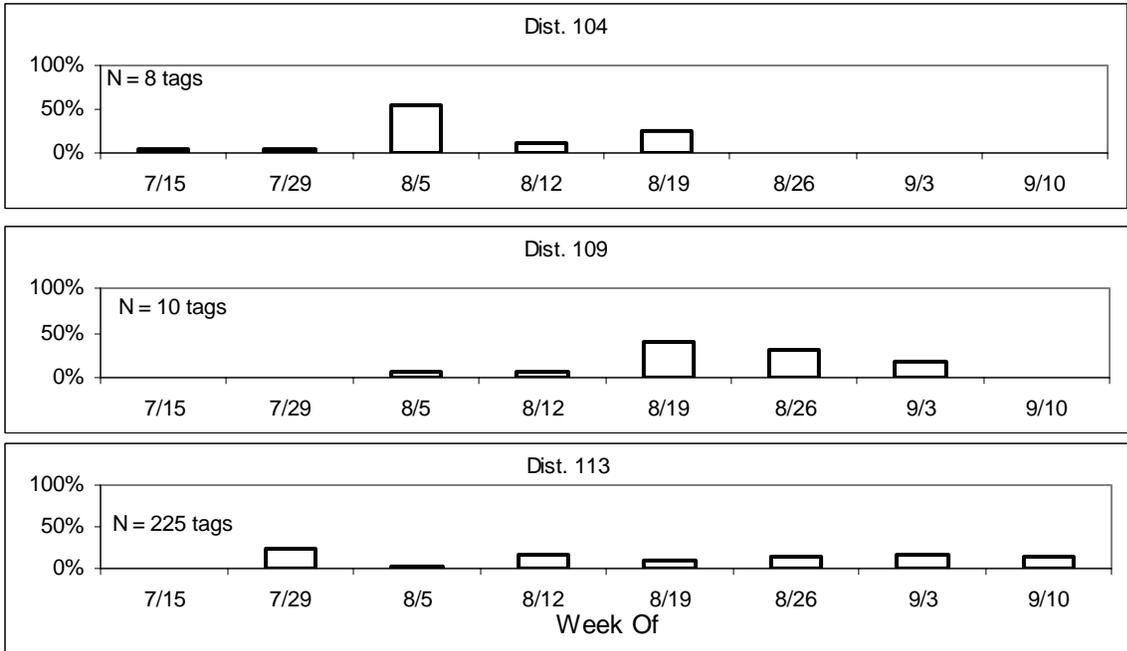


Figure 17. Catch timing of Central Outside hatcheries in the purse seine fisheries, 1994-1998.

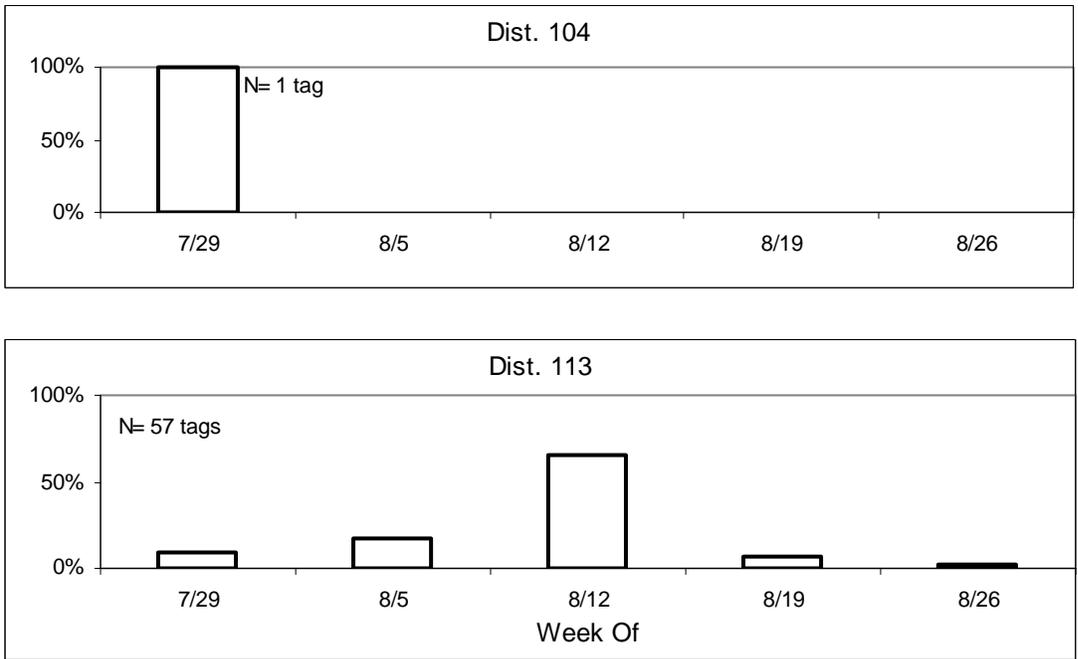


Figure 18. Catch timing of Ford Arm Lake wild stock in purse seine fisheries, 1994-1998.

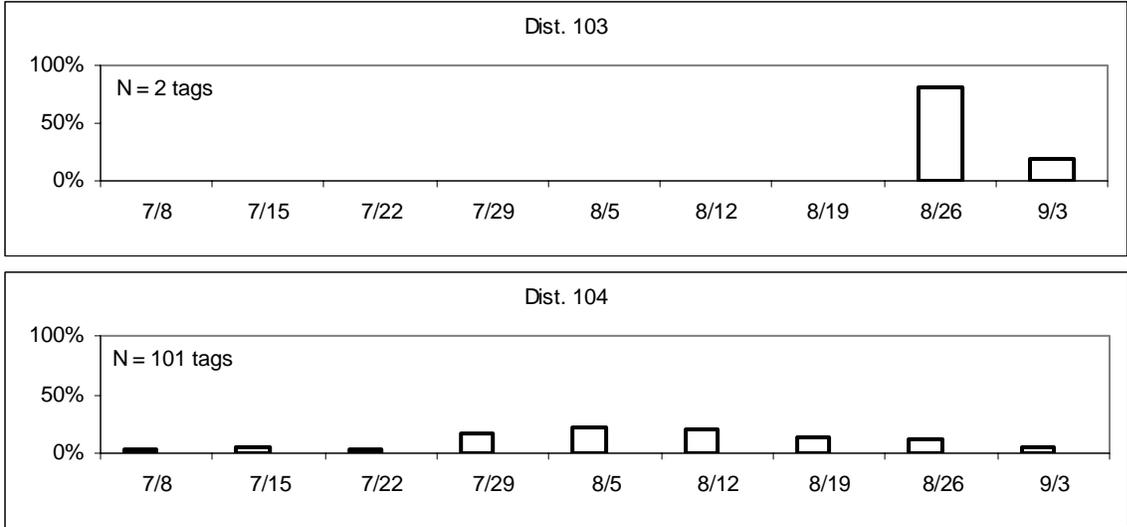
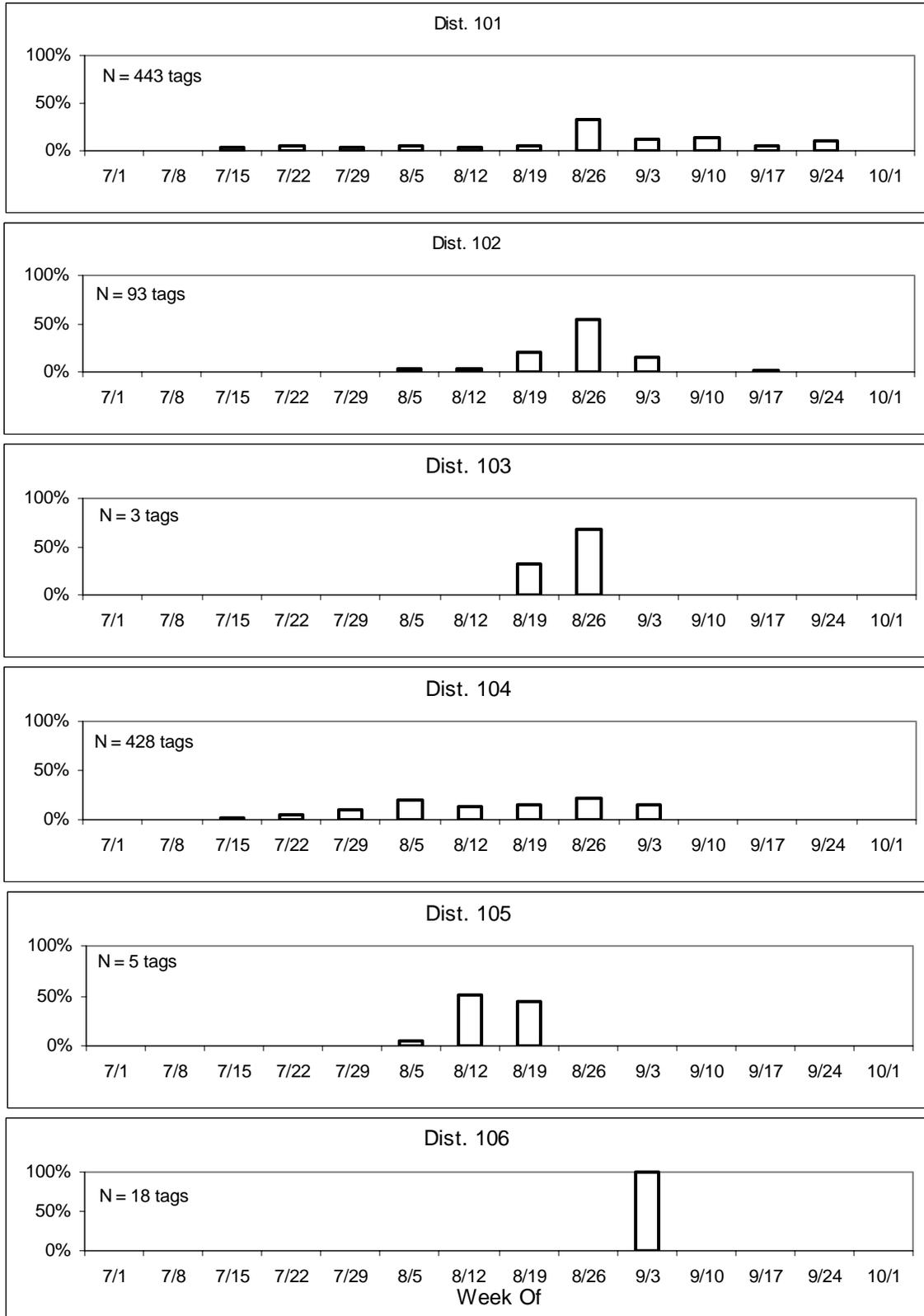


Figure 19. Catch timing of Southern Outside hatcheries in the purse seine fisheries, 1994-1998.



-continued-

Figure 20. Catch timing of Southern Inside hatcheries in the purse seine fisheries, 1994-1998.

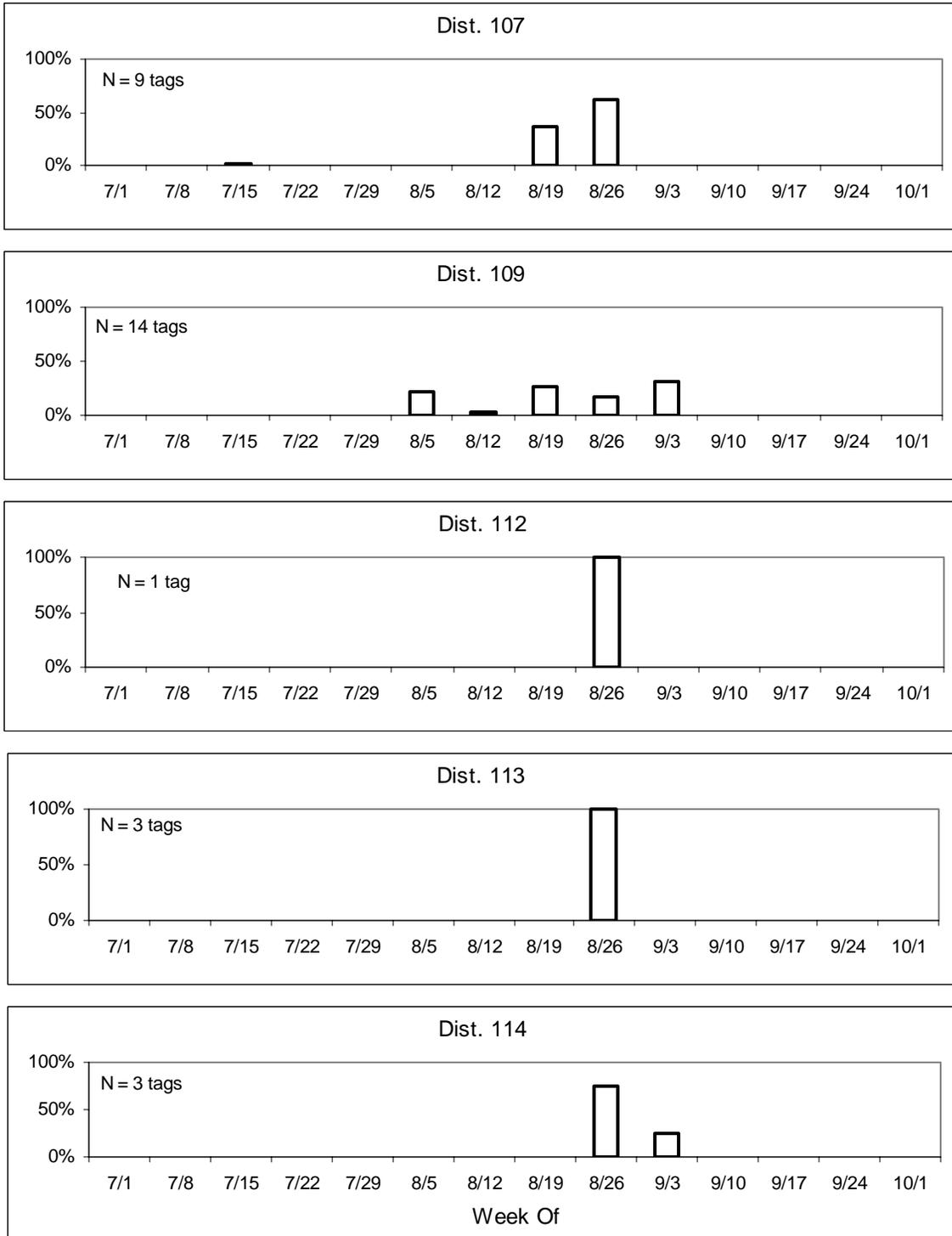


Figure 20. (page 2 of 2)

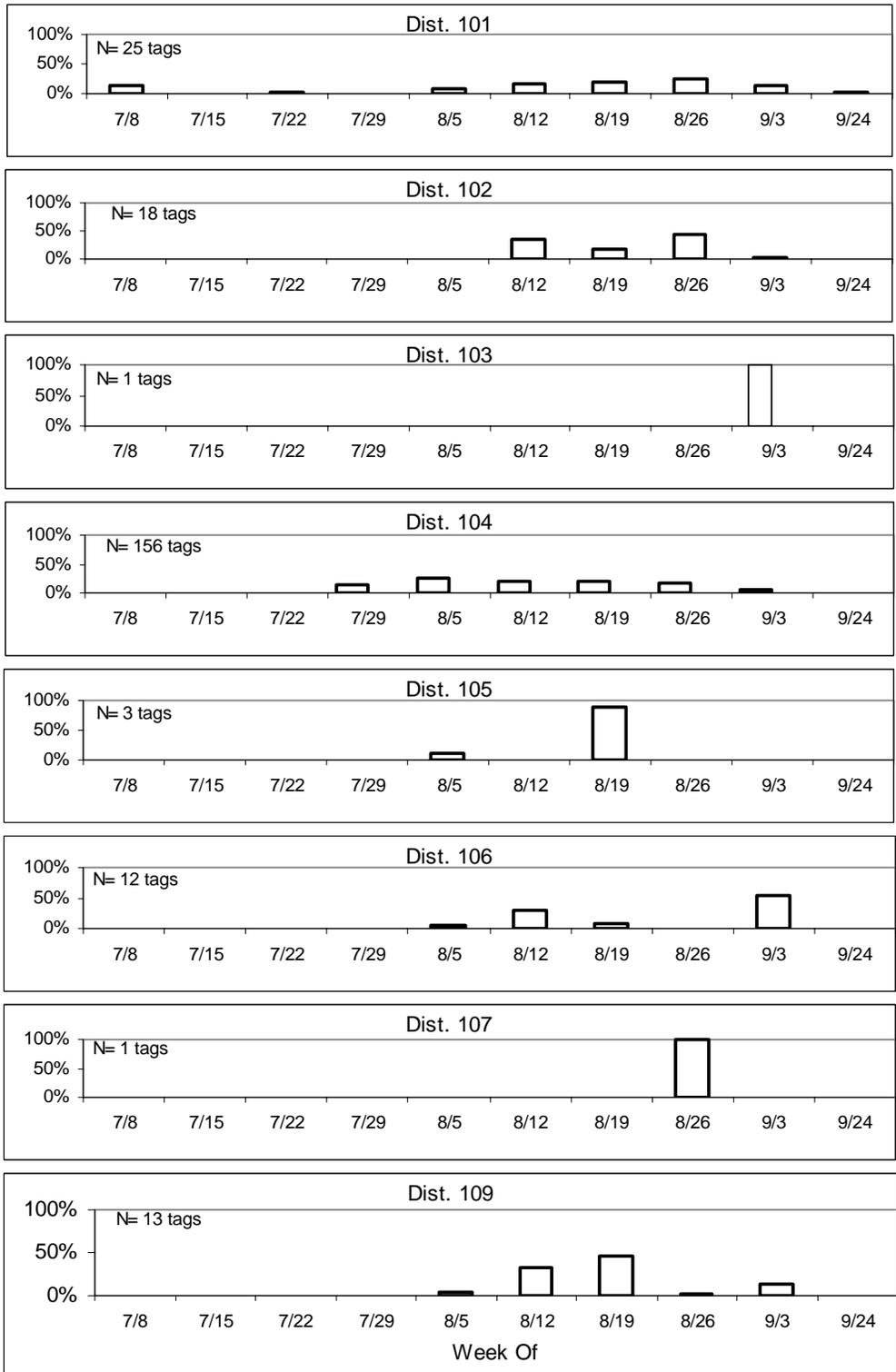
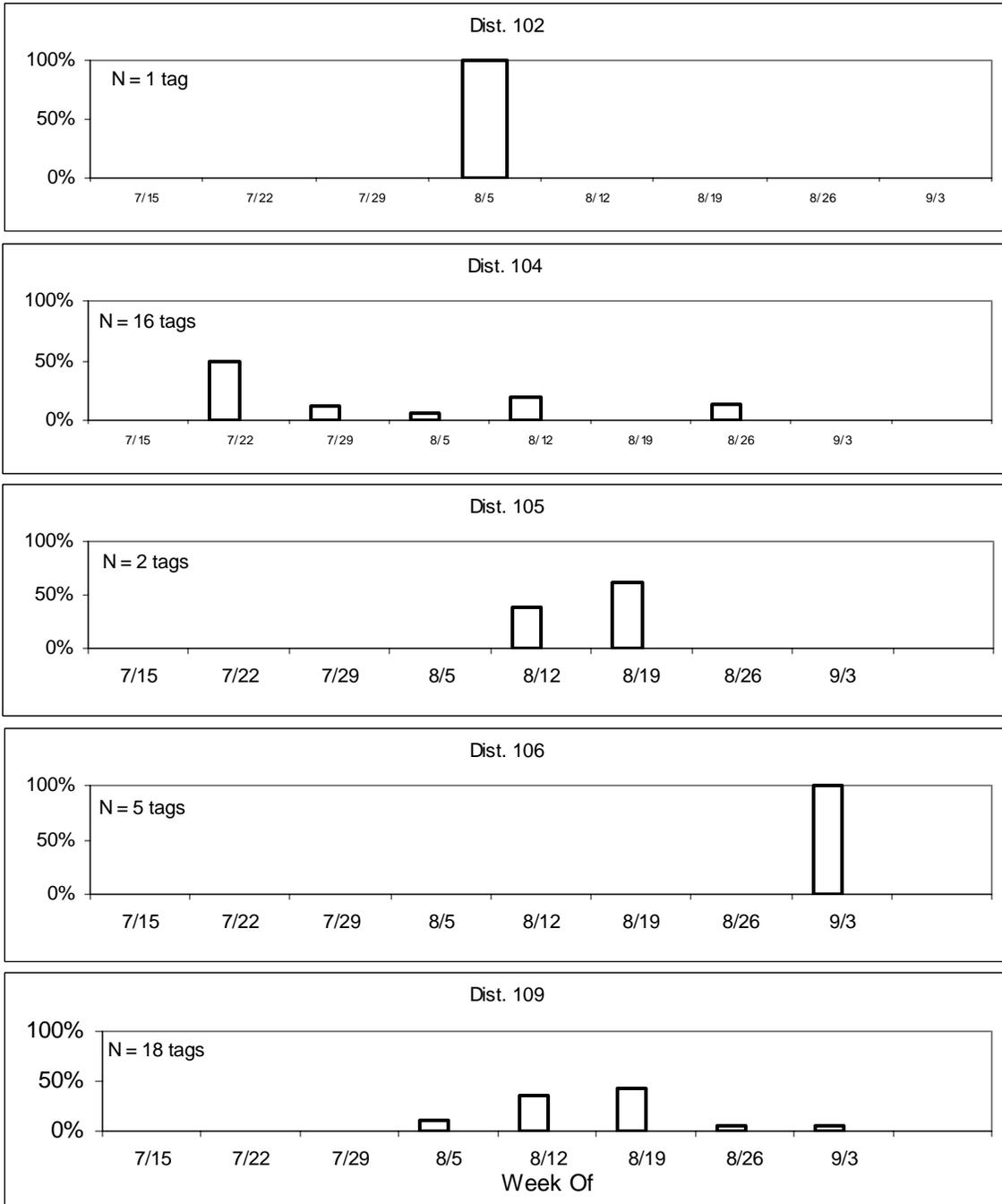


Figure 21. Catch timing of Hugh Smith Lake wild stock in purse seine fisheries, 1994-1998.



-continued-

Figure 22. Catch timing of Central Inside hatcheries in the purse seine fisheries, 1994-1998.

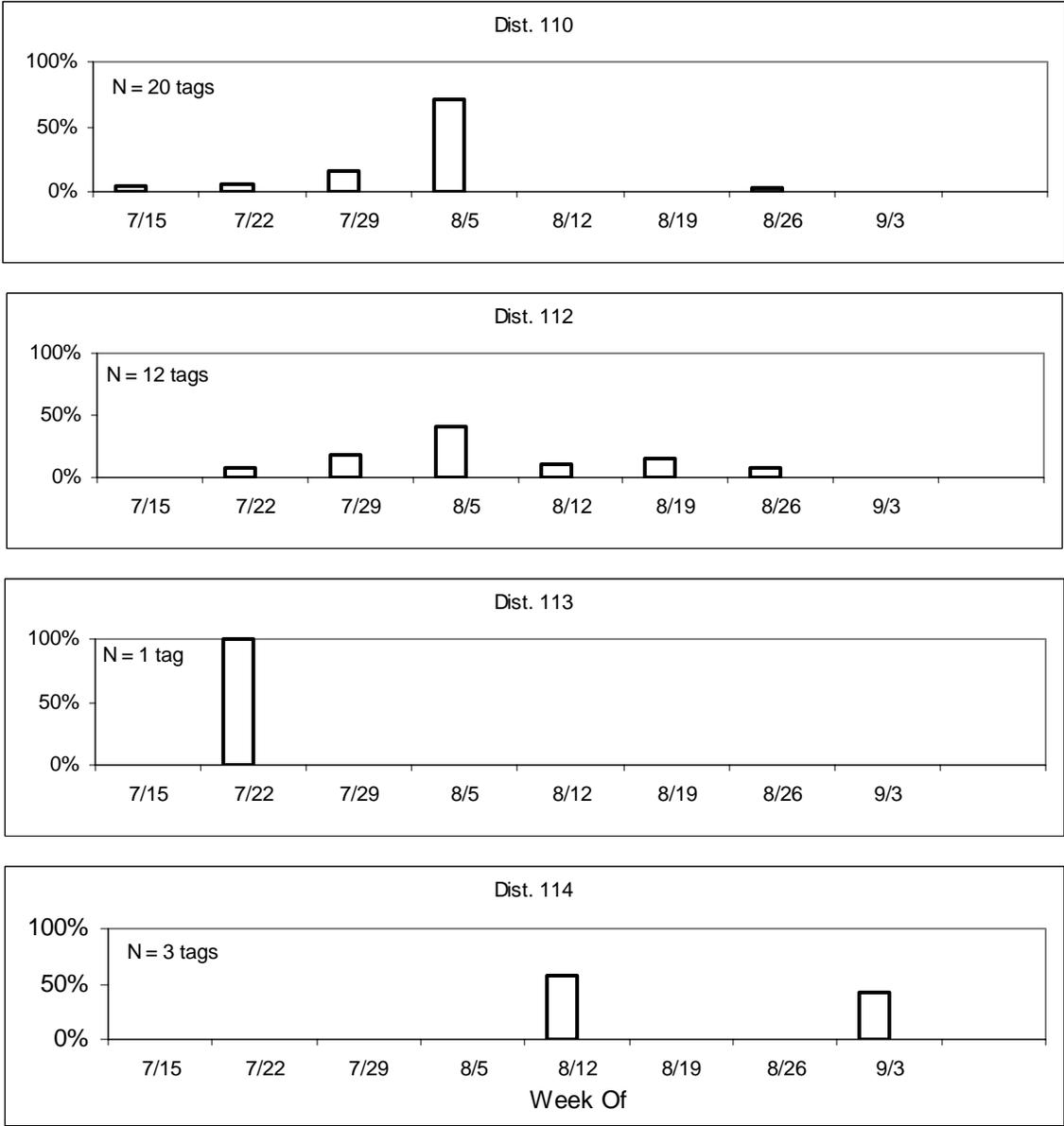
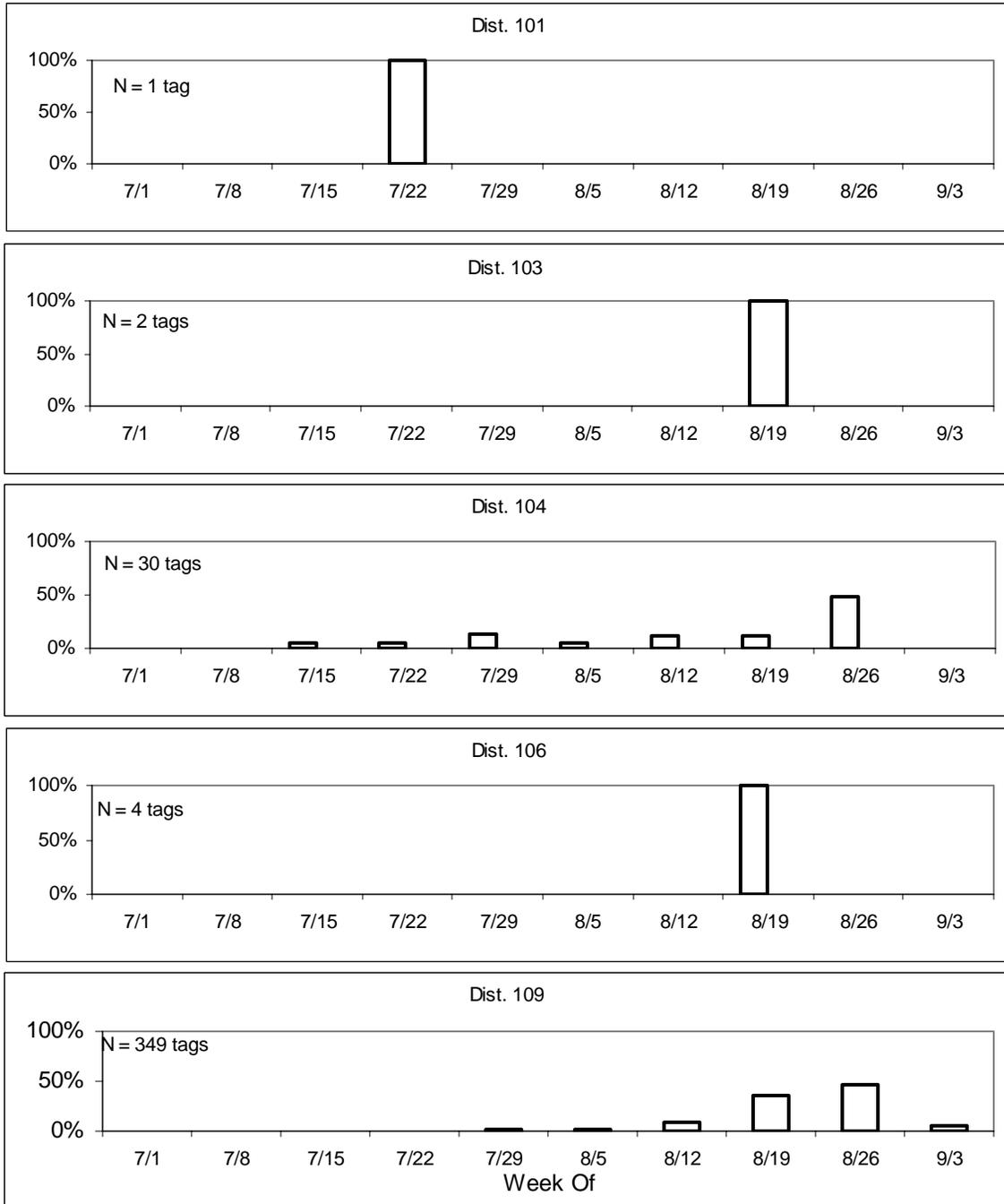


Figure 22. (page 2 of 2)



-continued-

Figure 23. Catch timing of Chatham Strait Area hatcheries in the purse seine fisheries, 1994-1998.

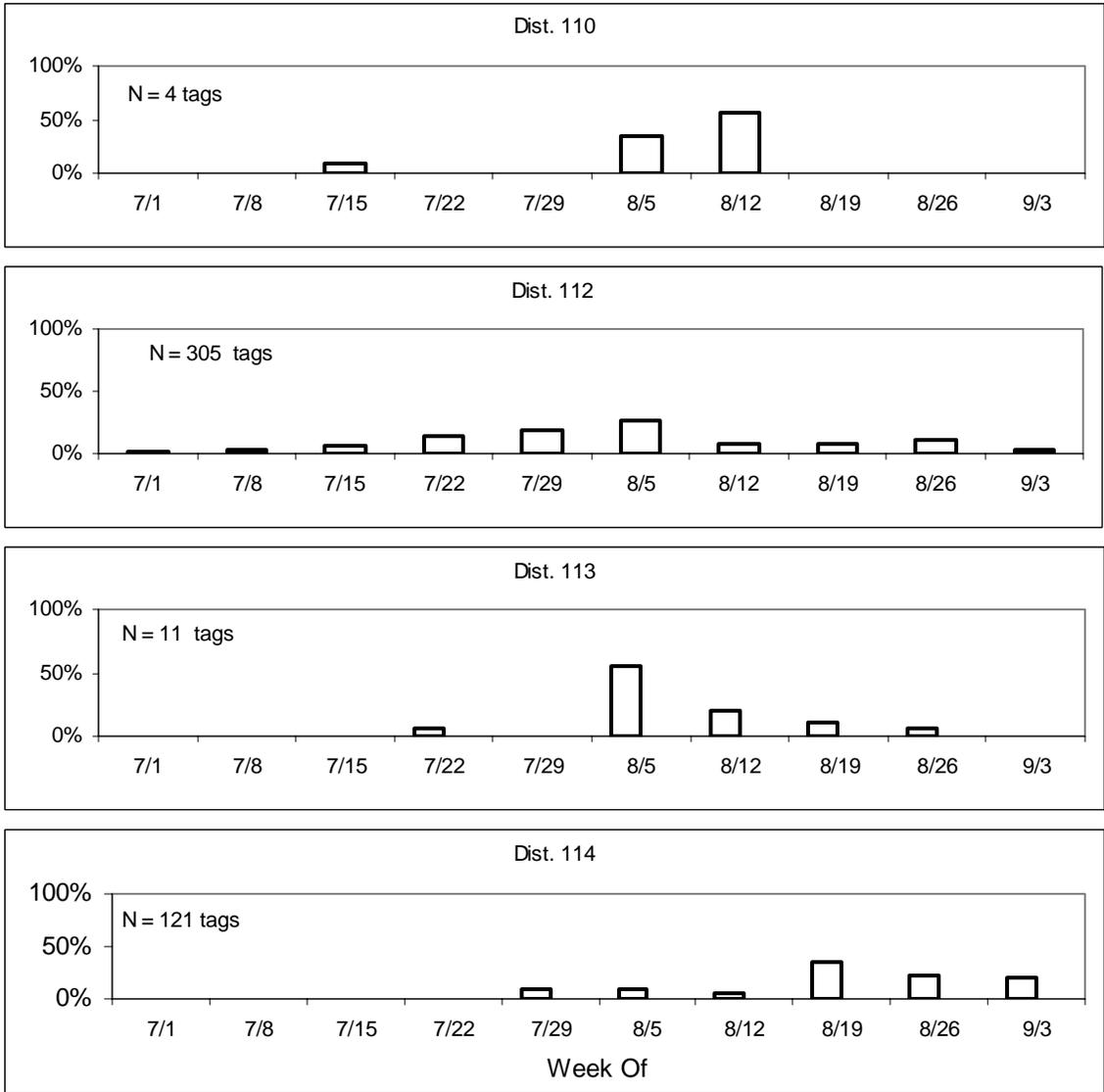


Figure 23. (page 2 of 2)

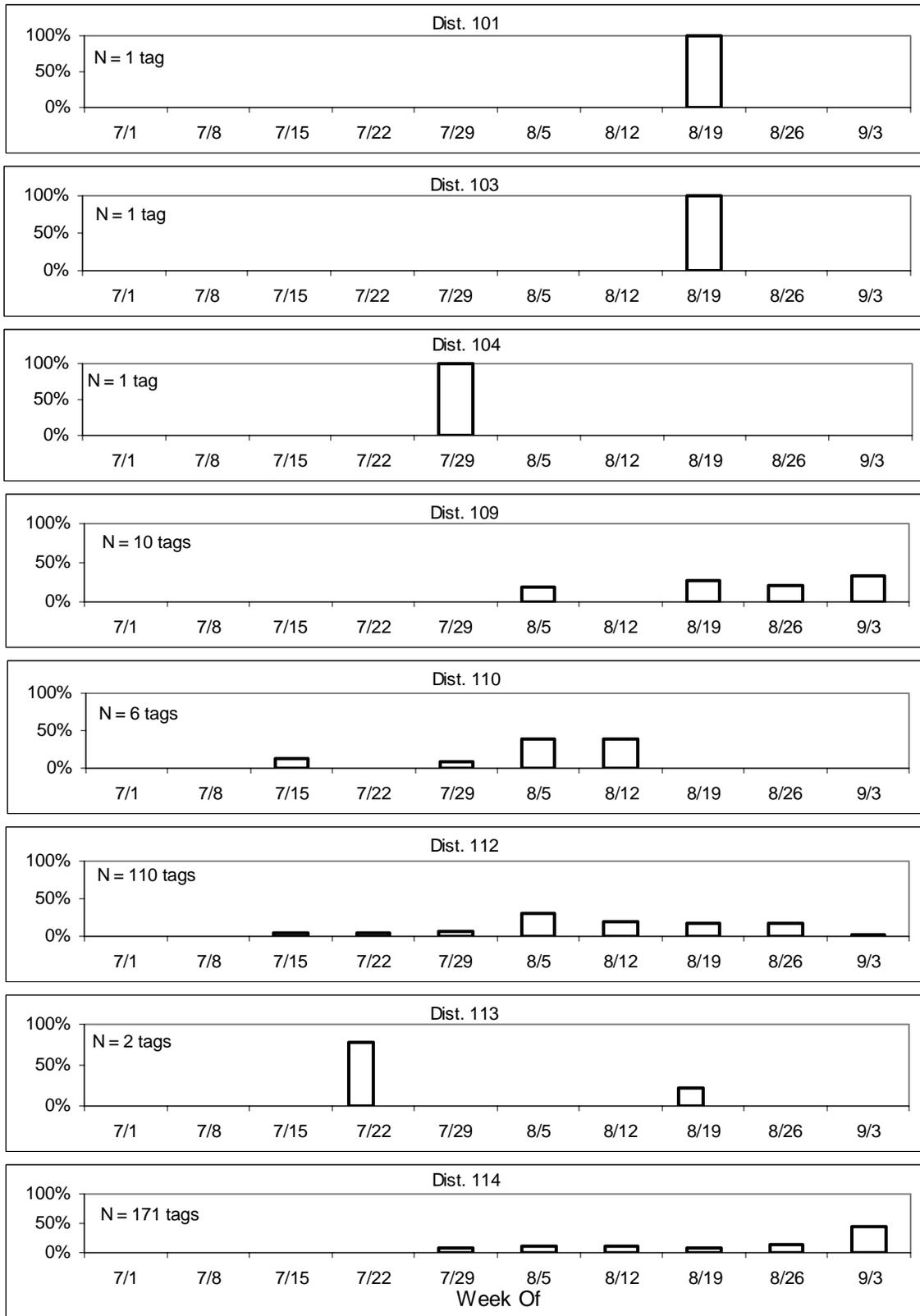


Figure 24. Catch timing of Northern Inside hatcheries in the purse seine fisheries, 1992-1996.

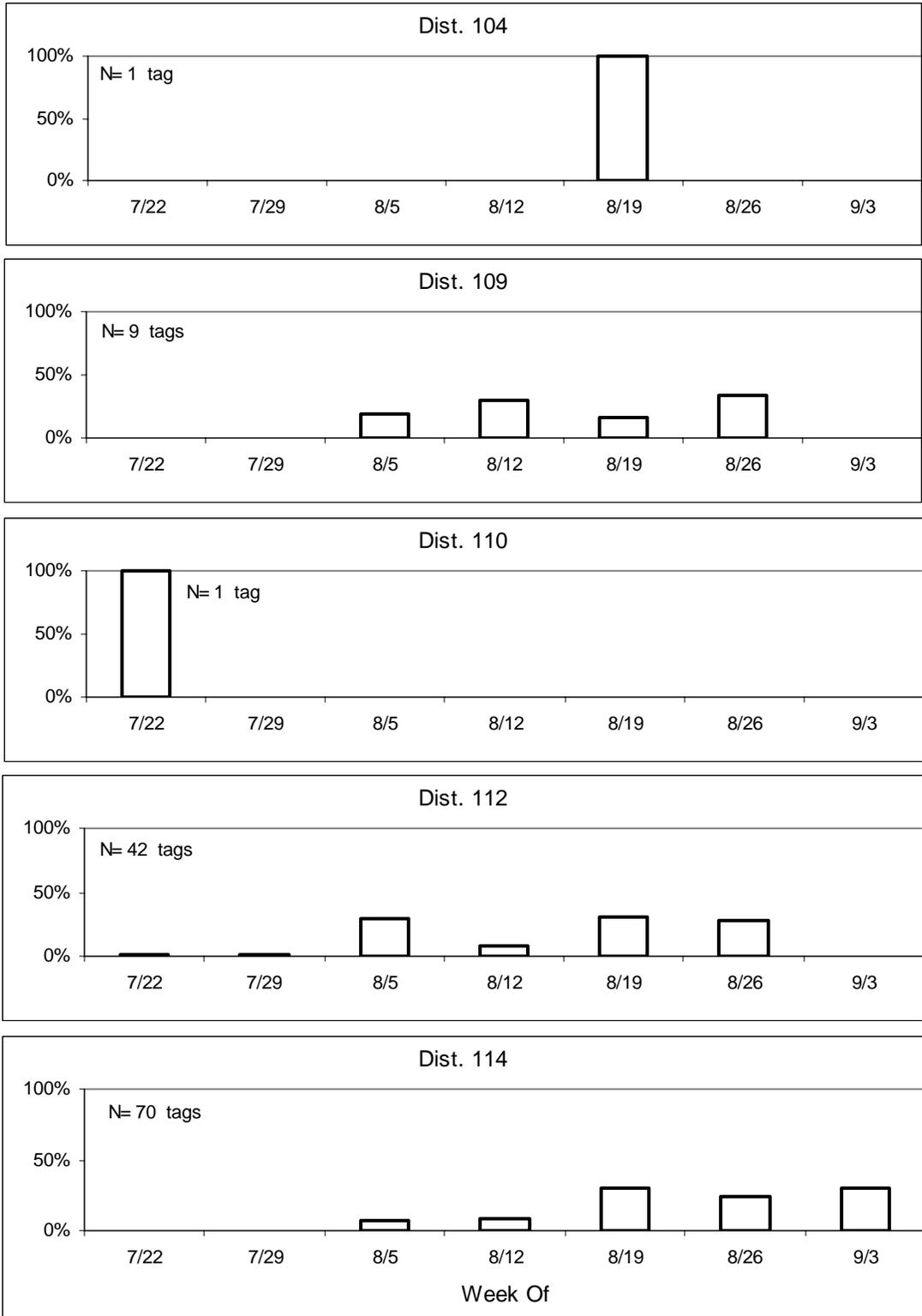


Figure 25. Catch timing of Berners River wild stock in purse seine fisheries, 1994-1998.

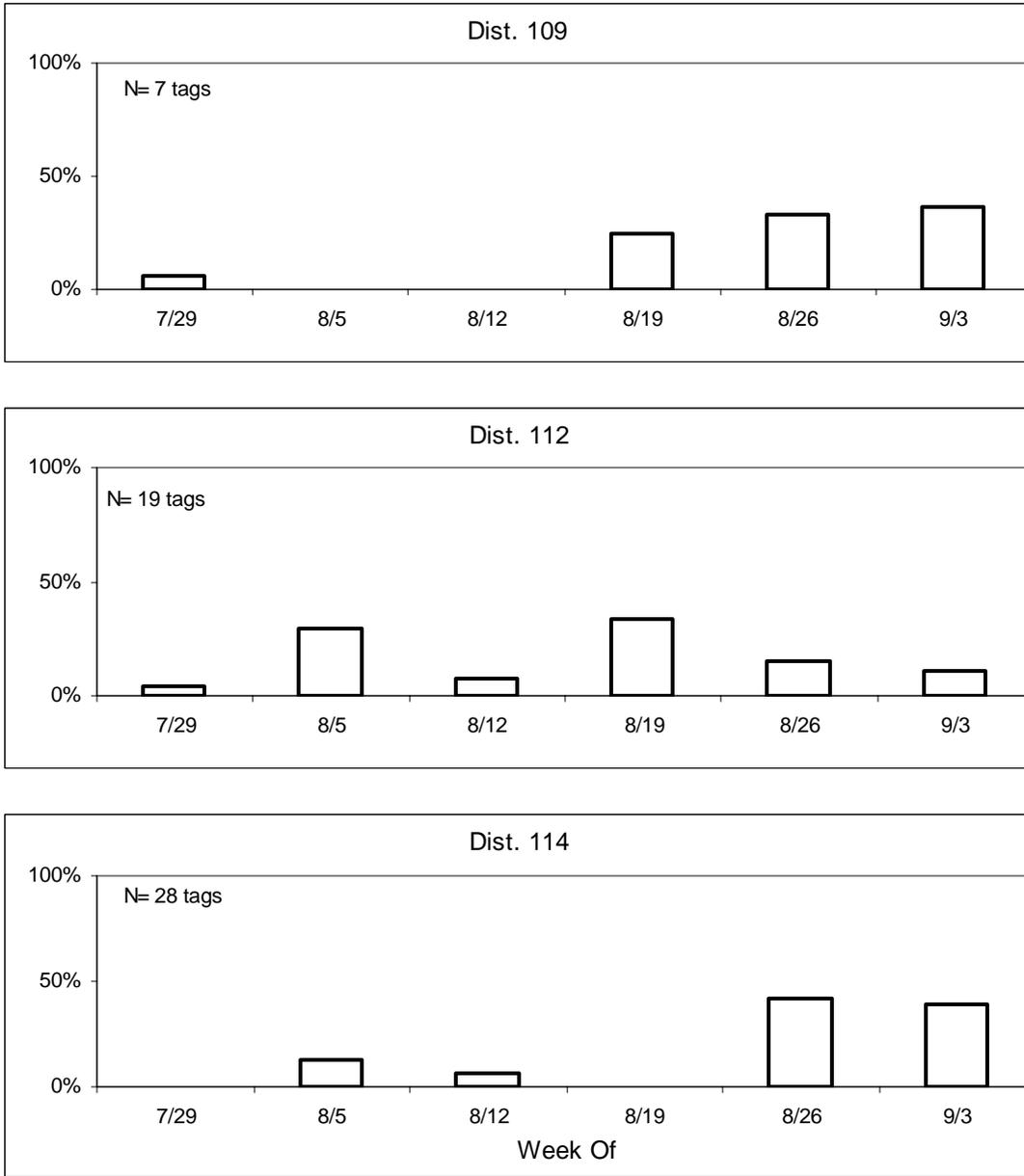


Figure 26. Catch timing of Auke Creek wild stock in purse seine fisheries, 1994-1998.

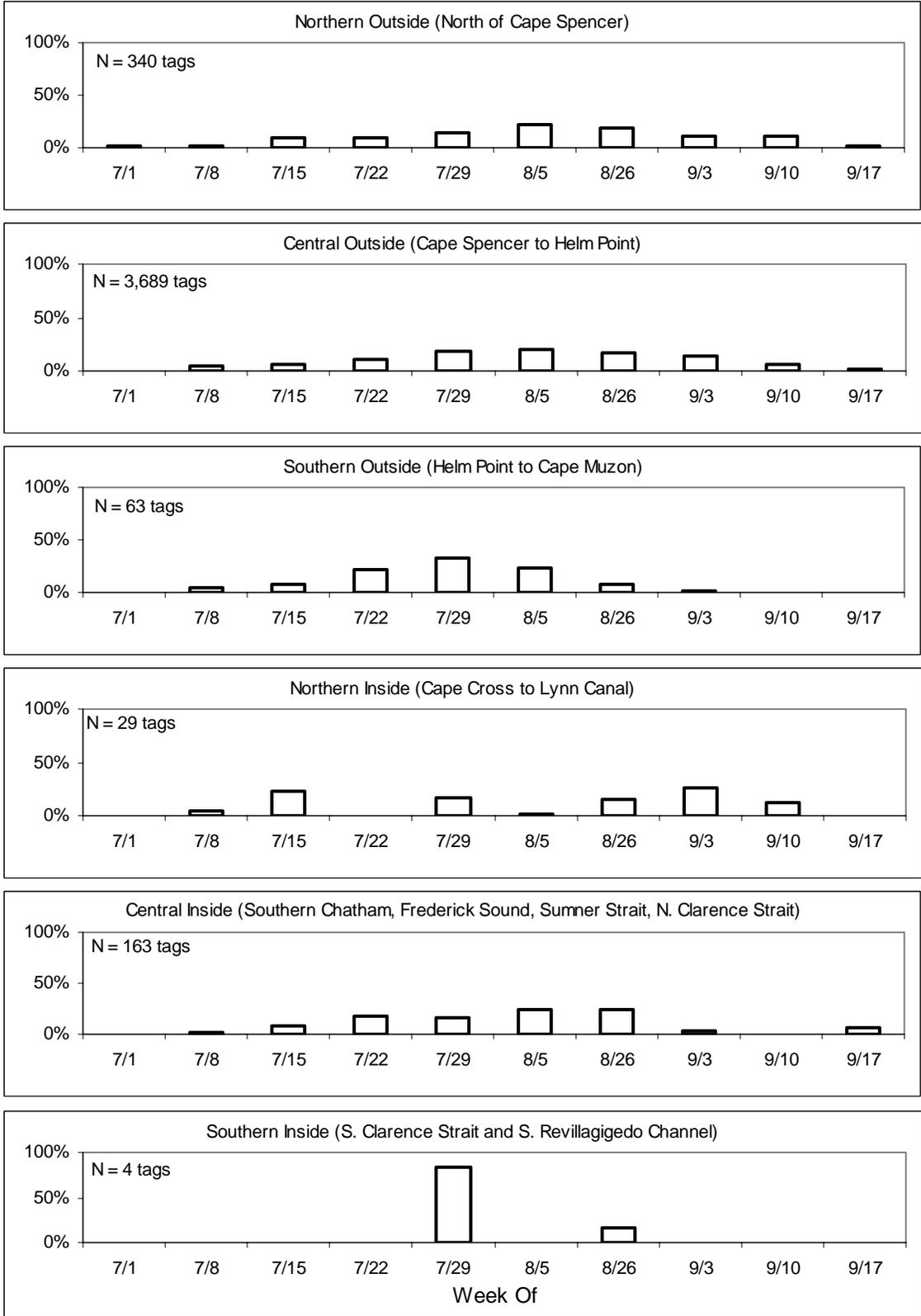


Figure 27. Catch timing of Central Outside hatcheries within troll harvest areas, 1994-1998.

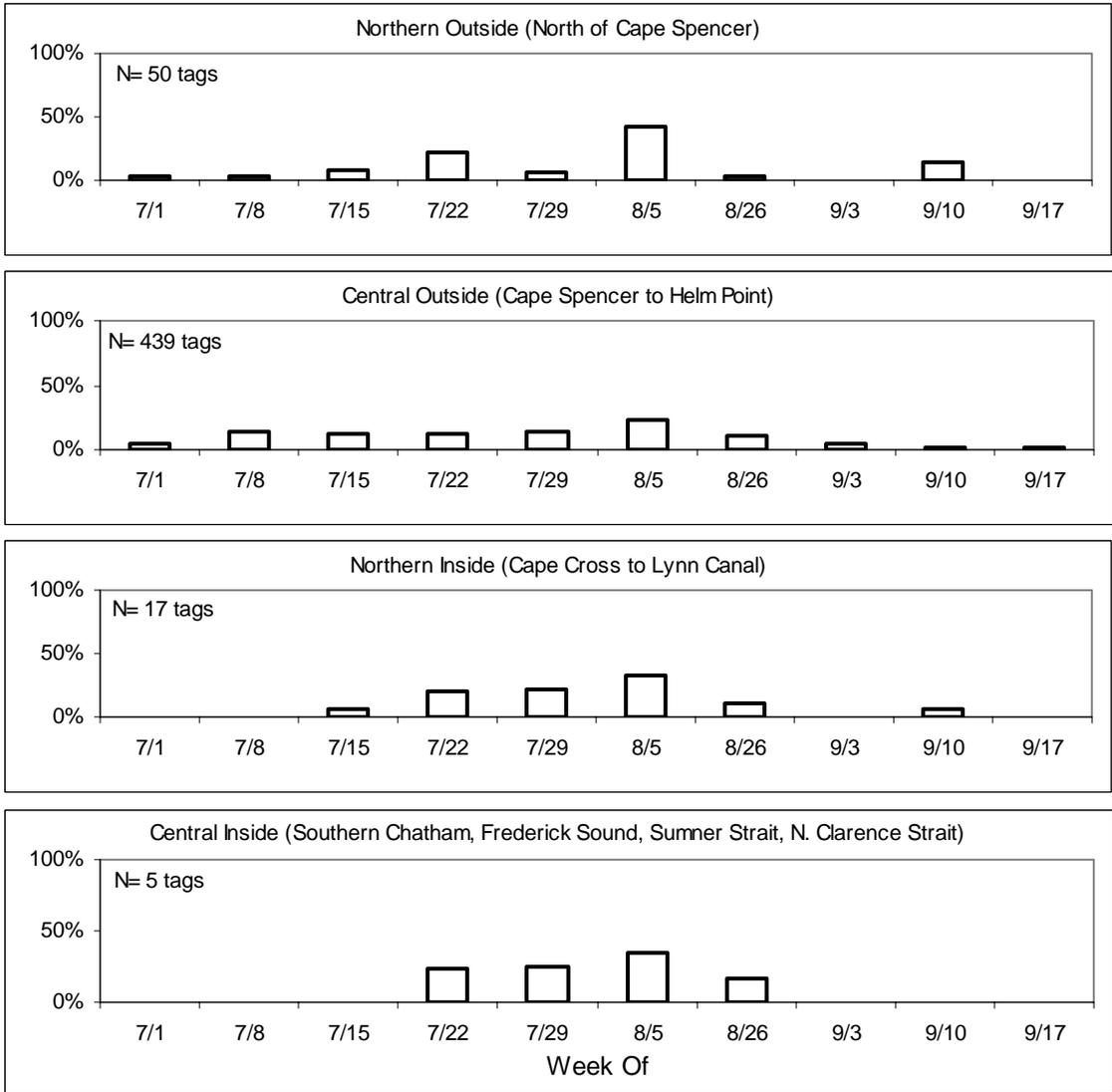


Figure 28. Catch timing of Ford Arm Lake wild stock within troll harvest areas, 1994-1998.

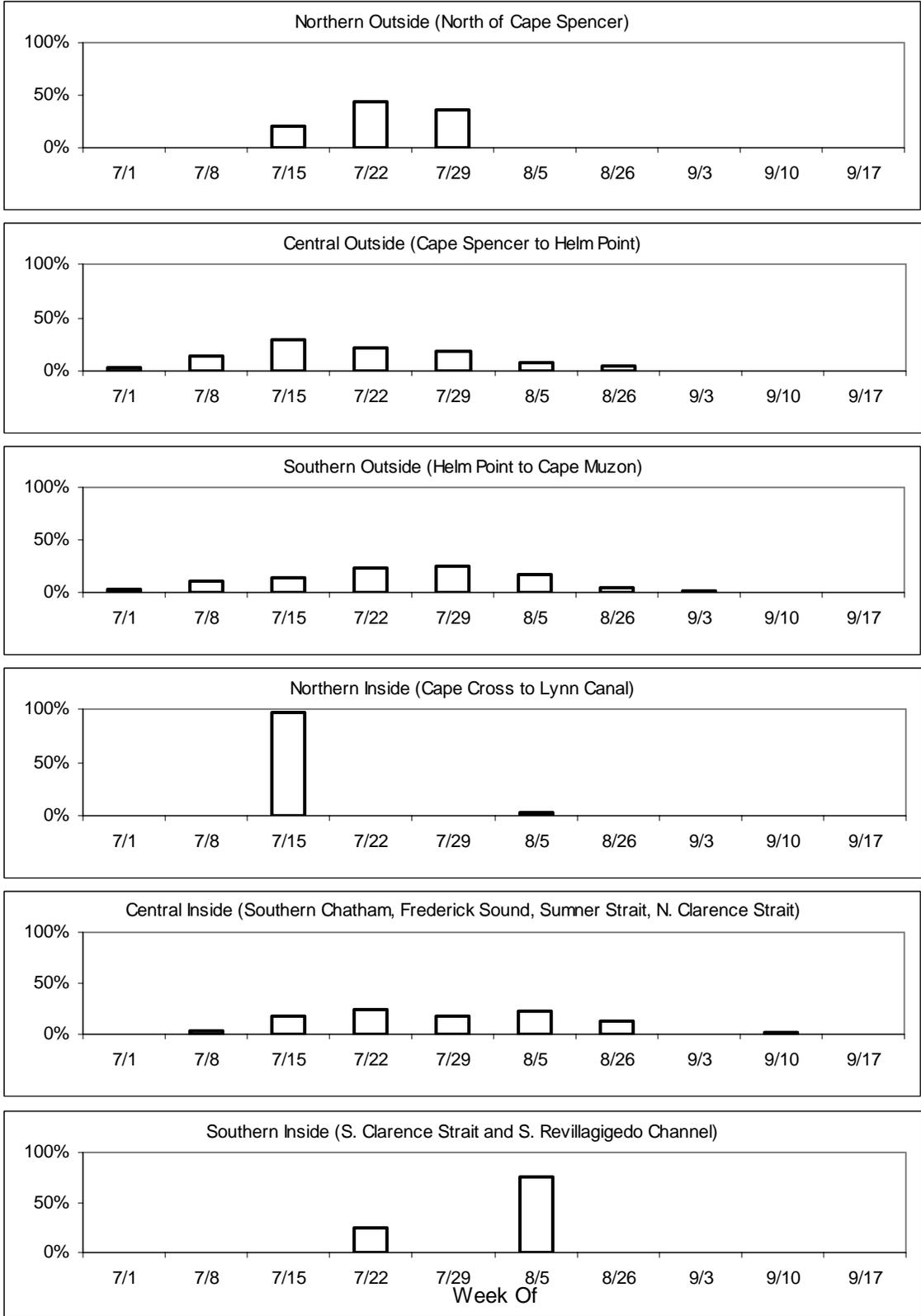


Figure 29. Catch timing of Southern Outside hatcheries within troll harvest areas, 1994-1998.

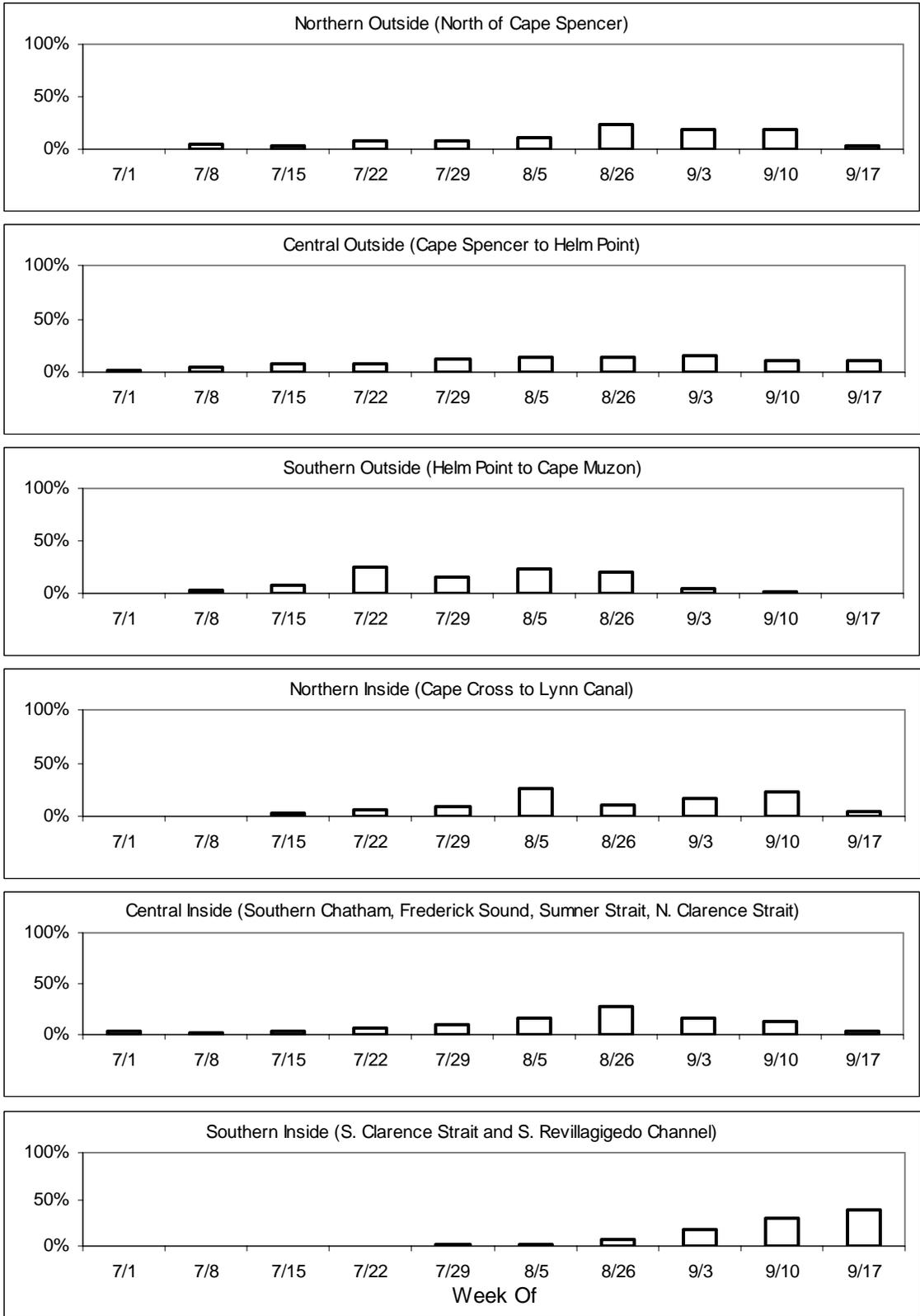


Figure 30. Catch timing of Southern Inside hatcheries within troll harvest areas, 1994-1998.

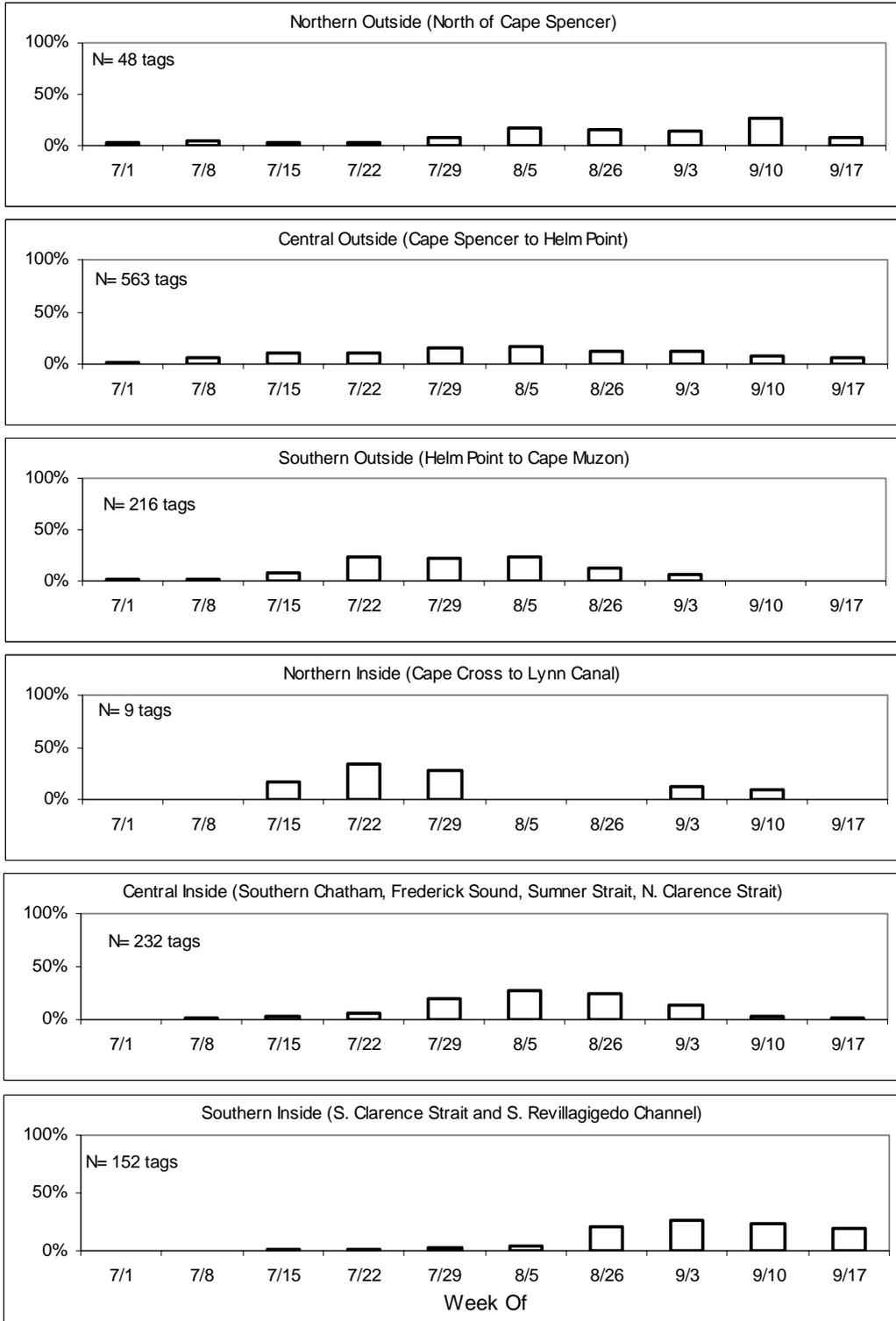


Figure 31. Catch timing of Hugh Smith Lake wild stock within troll harvest areas, 1994-1998.

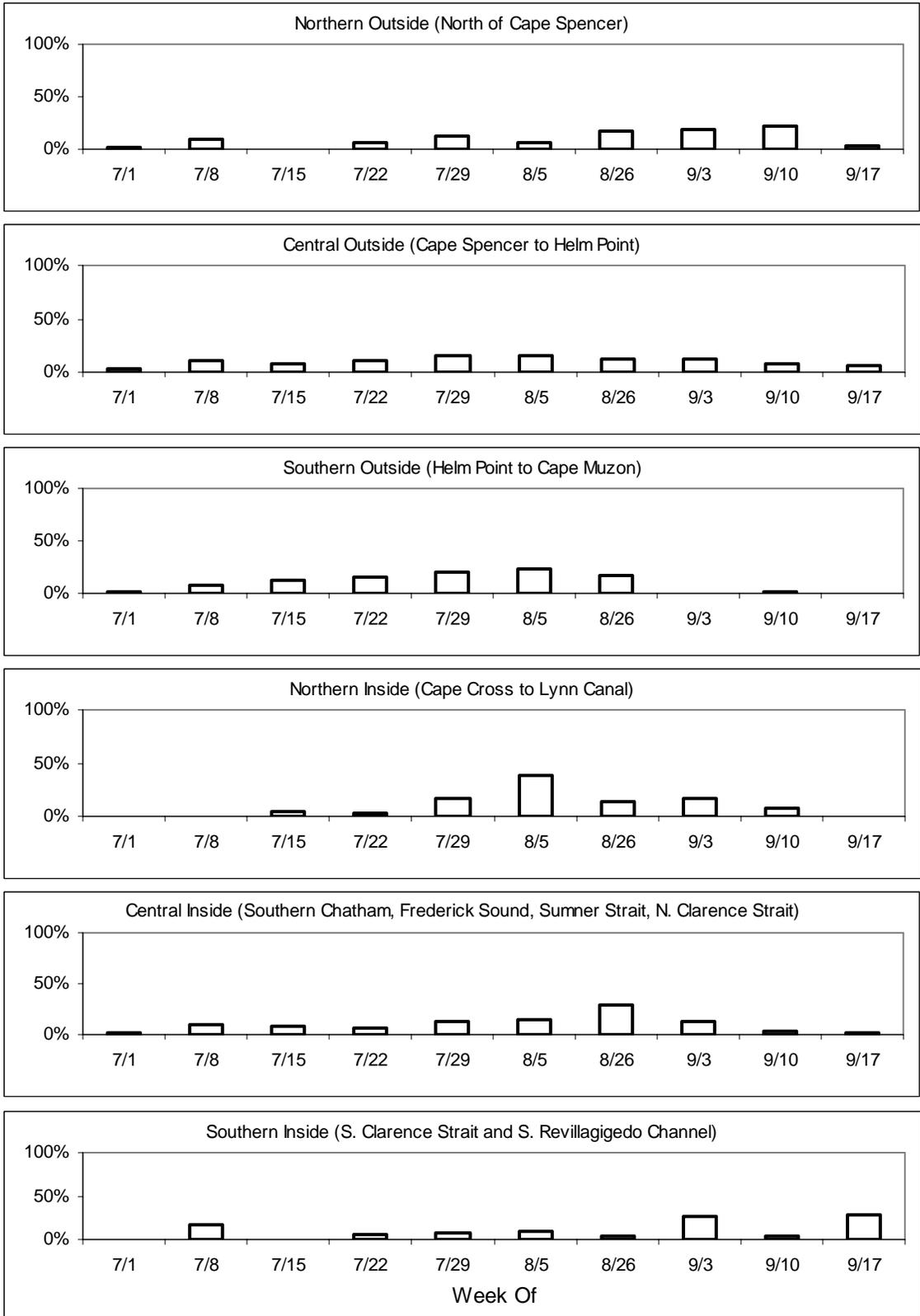


Figure 32. Catch timing of Central Inside hatchery stocks within troll harvest areas, 1994-1998.

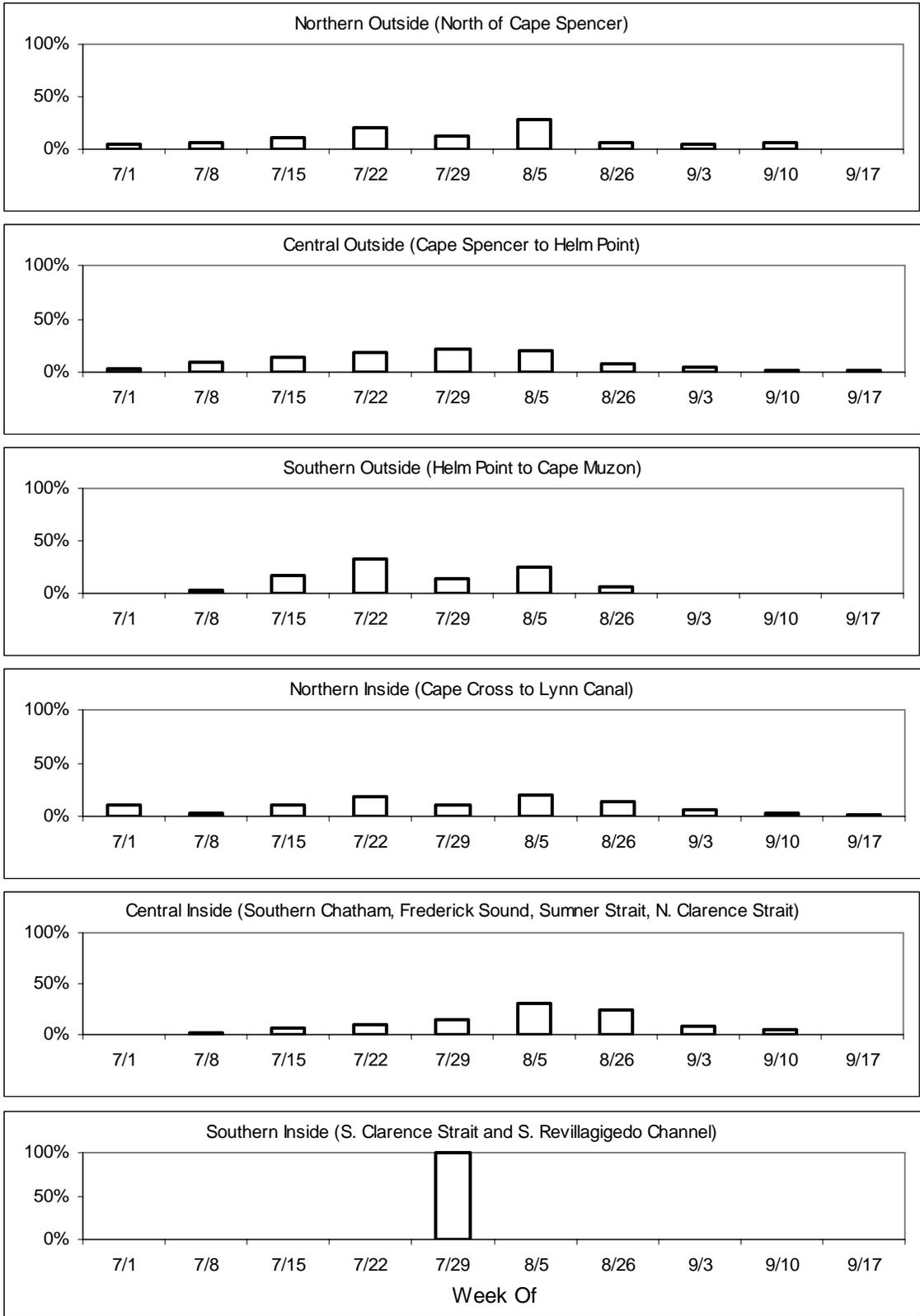


Figure 33. Catch timing of Chatham Strait hatchery stocks within troll harvest areas, 1994-1998.

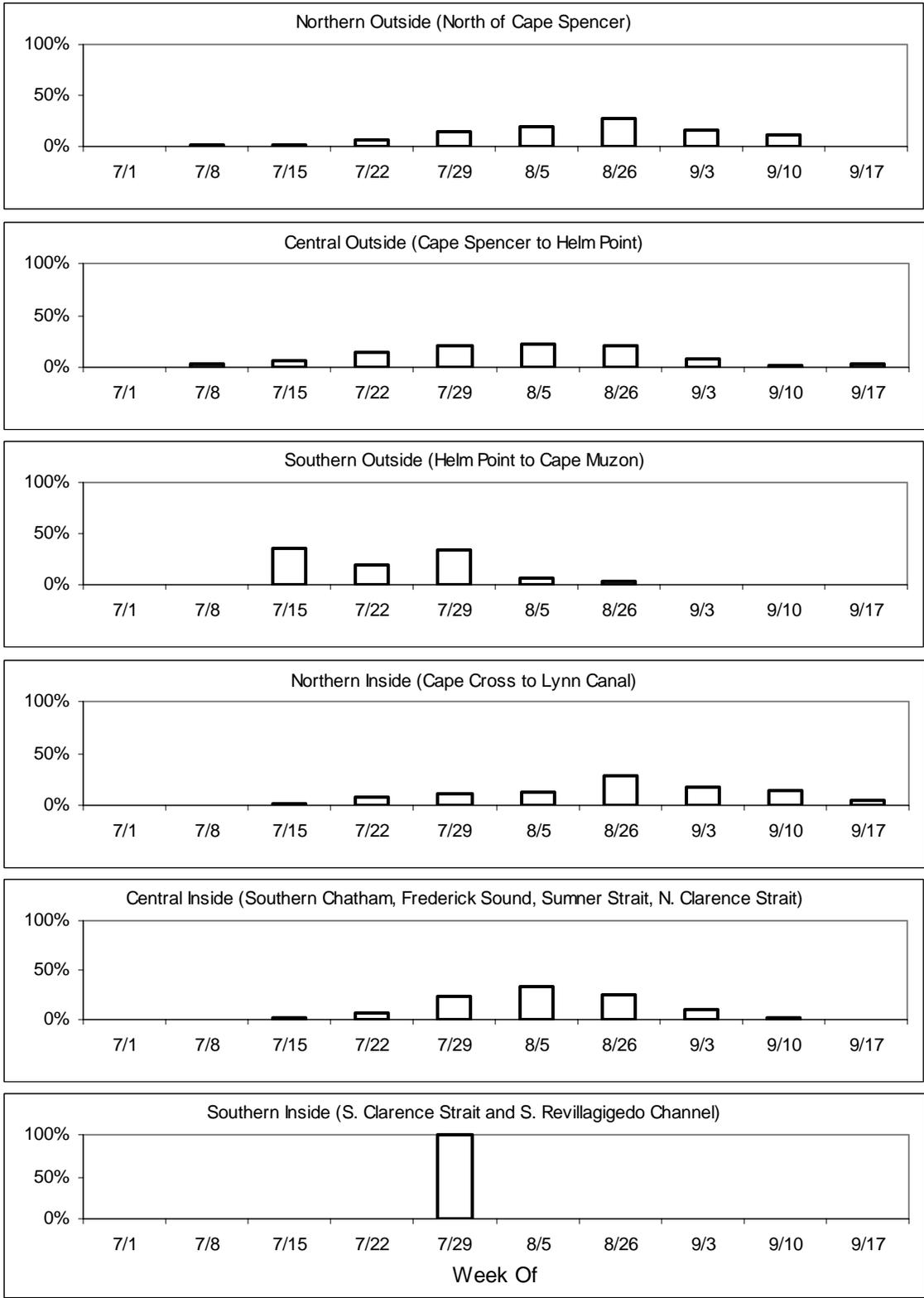


Figure 34. Catch timing of Northern Inside hatchery stocks within troll harvest areas, 1994-1998.

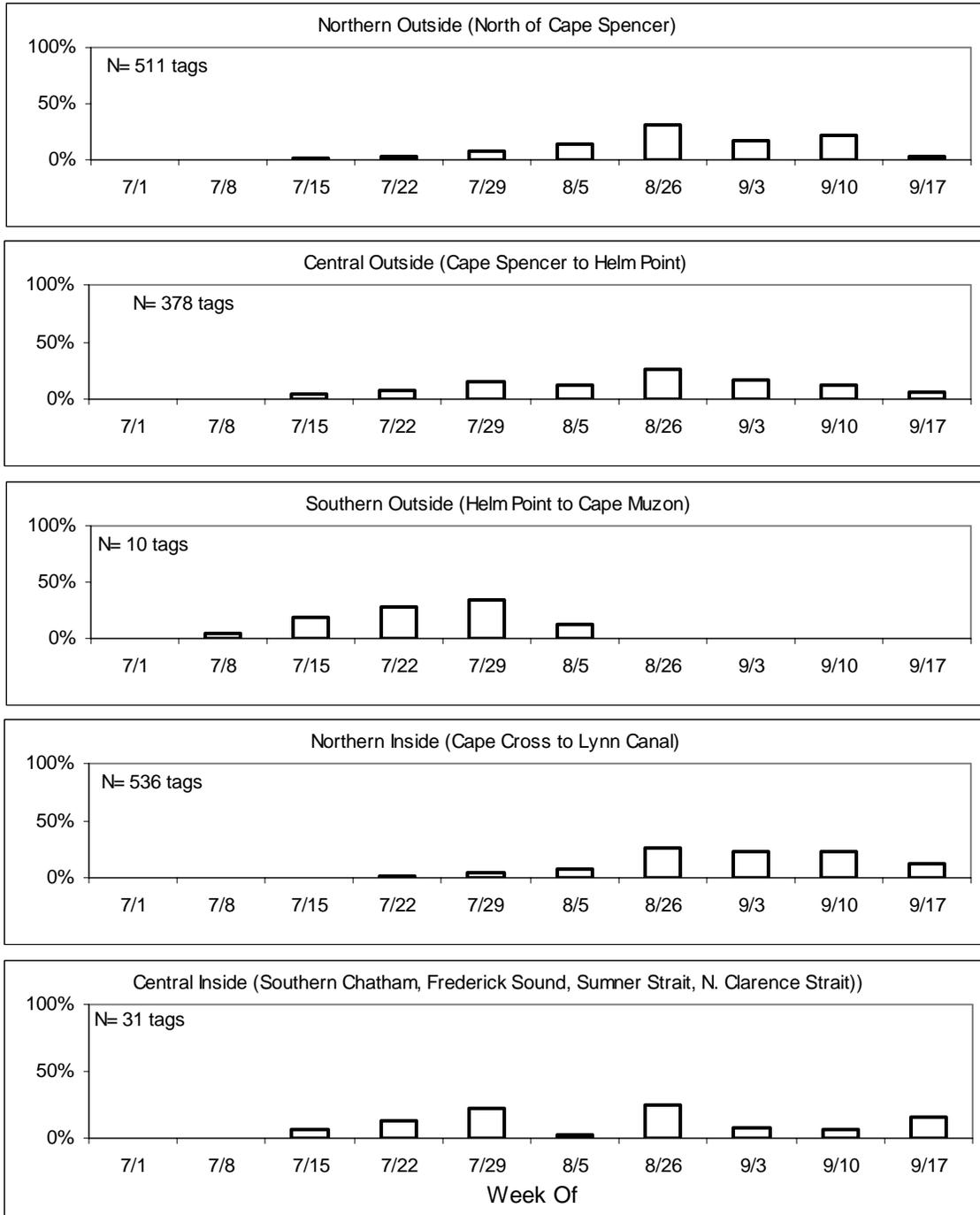


Figure 35. Catch timing of Berners River wild stock within troll harvest areas, 1994-1998.

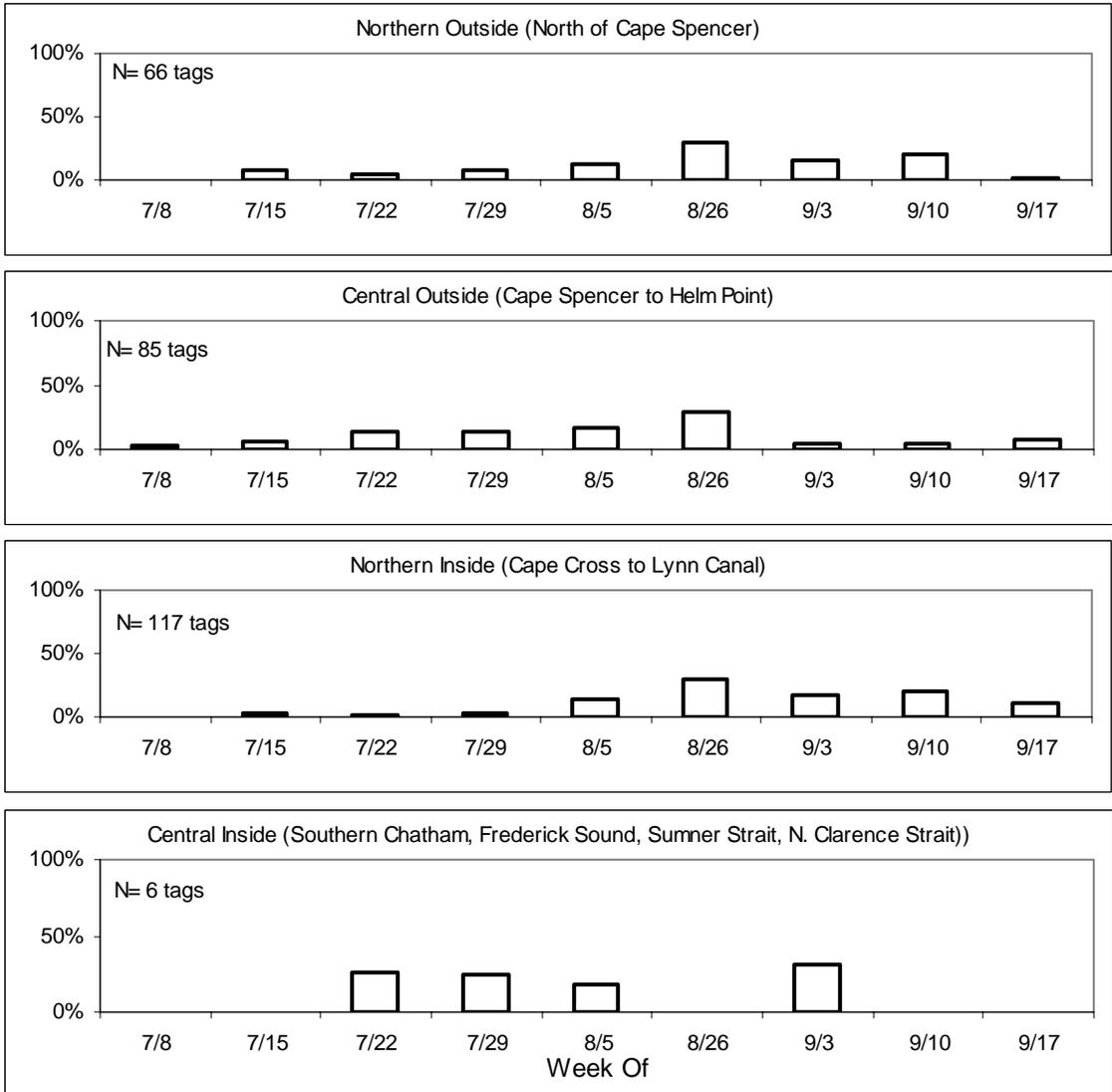


Figure 36. Catch timing of Auke Creek wild stock within troll harvest areas, 1994-1998.

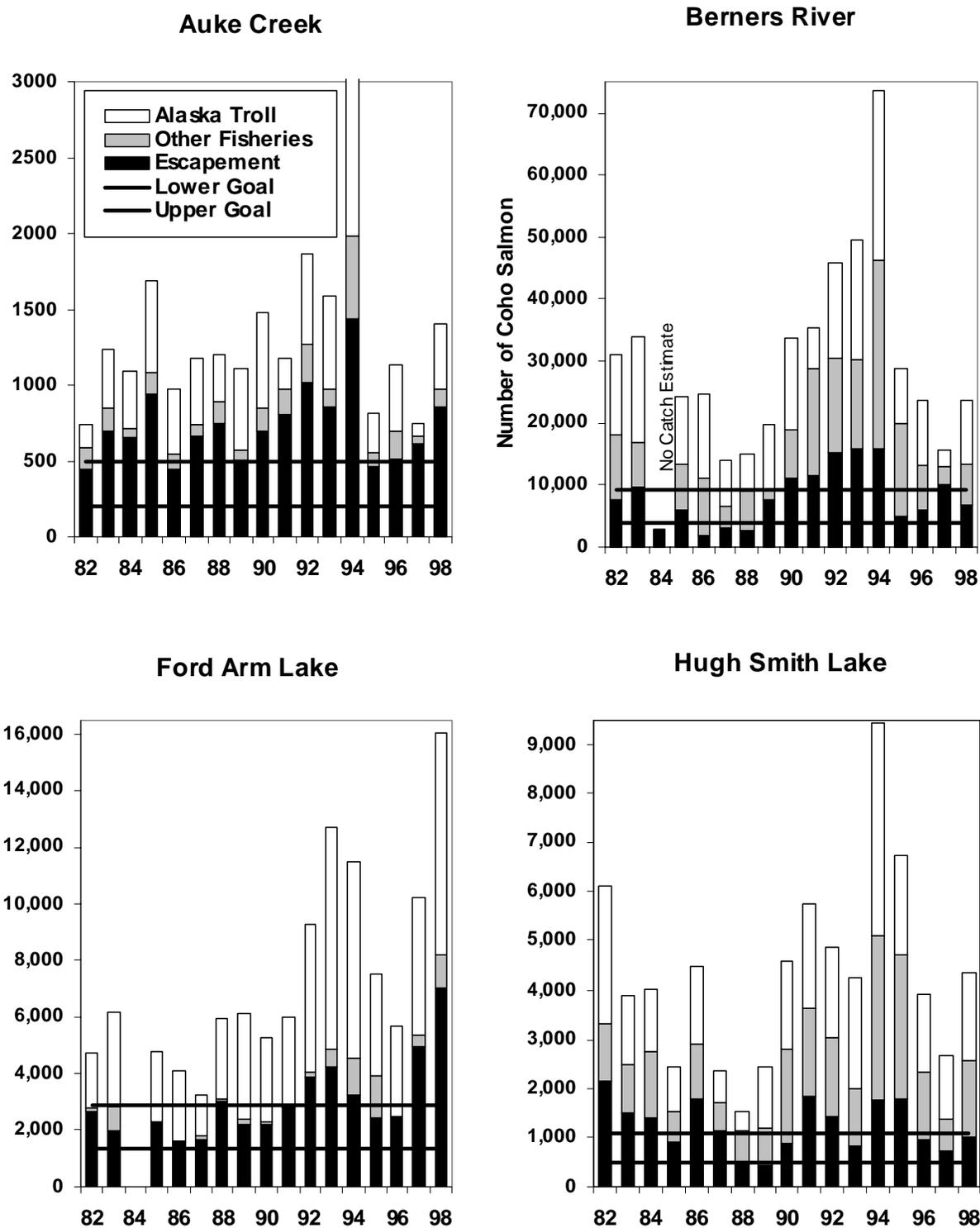


Figure 37. Total run size, catch, escapement and escapement goal range for four wild Southeast Alaska coho salmon indicator stocks, 1982-1998.

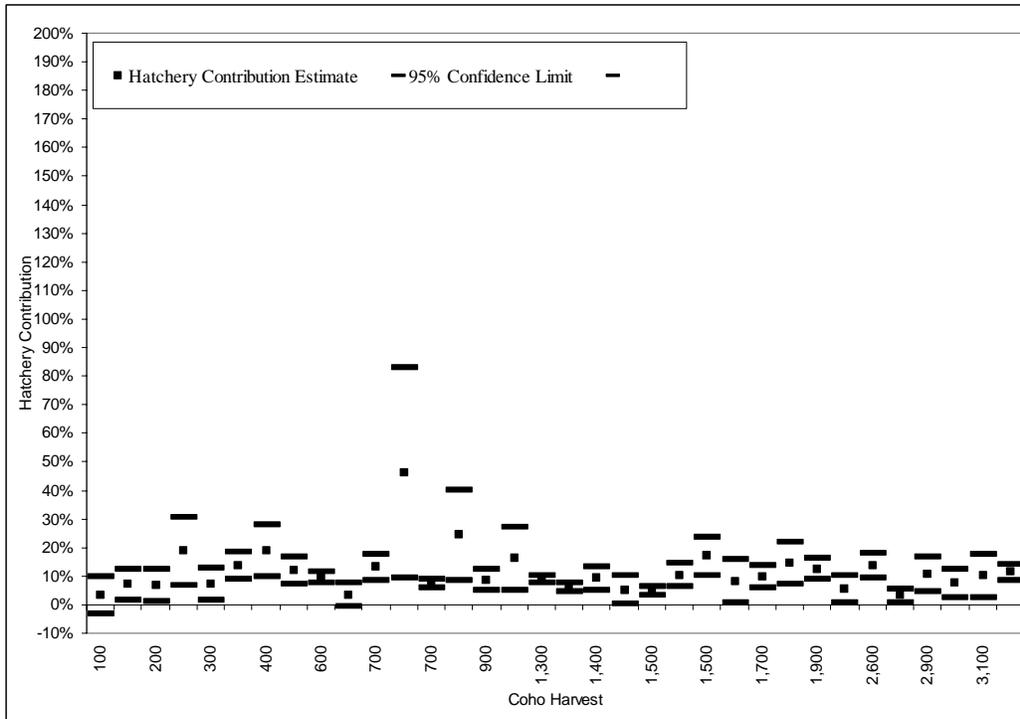


Figure 38. District 1 gillnet fishery weekly hatchery contributions and 95% confidence interval bounds, weeks 25-31, 1994-1998.

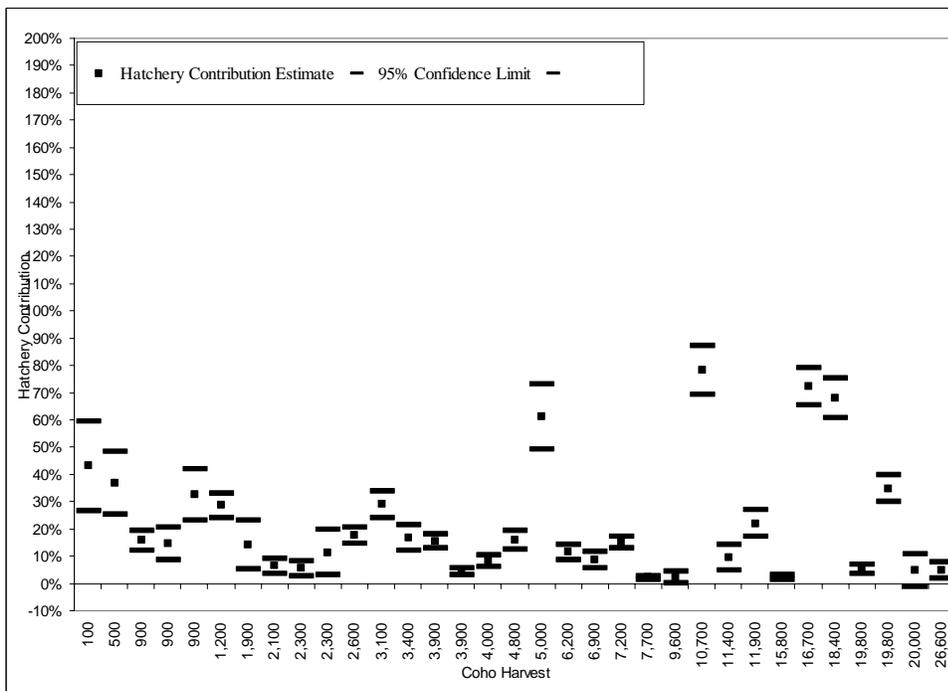


Figure 39. District 6 gillnet fishery weekly hatchery contributions and 95% confidence interval bounds, weeks 25-31, 1994-1998.

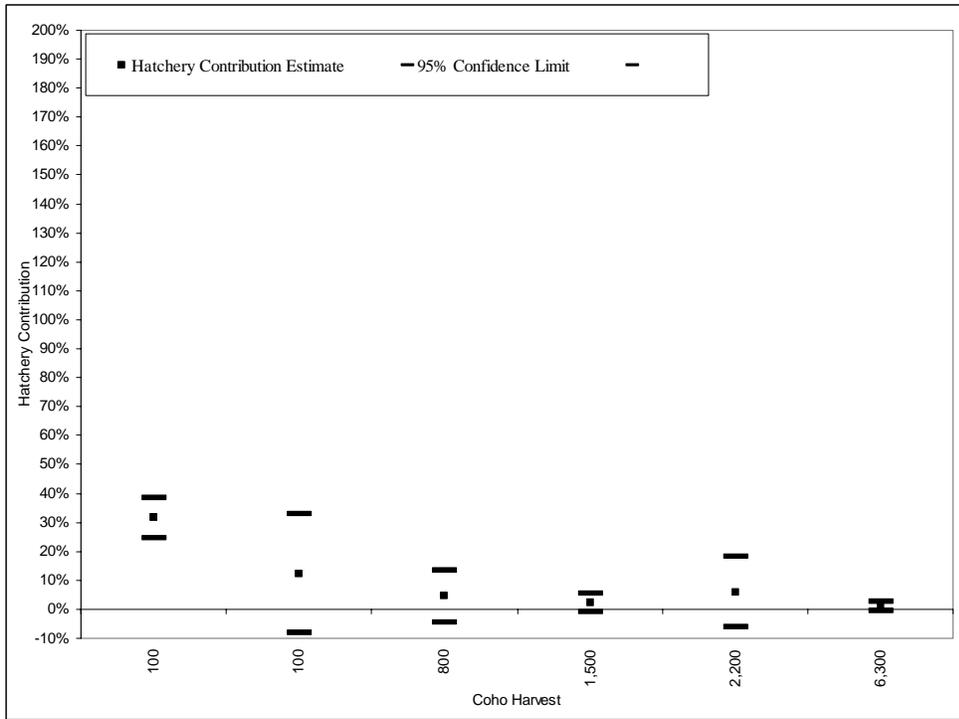


Figure 40. District 11 gillnet fishery weekly hatchery contributions and 95% confidence interval bounds, weeks 25-31, 1994-1998.

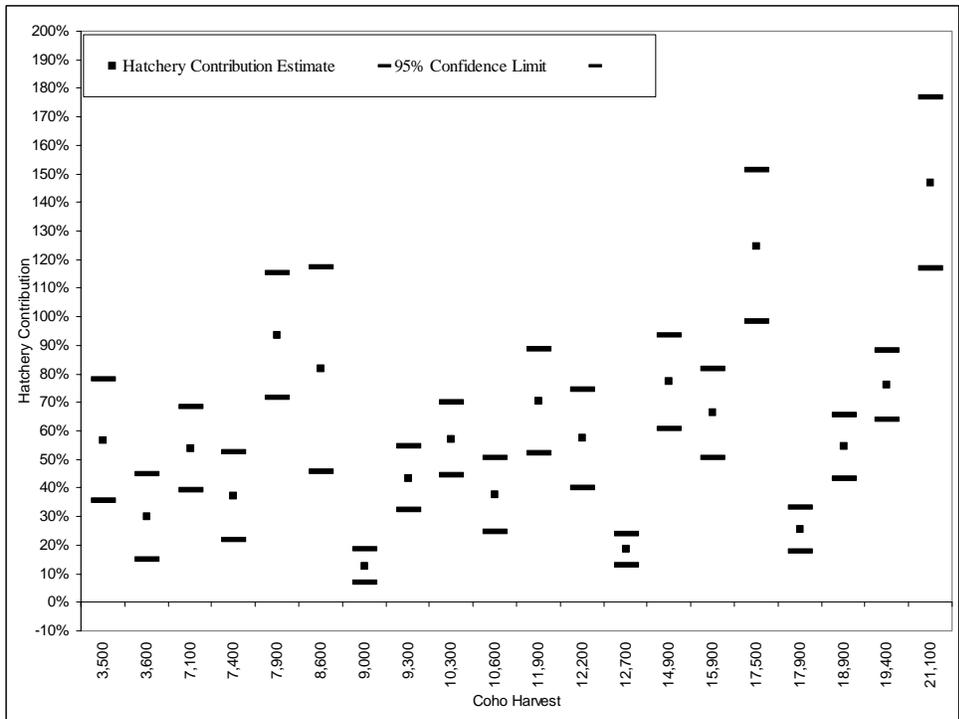


Figure 41. District 1 gillnet fishery weekly hatchery contributions and 95% confidence interval bounds, weeks 36-39, 1994-1998.

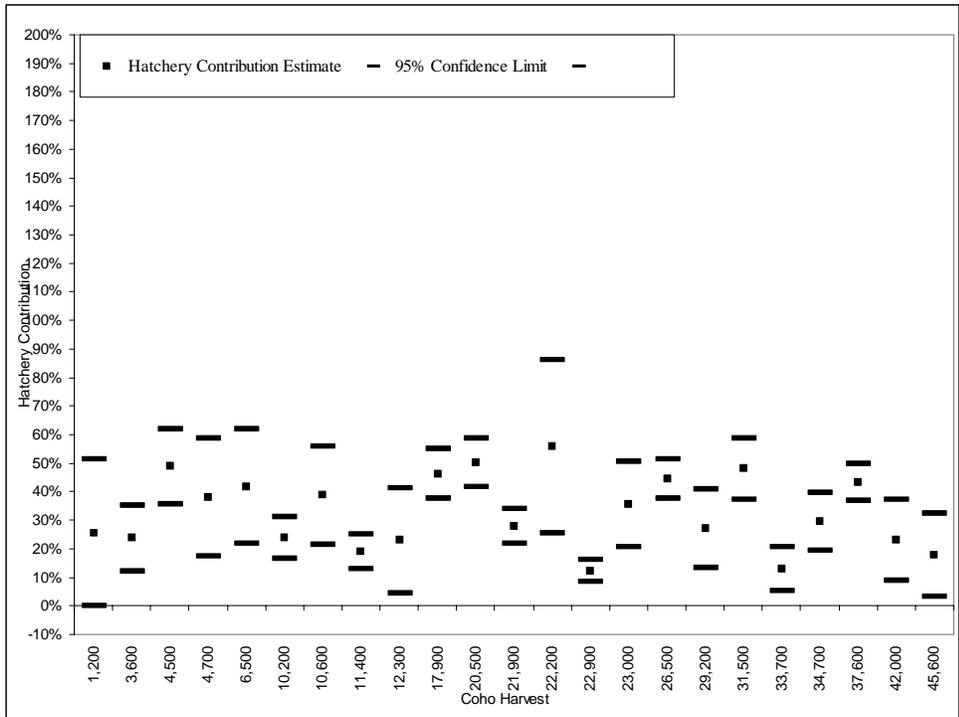


Figure 42. District 6 gillnet fishery weekly hatchery contributions and 95% confidence interval bounds, weeks 35-39, 1994-1998.

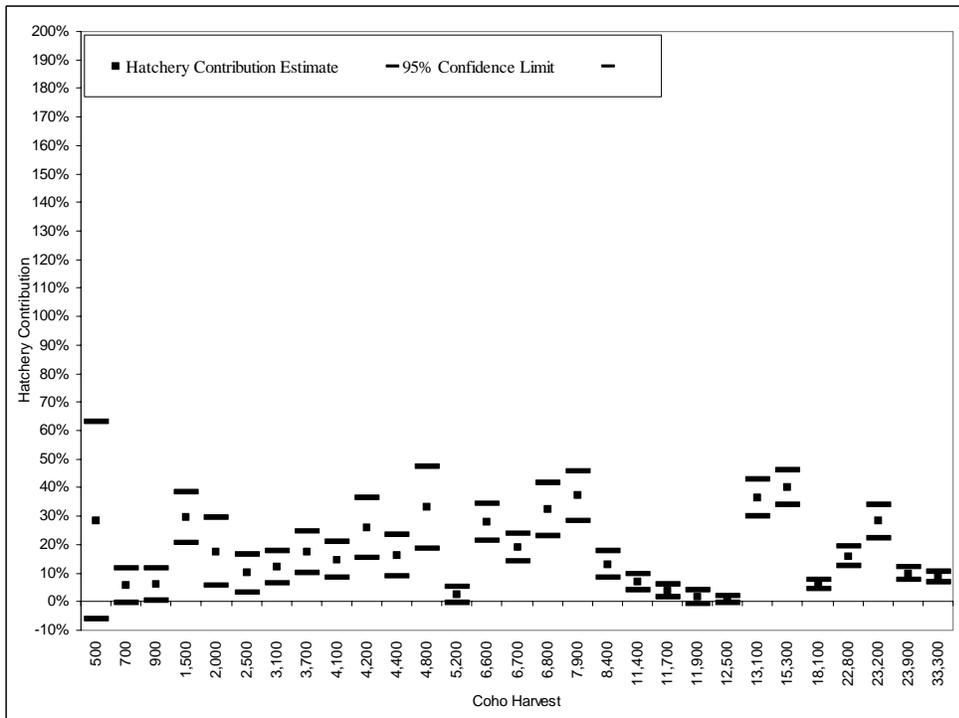


Figure 43. District 11 gillnet fishery weekly hatchery contributions and 95% confidence interval bounds, weeks 36-39, 1994-1998.

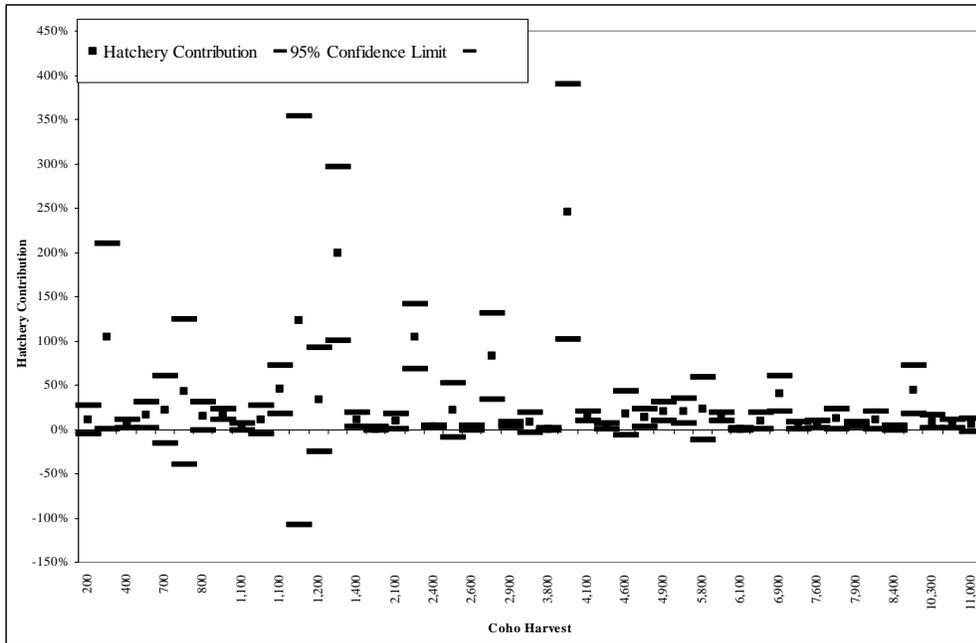


Figure 44. District 101 purse seine fishery weekly hatchery contributions and 95% confidence interval bounds, 1994-1998. Values were omitted for weeks where no tags were recovered in sampling, or when no sampling occurred. Note that the hatchery contribution scales differs from Figures 47-57 due the larger ranges of hatchery contributions and confidence intervals in this fishery.

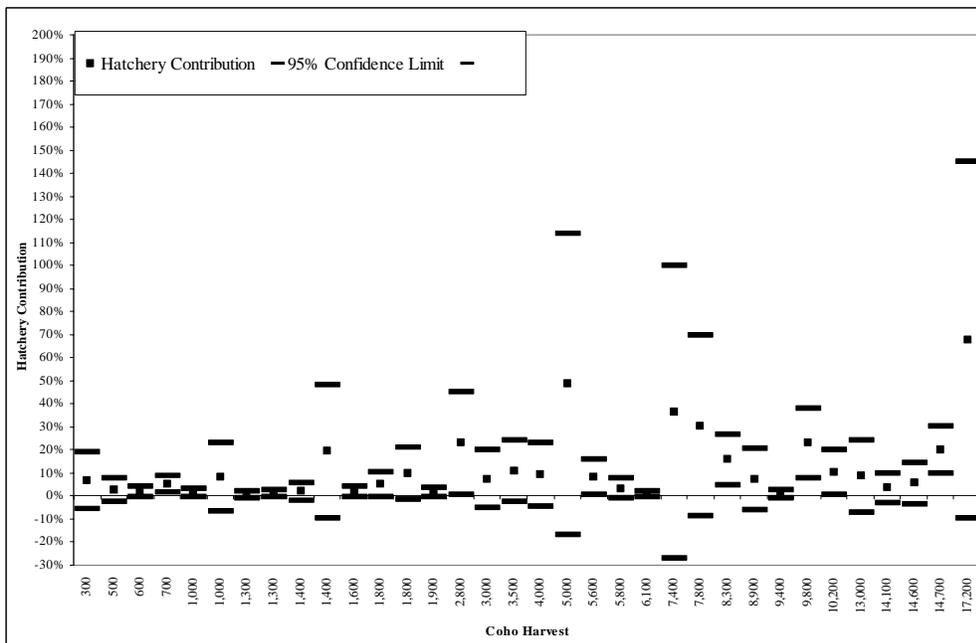


Figure 45. District 102 purse seine fishery weekly hatchery contributions and 95% confidence interval bounds, 1994-1998. Values were omitted for weeks where no tags were recovered in sampling, or when no sampling occurred. A value for a catch of 2,354 with a hatchery contribution estimate of 93% +/- 183% was not included to preserve formatting range of graph.

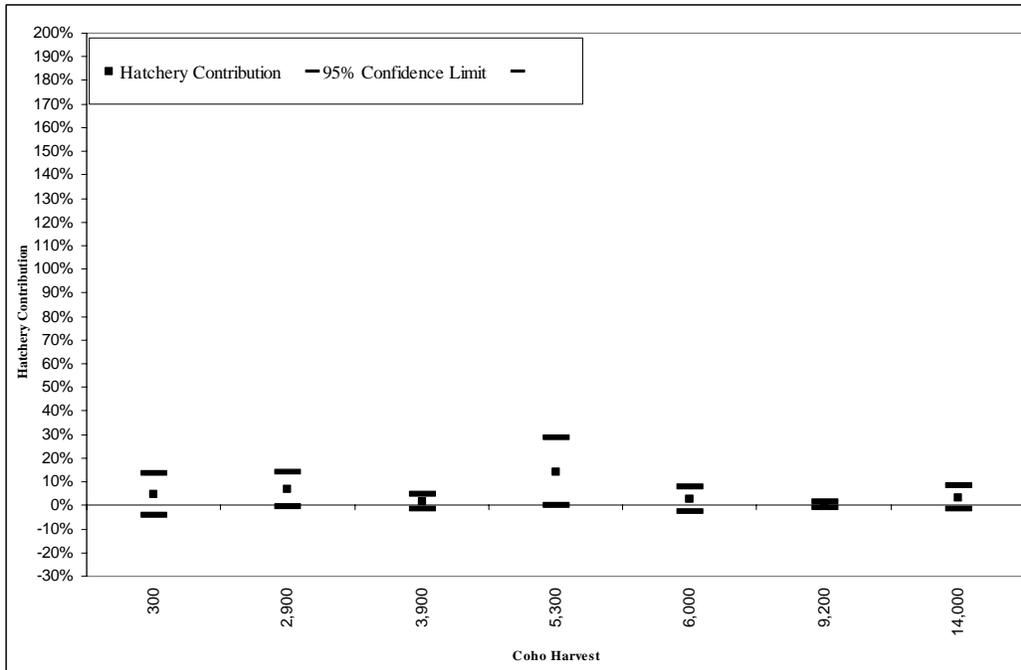


Figure 46. District 103 purse seine fishery weekly hatchery contributions and 95% confidence interval bounds, 1994-1998. Values were omitted for weeks where no tags were recovered in sampling, or when no sampling occurred.

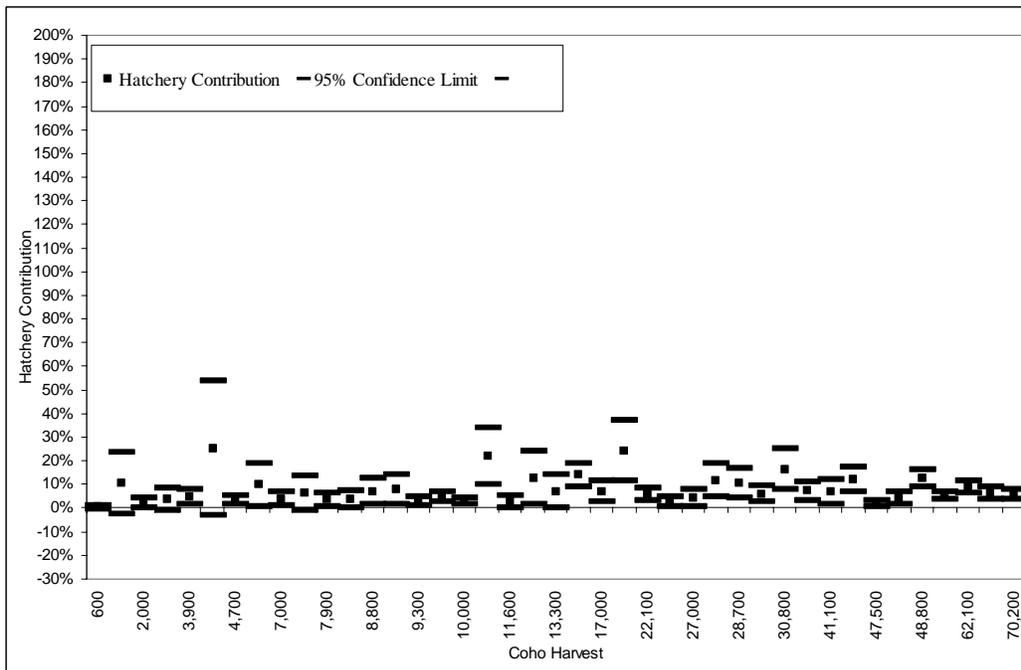


Figure 47. District 104 purse seine fishery weekly hatchery contributions and 95% confidence interval bounds, 1994-1998. Values were omitted for weeks where no tags were recovered in sampling, or when no sampling occurred.

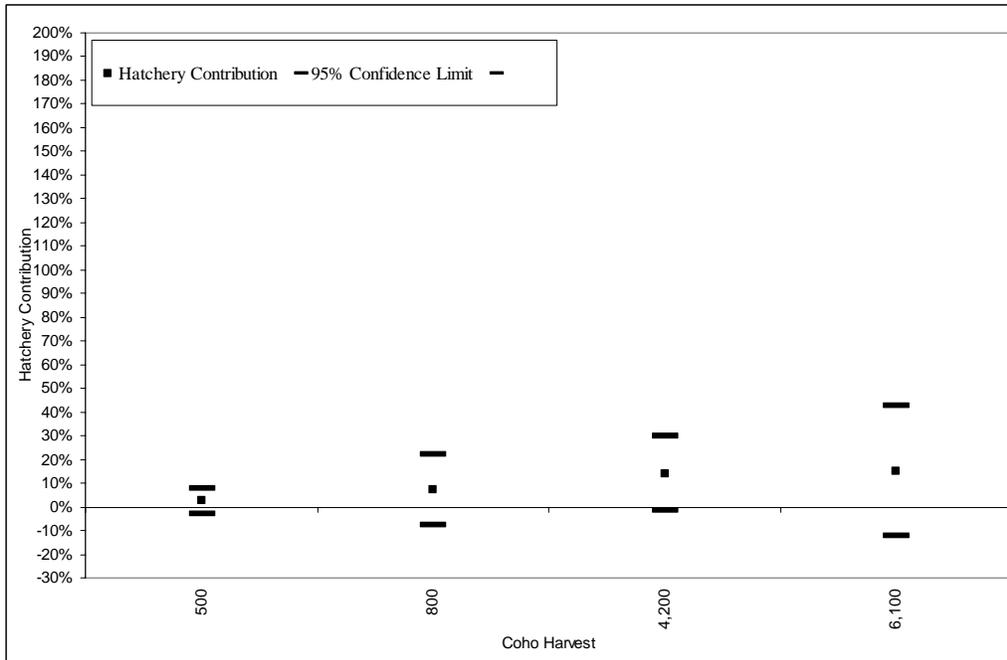


Figure 48. District 105 purse seine fishery weekly hatchery contributions and 95% confidence interval bounds, 1994-1998. Values were omitted for weeks where no tags were recovered in sampling, or when no sampling occurred.

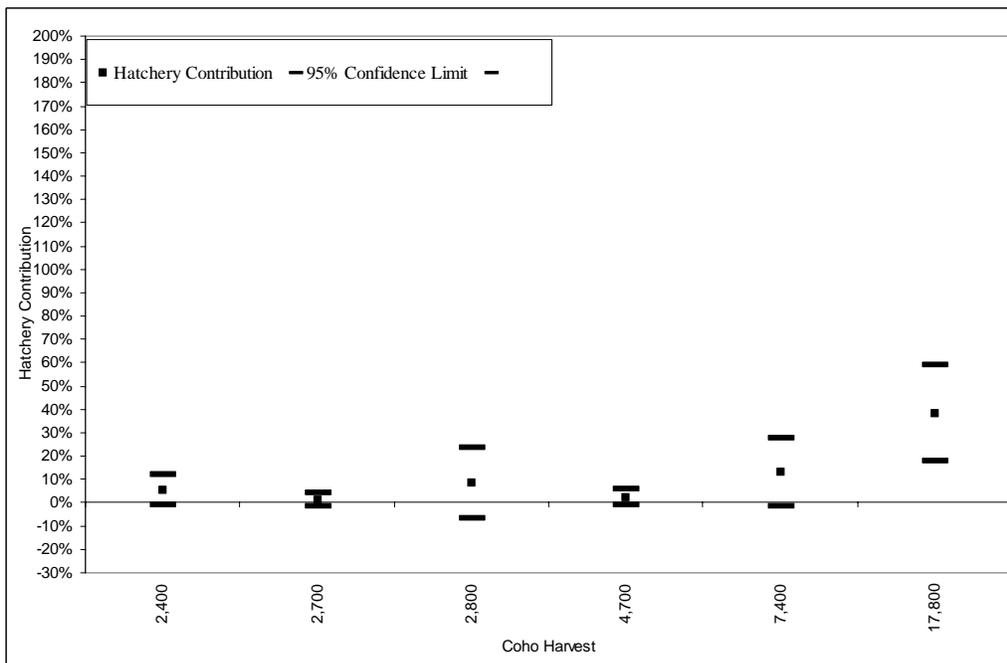


Figure 49. District 106 purse seine fishery weekly hatchery contributions and 95% confidence interval bounds, 1994-1998. Values were omitted for weeks where no tags were recovered in sampling, or when no sampling occurred. A value for a catch of 612 with a hatchery contribution estimate of 127% +/- 125% was not included to preserve formatting range of graph.

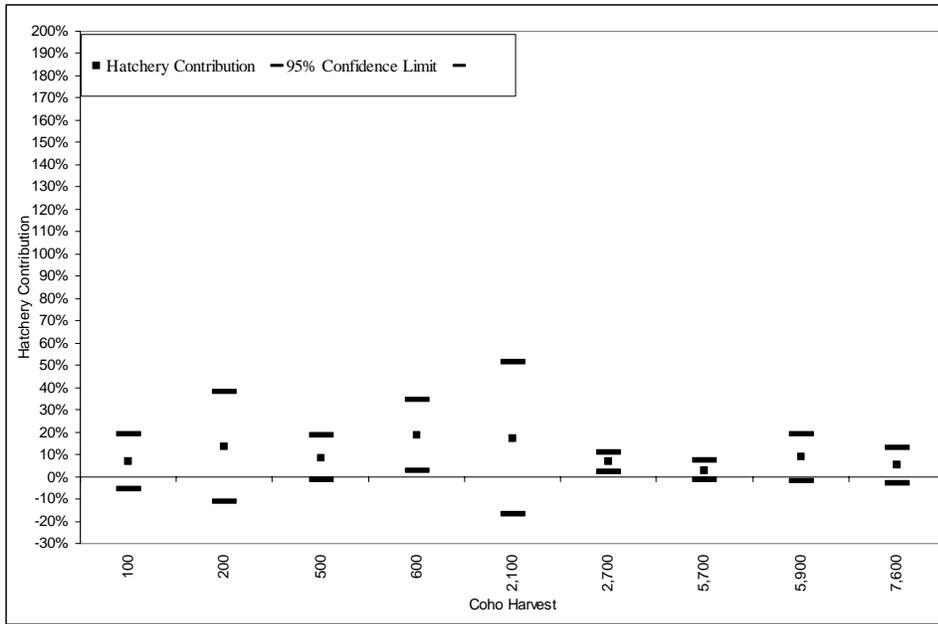


Figure 50. District 107 purse seine fishery weekly hatchery contributions and 95% confidence interval bounds, 1994-1998. Values were omitted for weeks where no tags were recovered in sampling, or when no sampling occurred.

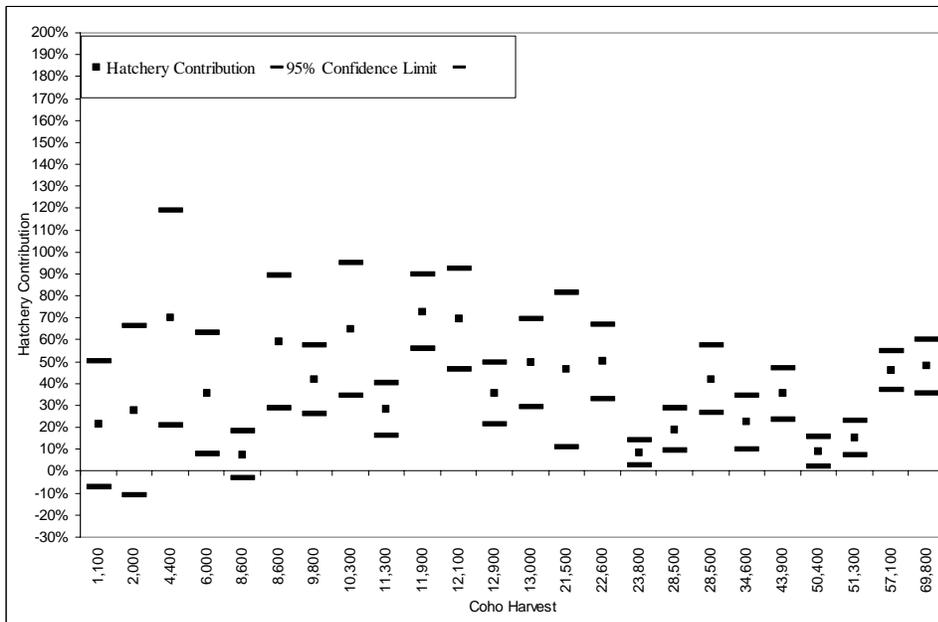


Figure 51. District 109 purse seine fishery weekly hatchery contributions and 95% confidence interval bounds, 1994-1998. Values were omitted for weeks where no tags were recovered in sampling, or when no sampling occurred. A value for a catch of 445 with a hatchery contribution estimate of 494% +/- 953% was not included to preserve formatting range of graph.

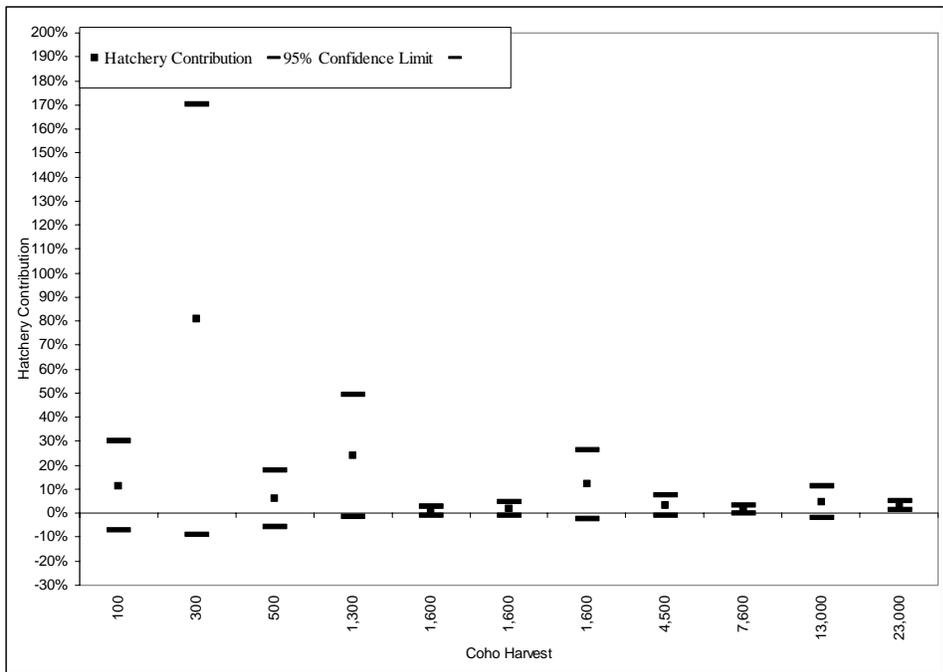


Figure 52. District 110 purse seine fishery weekly hatchery contributions and 95% confidence interval bounds, 1994-1998. Values were omitted for weeks where no tags were recovered in sampling, or when no sampling occurred.

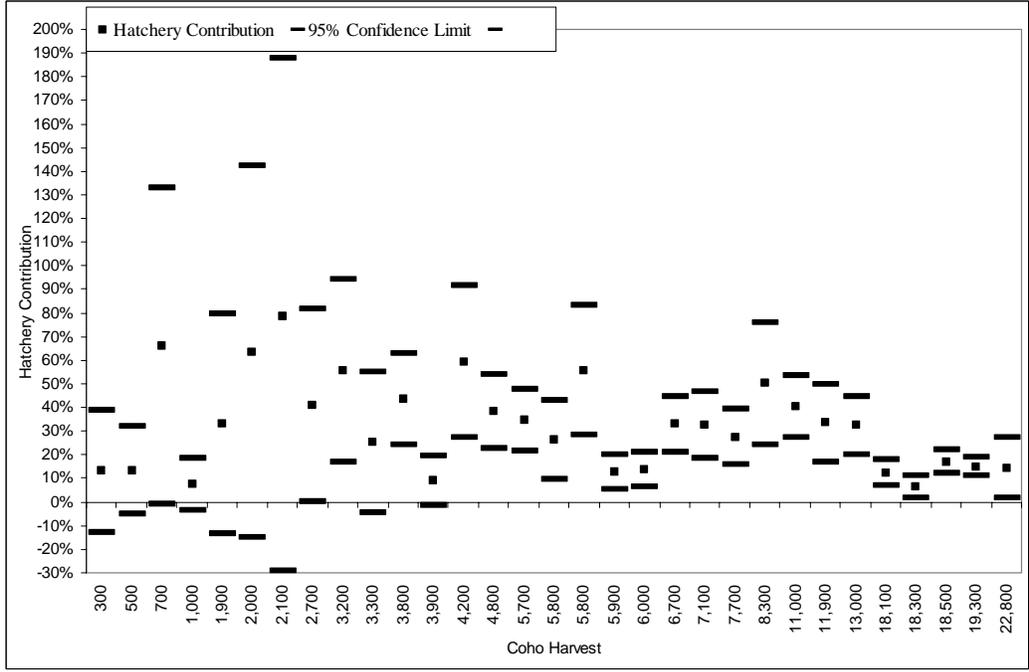


Figure 53. District 112 purse seine fishery weekly hatchery contributions and 95% confidence interval bounds, 1994-1998. Values were omitted for weeks where no tags were recovered in sampling, or when no sampling occurred. A value for a catch of 127 with a hatchery contribution estimate of 865% +/- 1,488% was not included to preserve formatting range of graph.

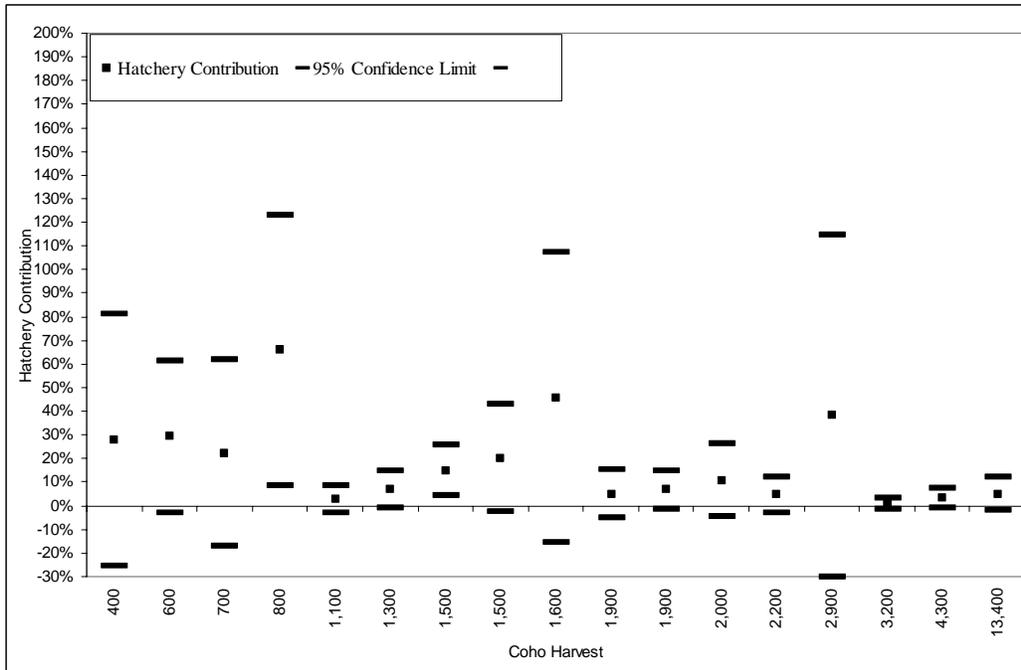


Figure 54. District 113 purse seine fishery weekly hatchery contributions and 95% confidence interval bounds, 1994-1998. Values were omitted for weeks where no tags were recovered in sampling, or when no sampling occurred.

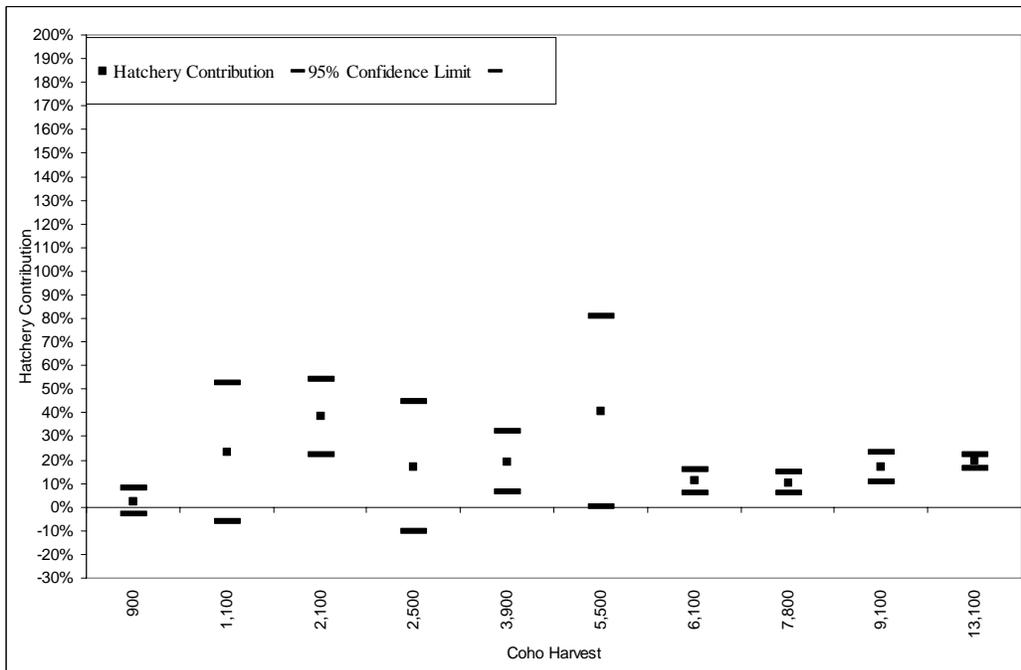


Figure 55. District 114 purse seine fishery weekly hatchery contributions and 95% confidence interval bounds, 1994-1998. Values were omitted for weeks where no tags were recovered in sampling, or when no sampling occurred. A value for a catch of 129 with a hatchery contribution estimate of 173% +/- 334% was not included to preserve formatting range of graph.

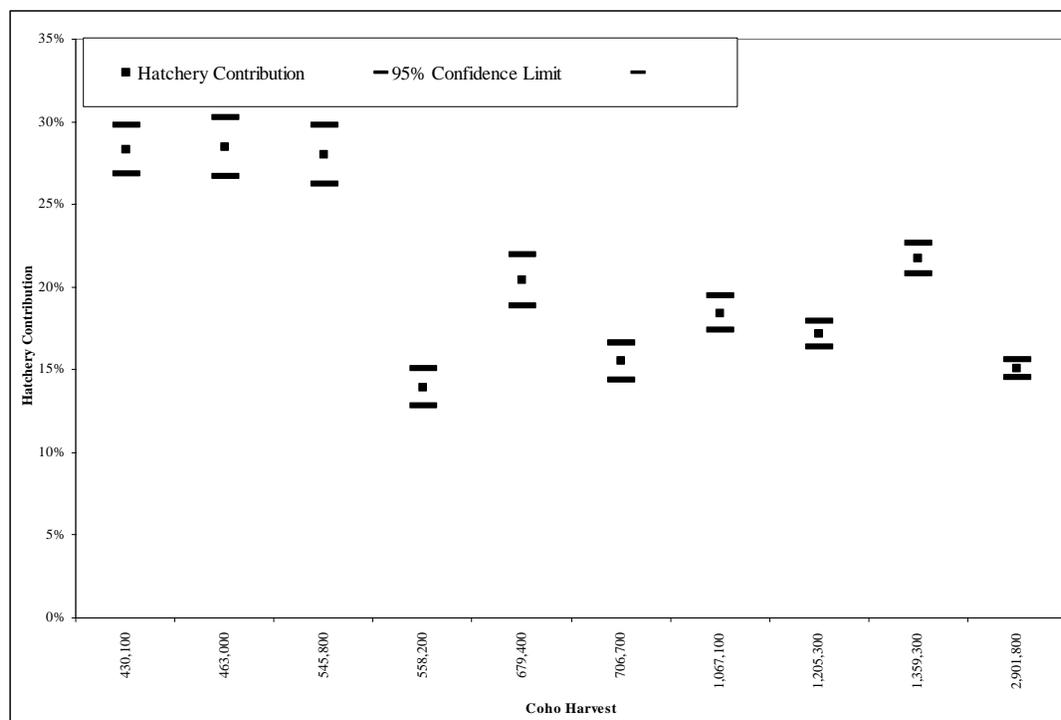


Figure 56. Troll fishery hatchery contributions by period and 95% confidence interval bounds, 1994-1998. There are two periods for each year: 1) July 1 to the mid-August troll closure, and 2) mid-August reopening through the September closure.

The Alaska Department of Fish and Game administers all programs and activities free from discrimination on the bases of race, color, national origin, age, sex, religion, marital status, pregnancy, parenthood, or disability. The department administers all programs and activities in compliance with Title VI of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, Title II of the Americans with Disabilities Act of 1990, the Age Discrimination Act of 1975, and Title IX of the Education Amendments of 1972.

If you believe you have been discriminated against in any program, activity, or facility, or if you desire further information please write to ADF&G, P.O. Box 25526, Juneau, AK 99802-5526; U.S. Fish and Wildlife Service, 4040 N. Fairfield Drive, Suite 300, Arlington, VA 22203 or O.E.O., U.S. Department of the Interior, Washington DC 20240.

For information on alternative formats for this and other department publications, please contact the department ADA Coordinator at (voice) 907-465-4120, (TDD) 907-465-3646, or (FAX) 907-465-2440.