

## CHAPTER II

### CHINOOK SALMON MANAGEMENT

#### CENTRAL VALLEY CHINOOK STOCKS

Central Valley Chinook stocks include fall, late-fall, winter, and spring stocks of the Sacramento and San Joaquin rivers and their tributaries. Two of these stocks are listed under the ESA: (1) Sacramento River winter Chinook, listed as endangered in January 1994; and (2) Central Valley spring Chinook, listed as threatened in September 1999.

#### *Management Objectives*

The following conservation objectives guided Council management of Central Valley Chinook salmon stocks in the 2010 fisheries: (1) for SRFC, an escapement goal of 122,000 to 180,000 hatchery and natural area adults, including additional NMFS guidance to target the upper end of the escapement goal range; and (2) for Sacramento River winter and Central Valley spring Chinook, the ESA consultation standard concerning the duration and timing of the commercial and recreational ocean salmon fisheries south of Point Arena, as well as additional NMFS guidance on recreational size limits directed at reducing mortality of Sacramento River winter Chinook. Harvest impacts on Central Valley Chinook were a primary management concern in fisheries south of Cape Falcon, Oregon

#### **Regulations to Achieve Objectives**

Season and size limit details are presented in Tables I-1 and I-3.

#### *Commercial*

California commercial fisheries were heavily constrained in 2010, primarily to allow for the projected attainment of the SRFC conservation objective. There were only eight days open to commercial fishing south of Point Arena in 2010. Those eight days and quota fisheries of 18,000 and 9,375 were allowed in the Fort Bragg area, and the California portion of the KMZ was closed. Fisheries between Cape Falcon and the OR/CA border delayed opening until May 1, and the Oregon portion of the KMZ was closed in June.

#### *Recreational*

Recreational seasons and size limits were structured to meet the Sacramento River winter and Central Valley spring Chinook ESA consultation standard. In addition to the consultation standard, the minimum size limit for recreational fisheries south Point Arena was 24 inches total length for the period from May 1 through September 6 to comply with 2010 NMFS guidance pertaining to Sacramento River winter Chinook (Chapter I, Regulatory Objectives by Management Area, Horse Mountain to U.S./Mexico Border). The minimum size limit between Point Arena and Horse Mountain was also increased to 24 inches to provide statewide consistency.

Recreational fisheries opened on April 3<sup>rd</sup> south of Horse Mountain, May 29<sup>th</sup> (Memorial Day weekend) in the KMZ, and May 1 between Cape Falcon and Humbug Mt. All recreational fisheries south of Cape Falcon continued through September 6 (Labor Day); however, fisheries south of Point Arena were closed Tuesdays and Wednesdays beginning in May to help achieve the 2010 SRFC spawning escapement objective of 180,000 hatchery and natural area adults.

### *Inside Harvest*

Recreational angling for salmon in Central Valley rivers was structured, in part, to result in a harvest of 8,200 adult SRFC; a mosaic of closures in Central Valley rivers were implemented to achieve this catch expectation. An estimate of SRFC harvest in 2010 Central Valley river fisheries was not available at the time of publication.

Since 1990, regulations have closed the mainstem Sacramento River to retention of salmon from January 15 to July 15, a period when winter Chinook adults are thought to be most abundant. Beginning in 2004, the retention closure was enacted earlier, on January 1 from the Carquinez Bridge to Red Bluff, in response to recovery of winter Chinook coded-wire-tags (CWTs) in the sport fishery. Owing to low Chinook escapement to the Stanislaus, Tuolumne, and Merced rivers during the last decade, the majority of the San Joaquin River has been closed to recreational salmon fishing.

### *Escapement and Management Performance*

Chinook catch in all commercial and recreational fisheries south of Cape Falcon were below preseason expectations. Overall, commercial Chinook fisheries caught about 47 percent of preseason expectations and recreational Chinook fisheries caught about 33 percent of preseason expectations (Table I-7).

### **Sacramento River Fall Chinook**

Under the 2010 regulations, the projected spawning escapement in the Sacramento River Basin was 180,000 hatchery and natural area fall Chinook adults. A total of 125,353 hatchery and natural area SRFC adults were estimated to have returned to the Sacramento River basin for spawning in 2010 (Table II-1, Figure II-1). The 2010 adult escapement estimate is slightly higher than the lower bound of the FMP conservation objective of 122,000 to 180,000 hatchery and natural area adults, and comes one year after the lowest escapement estimate on record. In 2009, SRFC failed to meet the lower bound of the conservation objective for the third consecutive year, thereby triggering an Overfishing Concern under the terms of the FMP.

Fall Chinook returns to Sacramento River hatcheries in 2010 totaled 39,702 adults, and escapement to natural areas was 85,651 adults. Available data indicate hatchery-produced fish constitute a large portion of the Sacramento River naturally spawning fall Chinook population. Table II-1 and Figure II-1 display historical natural and hatchery fall spawner escapement estimates. For a more detailed breakdown of the historical escapement see Appendix B, Tables B-1 and B-2.

### **Sacramento River Winter and Spring Chinook**

Spawner escapement of endangered winter Chinook salmon in 2010 was estimated to be 1,555 adults and 41 jacks. This estimate is derived from a carcass survey conducted on the upper Sacramento River and includes winter Chinook captured in the Keswick trap, which provides broodstock to Livingston Stone National Fish Hatchery. Spawner escapement estimates derived from Red Bluff Diversion Dam counts have been made since 1967, and from 1987 to 2008 the estimates were derived by expanding counts made during the period of dam operation (which overlaps with approximately 15 percent of the winter run migration period). In 2009 and 2010 the period of dam operation was delayed by one month which did not allow for a winter run escapement estimate to be made based on Red Bluff Diversion Dam passage (the gates at Red Bluff Diversion Dam were down beginning on June 15, whereas the gates are down typically on May 15). However, even during years with typical Red Bluff Diversion Dam operation timing, the estimates from the carcass survey are considered to better represent winter run spawner escapement owing to the small proportion of the winter run migration sampled during the Red Bluff Diversion Dam operation period.

Escapement of spring Chinook to the Sacramento River system in 2010 totaled 4,612 fish (jacks and adults), most of which (an estimated 2,951 fish) returned to upper Sacramento River tributaries; the remaining 1,661 fish returned to the Feather River Hatchery. No estimate of spring Chinook escapement to the upper mainstem Sacramento River could be made in 2010 due to the changes in Red Bluff Diversion Dam operation described above. The method used to estimate the spring Chinook return to the Feather River Hatchery was modified in 2005. In previous years, the estimate was equal to the number of Chinook that entered the hatchery during the early period of Chinook spawning. From 2005 through 2010, prior to the spring run spawning period, fish that entered the hatchery were tagged and returned to the river; the number of tagged fish that re-entered the hatchery during the spring run spawning period was used as the estimate of spring Chinook escapement in the Feather River. The fish that were tagged at the hatchery and returned to the river but did not re-enter the hatchery during the spawning period were counted in the natural fall run survey and reported as Feather River fall Chinook. The natural area spawner surveys in the Feather River are not currently capable of separating the spring and fall runs.

Historical spawner escapements for Sacramento River winter and spring Chinook salmon are presented in Appendix B, Table B-3.

### **San Joaquin River Fall Chinook**

San Joaquin River spawning areas are used primarily by fall Chinook. The estimated San Joaquin River fall Chinook spawning escapement in 2010 totaled 4,937 jacks and adults in natural areas and 5,422 jacks and adults to hatcheries (Appendix B, Tables B-1 and B-2 provide historical spawner escapements). Salmon production in the San Joaquin River is determined largely by spring outflows three years earlier. Since 1986, spawner returns to the San Joaquin River have constituted less than 10 percent of the total Central Valley escapement for fall run Chinook.

## **NORTHERN CALIFORNIA COAST CHINOOK STOCKS**

Northern California stocks include fall and spring stocks north of the entrance to San Francisco Bay. Primary river systems in this area are (from north to south) the Smith, Klamath, Mad, Eel, Mattole, and Russian rivers. Coastal Chinook stocks south of the Klamath River were listed as threatened under the ESA in September 1999.

### *Management Objectives*

The KRFC conservation objective, and Council guidance for this stock, primarily influenced management of northern California Chinook salmon stocks in the 2010 fisheries. KRFC were managed in accordance with Council guidance calling for a maximum adult natural spawner reduction rate of 67 percent, with a minimum spawner escapement of 40,700 adults in natural areas. The minimum spawner escapement was raised from 35,000 to 40,700 for 2008, 2009, and 2010 in response to the triggering of an Overfishing Concern after failing to meet the 35,000 spawner escapement floor for three consecutive years (2004, 2005, and 2006). The available harvest of KRFC was shared equally between non-tribal and tribal fisheries (tribes with Federally-recognized fishing rights). KRFC also provided the basis for the NMFS ESA consultation standard for California coastal Chinook, which limits the ocean harvest rate on age-4 KRFC to no more than 16.0 percent.

### **Regulations to Achieve Objectives**

To achieve the management objectives for KRFC, the adopted regulations were designed to result in: (1) a Klamath River run of 110,700 fall Chinook adults, resulting in a spawner escapement of 40,700 adults to natural areas, taking into account projected river fishery impacts of 49,800 adults and returns to basin hatcheries; (2) 50 percent (34,600) of the allowable adult harvest for tribal subsistence and commercial fisheries; (3) 34.6 percent (12,000) of the non-tribal harvest to the Klamath River recreational fishery; and (4) 15.2 percent (approximately 3,400 fish) of the ocean harvest to the KMZ recreational

fishery. The age-4 ocean harvest rate resulting from the above configuration was forecast to be 12.3 percent. Season and size limit details are presented in Tables I-1 and I-3.

### *Commercial*

Commercial fisheries south of Cape Falcon were constrained during the spring and summer months primarily to meet the 2010 management objective for SRFC of 180,000 adult spawners and the ESA consultation standard for LCR natural tule Chinook of a total exploitation rate of no more than 38 percent. Limited opportunities in the Oregon KMZ and Fort Bragg were intended to harvest available KRFC when SRFC abundance was relatively low. Fisheries with quotas of 1,500 in July and 1,500 in August occurred in the Oregon KMZ. Fisheries with quotas of 18,000 July (15-29) and 9,375 in August occurred in Fort Bragg.

No fall commercial fisheries (September-December) were established in Council area waters south of Cape Falcon in 2010 due to concern over the status of SRFC and because KRFC remains in a rebuilding plan, which requires restricting fall fisheries opportunity. State waters only terminal commercial fisheries were allowed in three areas in Oregon (Table I-1).

### *Recreational*

Recreational fisheries south of Cape Falcon were permitted in the KMZ from Memorial Day weekend through Labor Day weekend. Fall fisheries were not permitted in Council area waters south of Cape Falcon after September 6 due to concern over the status of SRFC and because KRFC remains in a rebuilding plan. State waters only terminal commercial fisheries were allowed in three areas in Oregon (Table I-3).

### *Inside Harvest*

Yurok and Hoopa tribes shared a federally reserved right of 50 percent (34,600) of the available harvest surplus of adult Klamath fall Chinook. The State of California managed the river recreational fishery under a 12,000 adult fall Chinook quota. Tribal adult harvest was 29,966, which was 87 percent of the quota (Appendix B, Table B-5). The estimated recreational fishery harvest was 3,035 adult fish, which was 25 percent of the quota. Harvest estimates from streams outside the Klamath River Basin were not available.

### *Escapement and Management Performance*

The commercial quota fisheries in the Oregon portion of the KMZ attained only 3 percent and 8 percent of their July and August quotas, respectively, and the Fort Bragg commercial quota fisheries achieved 25 and 66 percent of their July and August quotas, respectively (Table I-6).

### **Threatened California North Coast Chinook**

Historical indices of spawner abundance, or actual spawning escapement estimates, for Chinook salmon in California coastal streams outside of the Klamath River Basin are limited. Cursory, nonsystematic surveys are conducted on one tributary of the Mad River and two tributaries of the Eel River. Video counts of Chinook passage at Mirabel Dam on the Russian River have been conducted since 2000 (Appendix B, Table B-7).

The 2010 preseason forecast of the KRFC age-4 ocean harvest rate was 12.3 percent (the ESA consultation standard for California Coastal Chinook is no more than 16.0 percent). The postseason evaluation of the 2010 KRFC age-4 ocean harvest rate was not available in time for this report.

## **Klamath River Fall Chinook**

The 2010 preliminary postseason river run size estimate for KRFC was 90,972 adults compared to the preseason predicted ocean escapement (river run size) of 110,700 adults. The escapement to natural spawning areas was 37,221 adults, which was 91 percent of the preseason prediction of 40,700 adults. The estimated number of hatchery returns was 18,050 adults. Table II-2, Figure II-2, and Appendix B, Table B-4 present historical harvest and escapement data for KRFC.

Spawning escapement to the upper Klamath River tributaries (Salmon, Scott, and Shasta Rivers), where spawning was only minimally affected by hatchery strays, totaled 5,850 adults. The Shasta River has historically been the most important Chinook salmon spawning stream in the upper Klamath River, supporting a spawning escapement of 30,700 adults as recently as 1964, and 63,700 in 1935. The escapement in 2010 to the Shasta River was 1,259 adults, while escapement to the Salmon and Scott Rivers was 2,113 and 2,478 adults, respectively (Appendix B, Table B-6).

## **OREGON COAST CHINOOK STOCKS**

Oregon coast Chinook stocks include all fall and spring stocks from Oregon streams south of the Columbia River. These stocks are categorized into two major subgroups based on ocean migration patterns. Although ocean harvest distributions overlap somewhat, they are categorized as either north or south/local migrating. North migrating Chinook stocks include stocks north of and including the Elk River, with the exception of Umpqua River spring Chinook. South/local migrating Chinook stocks include Rogue River spring and fall Chinook, Umpqua River spring Chinook, and fall Chinook from smaller rivers south of the Elk River.

Based on CWT analysis, the populations from 10 major north Oregon coast (NOC) river systems from the Nehalem through the Siuslaw Rivers are harvested primarily in PSC ocean fisheries off B.C., SEAK and Oregon terminal area fisheries. NOC stocks are harvested to a much lesser degree, in Council area fisheries off Washington and Oregon. Analysis of CWTs indicates the populations from five major mid-Oregon coast (MOC) systems between the Coos and the Elk Rivers are harvested primarily in ocean fisheries off B.C., Washington, Oregon and terminally. Minor catches occur in California fisheries and variable catches in SEAK troll fisheries. South/local stocks are important contributors to ocean fisheries off Oregon and northern California. Another central Oregon stock, Umpqua River spring Chinook, contributes primarily to ocean fisheries off Oregon and California, and to a lesser degree, off Washington, B.C., and SEAK.

### *Management Objectives*

The conservation objective for Oregon coast Chinook was an aggregate of 150,000 to 200,000 natural adult spawners, as indicated by peak spawner counts of 60 to 90 fish per mile in standard index surveys. This stock has been an abundant stock historically, therefore preseason abundance estimates were not developed for this stock, and it has not been of critical management concern. ESA consultation standards for OCN coho, LCN coho, and California Coastal Chinook, and KRFC management objectives generally result in reduced Council-area ocean fishery impacts on Oregon south/local migrating Chinook stocks. Council area Chinook fisheries have minor impacts on most of the stocks originating from the NOC, which have a northerly marine distribution pattern.

### **Regulations to Achieve Objectives**

The areas of primary management concern for ocean fisheries impacting Oregon coast Chinook vary between the north and south/local migrating stocks, although there is some overlap. Preseason abundance estimates were not available for Oregon coast Chinook; however, based on postseason abundance indicators, Council area fisheries impacts on this stock have not significantly affected objective achievement in recent years.

For the 2010 Oregon State-waters terminal area fisheries, conservative regulations were adopted with the intention of reducing impacts on these stocks. These regulations included season quotas, daily and weekly landing limits in commercial fisheries, and reduced daily and season bag limits and partial mark-selective restrictions in recreational fisheries (Tables I-1 and I-3).

### *Inside Harvest*

Inside recreational harvest of fall and spring Chinook occurred in most Oregon coastal estuaries and rivers. For the 2010 fisheries, conservative regulations were adopted with the intention of reducing impacts on many of these stocks. Complete estimates of the 2010 recreational Chinook harvest in freshwater areas were not available. Historical estimates of the recreational harvest of fall and spring Chinook, derived from Oregon Department of Fish and Wildlife (ODFW) salmon and steelhead angler catch record cards are reported in Table II-3.

### *Escapement and Management Performance*

The overall quota for the three fall terminal area commercial fisheries was 2,350 Chinook. The catch estimate for those fisheries was 1,912 Chinook.

Under the 2010 regulations, the STT expected the aggregate conservation objective for this stock would be met with the constraints required for SRFC and LCN coho. Actual escapement was not estimated for the Oregon Coast Chinook stock aggregate; achievement of the aggregate 150,000 to 200,000 naturally spawning adults was assessed through peak spawner index counts of 60 to 90 adults per mile in nine index streams and included both spring and fall Chinook. Peak spawner index counts were based on traditional non-random surveys (e.g., stream surveys, dam counts, etc.). ODFW is developing alternate methodologies for establishing escapement goals for Oregon coastal Chinook stocks, including fall Chinook PSC indicator stocks. Upon completion of this process, the escapement goals and assessments for these stocks will likely change.

### **North Migrating Chinook**

An index of adult spawners (peak count per index mile) in nine standard streams was used to measure natural spawner escapement trends for north migrating fall Chinook. Data have been collected since about 1950 for most systems. Overall peak Chinook adult index spawner counts in 2010 were preliminarily estimated at 87 adults per mile, within the goal range of 60 to 90 adults per mile (Table II-4, Figure II-3).

### **South/Local Migrating Chinook**

Standard fall Chinook spawning index escapement data for the smaller southern Oregon coastal rivers (south of the Elk River) were available for the Winchuck, Chetco, and Pistol Rivers (Appendix B, Table B-8). Rogue River carcass counts were used as an indicator of trends in escapement for naturally produced fall Chinook, but these surveys have not been conducted since 2004 (Table II-4). Therefore, two trend indicators of escapement for naturally produced spring Chinook were utilized: (1) Rogue River counts at Gold Ray Dam, and (2) Umpqua River counts at Winchester Dam (Table II-4). Escapements based on these indicators were an increase for the 2010 returns over recent years' returns (Figures II-3 and II-4). The aggregate Oregon coast goal of 150,000 to 200,000 naturally spawning Chinook adults was probably met in 2010.

## **COLUMBIA RIVER BASIN CHINOOK STOCKS**

Columbia River Basin Chinook salmon stocks include fall, summer, and spring stocks. NMFS has listed five Chinook ESUs within the Columbia Basin under the ESA, (1) Snake River wild (SRW) fall Chinook

listed as threatened April 1992; (2) Snake River spring/summer listed as threatened April 1992; (3) upper Columbia River spring listed as endangered March 1999; (4) lower Columbia River listed as threatened March 1999; and (5) upper Willamette River spring listed as threatened March 1999.

The assessment below covers five major stock groups of Columbia River Basin fall Chinook: lower river hatchery (LRH) tulle stock and lower river wild (LRW) bright stock, both of which are part of the ESA-listed lower Columbia River Chinook ESU; Spring Creek Hatchery (SCH) tulle stock; upriver bright (URB) stock, which includes the ESA-listed Snake River fall Chinook ESU; and mid-Columbia bright (MCB) hatchery stock. Management details for Columbia River spring and summer Chinook stocks are not discussed, since Council-managed ocean salmon fisheries have very limited impacts on these stocks (less than a 2 percent exploitation rate in base-period fisheries). Appendix B, Tables B-12 through B-19, contain historical harvest and escapement data for fall, summer, and spring stocks. Appendix B, Table B-20 summarizes catch information for all three Chinook runs in the Columbia Basin. Additional information on these stocks can be found in the *Joint Staff Report: stock status and fisheries for spring Chinook, summer Chinook, sockeye, steelhead, and other species and miscellaneous regulations* and the *Joint Staff Report concerning the fall in-river commercial harvest of Columbia River fall Chinook, summer steelhead, coho salmon, chum salmon, and sturgeon* published annually by the joint staffs of ODFW and WDFW.

### ***Management Objectives***

Council-area fisheries north of Cape Falcon in 2010 were managed to access SCH and LRH stocks while meeting the NMFS ESA consultation standards for the ESA-listed lower Columbia River Chinook ESU (both LCR natural tules and LRW) and SRW fall Chinook ESU. The standard for ESA-listed lower Columbia River natural tules was a total (ocean plus inriver) AEQ exploitation rate of no more than 38.0 percent. For preseason modeling, the estimated total exploitation rate on a composite of Washougal, Kalama, Cowlitz, and Big Creek hatchery tules was used as a surrogate for natural tules. The NMFS ESA consultation standard for LRW is a North Lewis River fall Chinook spawning escapement of 5,700; the preseason forecast was for an escapement of 10,000. The standard for the SRW ESU was no less than a 30.0 percent reduction in the Snake River Fall Index (SRFI) from the 1988 through 1993 base period exploitation rate for all ocean fisheries combined.

In 2010, allowable catch of Chinook was substantially increased due to the strong abundance of tulle Chinook from Spring Creek Hatchery. The NMFS ESA consultation standard for the threatened LCR tulle Chinook was the primary constraint on Council-area Chinook fisheries north of Cape Falcon, and to a lesser extent, south of Cape Falcon.

### **Regulations to Achieve Objective**

Fisheries north of Cape Falcon are managed with quotas to help ensure impacts to stocks do not exceed allowable limits and to ensure allocation objectives are met. The overall non-Indian Chinook total allowable catch (TAC) was 117,000, including a 12,000 mark selective Chinook quota for a portion of the recreational fishery; the equivalent non-mark-selective TAC was 110,000. These compare to a 2009 non-Indian TAC of 41,000 Chinook. The 2010 overall TAC was divided into 56,000 commercial and 61,000 recreational. The treaty Indian ocean troll TAC was 55,000 Chinook, and is applicable to the May-September period. This compares to a 2009 treaty Indian TAC of 39,000.

### ***Commercial***

Non-Indian commercial fisheries north of Cape Falcon included a Chinook directed fishery in May and June initially open seven days per week with no landing limit. Three-fourths of the overall non-Indian commercial Chinook quota north of Cape Falcon was allotted to the May-June time period to increase opportunity when Chinook were more available to the fishery. The typical allotment is two-thirds of the

total troll quota to the May-June time period. Inseason action was taken to limit the days per week and institute landing and possession limits toward the end of the season to ensure the quota of 42,000 Chinook was not exceeded.

The non-Indian commercial all salmon fishery was scheduled for July 1 through September 14 with preseason quotas of 14,000 Chinook and 11,800 marked coho. Inseason action was taken to transfer 2,700 Chinook remaining from the May-June commercial fishery quota and to transfer 1,650 and 1,000 Chinook from the north of Cape Falcon recreational fishery after adjusting for stock specific impact differences associated with different time periods and incidental mortality rates.(impact neutral basis). The fishery was closed September 7 prior to the scheduled closure of September 14 to ensure the Chinook final quota of 19,350 was not exceeded. The fishery was open Friday through Tuesday most weeks with various landing and possession limits for each open period. In addition, vessels were restricted to fishing and landing catch either north or south of Leadbetter Point during any one open period.

### *Recreational*

The recreational fisheries north of Cape Falcon included a June mark-selective Chinook fishery, the first mark-selective Chinook fishery in Council managed waters. The quota for that fishery was 12,000 marked Chinook, equivalent to a 5,000 non-mark-selective quota.

The summer all-salmon fisheries north of Cape Falcon started with a one Chinook bag limit, but inseason action was taken in July to allow two Chinook to be retained. Inseason action was also taken in July to allow the Westport, La Push, and Neah Bay subareas to open seven days per week; the Columbia River subarea was initially open seven days per week. All four subareas were able to close as scheduled, before exceeding their quotas for Chinook or coho. Inseason action was taken to transfer 2,500 and 1,500 Chinook to the non-Indian commercial fishery on an impact neutral basis in exchange for 7,000 marked coho for the Columbia River subarea recreational fishery.

### *Treaty Indian*

Treaty Indian ocean fisheries were similar in structure to recent years, with a May-June Chinook directed fishery and a July 1 to September 15 all salmon fishery. Chinook quotas were 27,500 in each fishery, and the coho quota in the all-salmon fishery was 41,500. Both fisheries closed as scheduled without exceeding any of their quotas.

### *Inside Harvest*

Since the Columbia River Fishery Management Plan expired on December 31, 1998, fall Chinook in Columbia River fisheries were managed through 2007 under the guidance of annual management agreements among the *U.S. versus Oregon* parties. In 2008, a new 10 year management agreement was negotiated through the *U.S. versus Oregon* process, which included revisions to some inriver objectives. In particular, the "*2008-2017 U.S. v Oregon Management Agreement*" (2008-2017 MA) specified that with run sizes of at least 200,000 URB, including at least 6,000 SRW fall Chinook, the allowable URB impact rate would be 38 percent. NMFS used the URB impact rate as a proxy in the SRW consultation standard.

In 2010, the fall fisheries were managed to achieve the NMFS ESA consultation standards for threatened LCR natural tule and SRW Chinook.

Harvestable surplus was projected for all major fall stocks in 2010. The postseason fall Chinook run reconstruction, however, was not completed in time for this report. The preliminary catch estimate for the non-Indian commercial gillnet fisheries were 39,949 spring, 4,740 summer, and 45,393 fall Chinook, which included 26,142 spring, 20 summer, and 12,712 fall Chinook in Select Area (terminal) fisheries.



The preliminary catch estimates for the treaty Indian fisheries were 37,815 spring, 15,569 summer, and 131,503 fall Chinook. The preliminary catch estimate for the recreational fisheries included 6,393 fall Chinook in the Buoy 10 fishery, and 29,735 spring, 2,738 summer, and 16,600 fall Chinook in mainstem fisheries below Bonneville Dam, 3,512 spring Chinook in mainstem fisheries above Bonneville Dam, and 11,209 fall Chinook in the Hanford Reach fishery above McNary Dam (Appendix B, Table B-20).

### *Escapement and Management Performance*

All Columbia River fall stocks met their escapement objectives (Table II-5). Preliminary estimates of river mouth returns based on inseason run updates were: 86,245 LRH; 9,971 LRW; 123,037 SCH; 255,492 URB; and 68,765 MCB. Estimates for SRW were unavailable. The total ocean escapement of the five stocks was 556,191 fall Chinook (Figure II-5).

The 2010 URB and SRW run sizes were both large enough to allow a 38 percent harvest rate per the 2008-2017 MA. The preliminary URB harvest rate estimate was 36.02 percent. No specific escapement goal was established for the ESA-threatened Snake River wild fall Chinook stock. Because nearly all spawning of this stock occurs upstream from Lower Granite Dam, establishing a spawning escapement goal at Lower Granite Dam would be appropriate. In the *Proposed Recovery Plan for Snake River Salmon*, NMFS has proposed a delisting goal for Snake River fall Chinook that provides for an eight-year (approximately two generation) geometric mean of at least 2,500 natural origin spawners in the mainstem Snake River annually; the eight-year mean through 2009 was 2,494. The total adult fall Chinook count at Lower Granite Dam in 2010 was 41,815 up from 15,167 in 2009. A significant portion of recent year years returns were from supplementation programs. An estimate of SRW fall Chinook spawning escapement in 2010 was not available for this report.

All Council area fisheries north of Cape Falcon were closed before exceeding their final quotas. Postseason estimates of exploitation rate on Columbia River natural tule or SRW for ocean fisheries were unavailable.

## **WASHINGTON COASTAL CHINOOK STOCKS**

Washington coastal Chinook stocks include all fall, summer, and spring stocks from coastal streams north of the Columbia River through the western Strait of Juan de Fuca (west of the Elwha River, inclusive). This complex consists of several natural stocks, generally of small to medium-sized populations, and some hatchery production (primarily Willapa Bay and Quinalt River). Coastal stocks are not impacted significantly by Council-area ocean fisheries.

### *Management Objectives*

Willapa Bay natural fall Chinook do not have a conservation objective defined in the Salmon FMP, although WDFW has a spawning escapement objective of 4,350 natural Chinook, which is based on peak density estimates and watershed area.

Spawning escapement goals for natural stocks managed within this complex north of Willapa Bay, established in U.S. District Court by WDFW and the treaty Indian tribes, were recognized in the Council's FMP conservation objectives. Objectives for Grays Harbor and the North Coast river systems were established pursuant to the U.S. District Court order in *Hoh versus Baldrige*. However, annual natural spawning escapement targets may vary from the FMP conservation objectives if agreed to by WDFW and the treaty Indian tribes under the provisions of *Hoh versus Baldrige* and subsequent U.S. District Court orders. After agreement is reached on the annual targets, ocean fishery escapement objectives are established for each river, or region of origin, which include provisions for treaty Indian allocation and inside non-Indian fishery needs. No agreements on annual spawning targets for Washington coastal Chinook other than those in the FMP were made in 2010.

## **Regulations to Achieve Objectives**

Preseason abundance forecasts for some Washington coastal Chinook stocks were available for the first time in 2008 for the Council preseason management process. However, base period Council area ocean fishery AEQ exploitation rates of 5 percent or less for these stocks were below a management threshold that allows effective Council management of these stocks, and therefore they qualified as exceptions to the Council's overfishing criteria. Because Council area fishery impacts to Washington coastal Chinook stocks are negligible, ocean regulations are not generally used to manage these stocks. The only Council area regulation affecting any of these stocks was closing the Grays Harbor Control Zone in August and September for the recreational fishery.

### *Willapa Bay Chinook*

#### **Inside Harvest**

Run size, harvest, and escapement data for Willapa Bay fall Chinook are presented in Appendix B, Table B-23.

No Chinook-directed non-Indian gillnet fishery was conducted during July 2010. This fishery is commonly referred to as the "summer dip-in" fishery; it occurs irregularly because historically it was dependent on Columbia River tule abundance, which now include the ESA-listed LCR natural tule stock. This fishery was generally assumed to harvest Columbia River tule stocks in a mix similar to adjacent ocean area catches; however, in light of recent catch composition information (>70 percent local Willapa Bay and Grays Harbor origin stock) this assumption has been questioned.

The 2010 pre-season forecast of Chinook returning to Willapa Bay was 33,157 fish (2,023 natural and 31,134 hatchery). There were two 24 hour Chinook-directed fisheries in August 2010. However, retention of unmarked Chinook was prohibited in August and September. Chinook harvest in coho-targeted gillnet fisheries during 2010 totaled 6,903 fish, based on preliminary data.

Recreational fisheries in the marine waters of Willapa Bay were open from July 4 through July 31, 2010 concurrent with the Ocean Marine Area 2 (ocean rules applied). From August 1, 2010 through January 31, 2011, Willapa Bay was open to recreational fishing with no more than three adults allowed to be harvested daily. Barbed hooks were not allowed when fishing for salmon. Retention of chum and unmarked Chinook was prohibited.

Recreational salmon fisheries in tributaries to Willapa Bay varied in duration but were generally open August 1, 2010 through January 31, 2011. Retention of unmarked Chinook was prohibited except in the Naselle River, where two unmarked adult Chinook could be retained. Single-point, barbless hooks were required in all areas except for the Naselle River. Recreational harvest estimates were not available for 2010.

#### **Escapement and Management Performance**

During 2009, Chinook returning to hatcheries in the Willapa Bay watershed totaled 20,333 fish. Based on current hatchery production, this return was sufficient to achieve the goal of 9,800 total Chinook escapement to Willapa Bay hatchery facilities. An escapement estimate was unavailable for 2010.

The WDFW escapement goal for naturally spawning Chinook in Willapa Bay was 4,350 adults. An estimate of the 2010 natural spawning escapement was not available (the 2009 natural escapement was 2,251 Chinook). An estimated 1,486 natural Chinook were harvested in commercial and recreational fisheries in 2010, above the preseason expectation of 850.

## *Grays Harbor Chinook*

### **Inside Harvest**

Run size, harvest, and escapement data for Grays Harbor Chinook are presented in Appendix B, Table B-25.

Spring Chinook sales were prohibited in the Chehalis Tribe commercial gillnet fishery. On the Chehalis River and the Humptulips commercial fishing Area 2C, the Quinault Indian Nation conducted a spring/summer commercial gillnet fishery with mesh restrictions to reduce impacts on spring Chinook while targeting white sturgeon. The recreational season was also closed to spring Chinook retention in Grays Harbor. No summer non-Indian gillnet fishery directed at non-local Chinook stocks occurred in 2010.

The non-Indian gillnet fishery in Humptulips commercial Area 2-C had six open periods in September for a total of 15 fishing days. Retention of fall Chinook and marked coho was allowed. Live boxes were required and unmarked coho could not be retained. Catches totaled 1,217 Chinook and 672 coho. The non-Indian gillnet fishery in the Chehalis River commercial Areas 2A and 2D was open for 2 days in October; live boxes were required, and Chinook could not be retained.

The recreational fishery in Marine Area 2-2 was open from September 16 through November 30, with Chinook and chum retention prohibited. The recreational fishery in the Chehalis River was closed to Chinook retention. In the recreational Humptulips River fishery from the mouth to Hwy 101 Bridge, retention of Chinook was allowed from September 16 through January 31. Recreational harvest estimates were not available.

The Quinault Indian Nation fall gillnet fishery harvested a total of 3,403 fall Chinook in two separately scheduled areas: the first in the lower Humptulips River and adjacent Area 2C of Grays Harbor and the second in the lower Chehalis River and adjacent areas of Grays Harbor, Areas 2D, 2A, and 2A-1. Fishing was restricted to east of Stearns Bluff in the Chehalis River, and Areas 2D, 2A, and 2A-1 to limit catches of Chinook, which tend to concentrate in deep areas off the mouths of the Johns and Elk Rivers. The Humptulips area treaty Indian gillnet fishery caught 1,951 fall Chinook, which was 83.9 percent of the preseason expected catch level. The Quinault Tribal gillnet fishery in the Chehalis River caught 1,452 fall Chinook, which was 70.6 percent greater than the preseason expected catch level. The Quinault treaty Indian gillnet fishery in the Chehalis River caught 1,452 fall Chinook which was 70.6 percent over the preseason expected catch level.

### **Escapement and Management Performance**

Chehalis River spring Chinook are of natural origin and managed for an escapement goal of 1,400 adults. The 2010 terminal run forecast for spring Chinook was 909 adult fish; an escapement estimate was not available for the 2010 return. The 2009 final escapement estimate was 1,132.

Grays Harbor fall Chinook were managed for a natural spawning escapement goal of 14,600 adults. The 2010 Grays Harbor fall Chinook forecast was 19,167 natural and 2,404 hatchery adults. Natural and hatchery escapement estimates for 2010 were unavailable. The total spawning ground escapement estimate for 2009 was 7,215, which included some hatchery origin fish. The established hatchery escapement goals for Grays Harbor are 578 for the Chehalis River, which was not achieved in 2009, and 369 for the Humptulips River, which was achieved in 2009.

## *Quinault River Chinook*

### **Inside Harvest**

Historical terminal gillnet harvest data for Quinault River Chinook stocks are presented in Appendix B, Table B-27.

A run of natural spawning spring/summer Chinook enters the river from April through July. The spring/summer Chinook run is typically small and any harvest is taken incidentally during fisheries directed at sockeye and steelhead. Less than 20 spring/summer Chinook were harvested in 2010.

The 2010 harvest of Quinault River fall Chinook was mostly hatchery origin fish taken in September and October. The treaty Indian net catch totaled 4,521 fall Chinook.

### **Escapement and Management Performance**

Quinault fall Chinook were managed for hatchery production. The 2010 fall Chinook spawning escapement estimate was not available. Hatchery fall Chinook egg-take goals for the Quinault River were attained at the Lake Quinault tribal hatchery.

## *Queets River Chinook*

### **Inside Harvest**

Historical terminal run size, catch, and escapement data for Queets River spring/summer and fall Chinook are presented in Appendix B, Tables B-29 and B-30, respectively.

The treaty Indian gillnet harvest of spring/summer Chinook remained closed during the spring/summer period through the last week of August. The non-Indian in-river recreational fishery was closed to retention of Chinook.

Fall Chinook were harvested from August 29 through November 4 by the treaty Indian fall gillnet fishery. The treaty Indian fishery was structured to target hatchery and natural coho while also harvesting Chinook at a total tribal plus non-tribal harvest rate of 40 percent. The treaty Indian gillnet fishery harvested 1,723 fall Chinook in the commercial fishery compared to a preseason expected catch of 1,635. Recreational fisheries targeted coho and Chinook during standard schedules in the Queets and Clearwater Rivers. The on-reservation Salmon River recreational harvest was limited to retention of coho. Only mark-selective Chinook retention was allowed for recreational fisheries within Olympic National Park waters. Catch estimates for recreational fisheries were not available.

### **Escapement and Management Performance**

The 2009 spawning escapement estimate for Queets River spring/summer Chinook was 495 adults, about 70 percent of the minimum escapement goal of 700. The 2010 escapement was not available.

The 2010 fall Chinook spawner survey escapement estimate was not available; however, total fall Chinook escapement is expected to be above the minimum escapement goal of 2,500. High flow conditions during Chinook spawning may adversely affect the quality of escapement estimates based on spawning ground surveys. Catch sampling suggests the proportion of natural and "indicator" Chinook (reared and released from the Salmon River hatchery) may have been close to the preseason prediction. The indicator Chinook originate from wild broodstock taken each year in the river.

## *Hoh River Chinook*

### **Inside Harvest**

Historical terminal run size, catch, and escapement data for Hoh River spring/summer and fall Chinook are presented in Appendix B, Tables B-32 and B-33, respectively.

The 2010 Hoh River spring/summer Chinook terminal abundance forecast was 814 fish, 86 fish below the escapement goal of 900. The treaty Indian gillnet fishery occurred between the weeks of May 3 and the week of July 5, and was scheduled for two days per week in weeks 19-23 and one day per week in weeks 24-27, targeting 7.9 percent (including ceremonial and subsistence catch) of the forecasted run. Tribal regulation in 2010 required a minimum of 8 inch stretch mesh during the first four weeks in order to minimize incidental take of steelhead kelts. The treaty Indian gillnet fishery harvested 107 Chinook. Results of mark sampling and scales indicated that 83 of these were of hatchery origin (24 natural). The non-Indian recreational fishery operated from May 16 through August 31, Wednesdays through Sundays, with a bag limit of one marked adult per day from the mouth to Willoughby Creek. A preliminary estimate of Chinook taken in the sport fishery was not available. Retention of un-marked fish was not allowed this year.

Hoh River fisheries for fall Chinook were based on an expected terminal run size of 3,250 adults, allowing for a terminal harvest rate of 40 percent. The spawning escapement was expected to be 1,950 adults.

The treaty Indian fishery targeted 25.5 percent of the terminal run. The treaty Indian gillnet fishery was scheduled for two days per week during weeks 36, 37, and 44-50, and three days per week in weeks 38-43, 51, and 52. The treaty Indian fishery caught approximately 342 Chinook out of an expected catch of 799. Results of mark sampling indicated that 308 of these were of natural origin. Coded-wire tag data were not available.

The non-Indian recreational fishery extended from September 1 through November 30, with the river below Willoughby Creek open and a daily-bag-limit of six salmon, two of which could be adults. The portion of the river between Willoughby Creek and Morgan's Crossing was open October 16 through November 30. The delayed opening was to reduce impacts on spawning spring/summer Chinook in that reach. The river above Morgan's Crossing was closed to recreational salmon fishing. A catch estimate was not available for the recreational fishery.

### **Escapement and Management Performance**

The 2010 spawning escapement for Hoh River spring/summer Chinook was estimated at 828 adults, approximately 72 fish lower than the 900 fish escapement floor established for this stock. However, this escapement was 78 fish higher than expected preseason.

The preliminary 2010 spawning escapement estimate for Hoh River fall Chinook was 2,347. The escapement goal is the greater of 60 percent of the terminal run or 1,200; for 2010 the goal was 1,950. Tribal catch was below expected harvest rates.

## *Quillayute River Chinook*

### **Inside Harvest**

Historical terminal run size, catch, and escapement data for Quillayute River spring, summer, and fall Chinook are presented in Appendix B, Tables B-35 and B-36 respectively. Spring and summer Chinook are currently managed separately, but data for both are combined in Table B-35. All hatchery origin fish are considered to be spring Chinook, and all natural spawners and tribal broodstock collections are considered to be summer Chinook. The management of these stocks is currently under review by the WDFW and Quileute Tribal co-managers.

The recreational and tribal fisheries for spring and summer Chinook were established by a preseason management agreement between WDFW and the Quileute Tribe. The total tribal catch for 2010 was 438 spring and 126 summer Chinook and included ceremonial and subsistence use. Estimates of 2010 recreational spring and summer Chinook harvest were unavailable.

The total 2010 Quileute Tribal harvest of fall Chinook was 1,814, and included ceremonial and subsistence use. An estimate of the 2010 recreational catch was unavailable.

As in past years, WDFW required release of unmarked Chinook during July and August to reduce impacts of the recreational fishery on the natural summer Chinook stock. The fall recreational fishery from September through November proceeded with normal bag limits and schedule. The Quileute Tribe did not have a closure in their fishery this year, but as in past years, reduced their fishery to 29 hours per week during July and August to reduce impacts to summer Chinook.

### **Escapement and Management Performance**

The management agreement called for an escapement goal of 200 hatchery spring Chinook. The actual rack return was 880, which exceeded hatchery requirements.

The summer Chinook run was managed to achieve an escapement of 1,200 adults, jacks, and broodstock collection combined. The preliminary estimated natural spawning summer Chinook escapement of 702 was under the escapement goal.

Terminal area fisheries on fall Chinook were managed for a target 40 percent harvest rate, with a minimum escapement level of 3,000 adults. The preliminary escapement estimate of 4,386 fall Chinook was above the escapement goal.

## **PUGET SOUND CHINOOK STOCKS**

Puget Sound Chinook stocks include all fall, summer, and spring stocks originating from U.S. tributaries in Puget Sound and the eastern Strait of Juan de Fuca (east of Salt Creek, inclusive). This stock complex consists of numerous natural Chinook stocks of small to medium sized populations and significant hatchery production. The Puget Sound ESU was listed under the ESA as threatened in March 1999.

### *Management Objectives*

The stocks within this complex and their respective FMP conservation objectives were established in U.S. District Court by WDFW and the treaty Indian tribes. The conservation objectives for stocks managed primarily for natural production were developed by a State/Tribal Management Plan Development Team following the Boldt Decision, and were based on "the adult spawning population that will, on the average, maximize biomass of juvenile outmigrants subsequent to incubation and freshwater rearing under average environmental conditions." The objectives were estimated for the average spawning escapement during periods thought to represent spawner abundances that provided maximum production. The objectives for

stocks managed for artificial production are based on hatchery escapement needs. Annual management targets (expected hatchery returns plus natural escapement) for specific rivers or regions of origin may vary from the FMP conservation objectives by following fixed procedures established in U.S. District Court as outlined in "Memorandum Adopting Salmon Management Plan" (*U.S. versus Washington*, 626 F. Supp. 1405 [1985]).

In 2010, Puget Sound stocks were managed pursuant to the provisions of a WDFW/Tribal management plan approved under an ESA Section 4(d) rule promulgated by NMFS. This plan contains exploitation rate ceilings for ESA-listed Puget Sound stocks that were compared to predicted exploitation rates to assess compliance with ESA consultation standards (Table II-5).

### **Regulations to Achieve Objectives**

Puget Sound stocks contribute to fisheries off B.C., are present to a lesser degree off SEAK, and are impacted to a minor degree by Council-area ocean fisheries. Puget Sound stocks have base period Council-area ocean fishery AEQ exploitation rates of 5 percent or less which are below a management threshold for effective Council management of these stocks, and therefore qualify as exceptions to the Council's overfishing criteria. Because Council area fishery impacts to Puget Sound Chinook stocks are negligible, ocean regulations are not generally used to manage these stocks. The only Council area regulation affecting any of these stocks was closing the Cape Flattery Control Zone for the commercial fishery.

#### *Inside Harvest*

Commercial inside fishery harvest of Puget Sound Chinook was managed on the basis of six regional stock management units or, in some cases, component stocks within management units: Strait of Juan de Fuca, Nooksack-Samish, Skagit, Stillaguamish-Snohomish, South Puget Sound, and Hood Canal. Harvest was regulated according to the natural spawning escapement goal or hatchery program escapement goal for that unit. Commercial net and troll harvest (treaty Indian and non-Indian) is presented in Appendix B, Table B-38. These catches included some fish of non-Puget Sound origin. The total commercial harvest in Puget Sound in 2010 was 937,200 Chinook, compared to 77,052 Chinook caught in 2009. The 2010 non-Indian net catch was 7,922 Chinook, compared to 2,749 Chinook caught in 2009. The 2010 treaty Indian net and troll harvest was 85,278 Chinook, compared to 74,303 Chinook caught in 2009.

Chinook catches in the Puget Sound recreational fishery for years 1971 through 2009 are presented in Appendix B, Table B-39. Catch estimates for the 2010 Puget Sound recreational fishery were unavailable.

#### *Escapement and Management Performance*

Puget Sound Chinook management goals for fishery planning processes in 2010 were expressed in terms of constraints on total fishery rebuilding exploitation rates (RER) or on exploitation rates on fisheries south of the Canadian border for those stocks without RERs. Information to evaluate performance against these constraints was unavailable.

Historical hatchery and natural run component escapements and net catches for summer/fall Chinook for each Puget Sound region of origin are presented in Appendix B, Table B-40. Historical spring Chinook escapement data are presented in Appendix B, Table B-43.

Preliminary data suggest most Puget Sound hatcheries met their summer/fall Chinook goals.

Naturally spawning Puget Sound spring and summer/fall Chinook remained depressed in 2010. Preliminary data suggest no Puget Sound spring Chinook natural stocks met their escapement goals. Preliminary information on 2010 natural spawning escapements for summer/fall Chinook stocks indicate escapement goals were met in some areas, but not in many others. Escapement estimates for 2010 were not available for most runs. In many natural spawning areas, hatchery origin Chinook comprise a large component of the natural spawning population.

### **COASTWIDE GOAL ASSESSMENT SUMMARY**

Information to assess conservation objectives was unavailable for LCR natural tule Chinook, SRW fall Chinook, Grays Harbor natural fall Chinook, and all Puget Sound natural Chinook stocks. Conservation objectives for all other Council managed Chinook stocks were met except for Hoh spring/summer, Queets spring/summer, and Quillayute summer Chinook.

A summary of 2010 performance for Chinook salmon stocks in relation to Council conservation objectives is presented in Table II-5.



TABLE II-1. Sacramento River natural and hatchery adult fall Chinook escapement in numbers of fish.

| Year               | Upper River <sup>a/</sup> |                       |          | Lower River |                       |          | Total    |                       | Grand Total     |
|--------------------|---------------------------|-----------------------|----------|-------------|-----------------------|----------|----------|-----------------------|-----------------|
|                    | Hatchery                  | Natural <sup>b/</sup> | Subtotal | Hatchery    | Natural <sup>b/</sup> | Subtotal | Hatchery | Natural <sup>b/</sup> |                 |
| 1970               | 3,010                     | 61,160                | 64,170   | 10,266      | 82,230                | 92,496   | 13,275   | 143,390               | 156,666         |
| 1971               | 1,728                     | 67,586                | 69,314   | 11,011      | 74,556                | 85,567   | 12,739   | 142,143               | 154,882         |
| 1972               | 1,259                     | 36,485                | 37,744   | 6,766       | 47,647                | 54,413   | 8,025    | 84,132                | 92,157          |
| 1973               | 1,679                     | 48,948                | 50,627   | 18,010      | 151,422               | 169,433  | 19,689   | 200,371               | 220,060         |
| 1974               | 1,984                     | 66,304                | 68,288   | 11,799      | 121,930               | 133,729  | 13,783   | 188,234               | 202,017         |
| 1975               | 3,289                     | 72,986                | 76,275   | 10,781      | 68,564                | 79,346   | 14,071   | 141,550               | 155,621         |
| 1976               | 3,017                     | 80,263                | 83,280   | 8,612       | 75,975                | 84,586   | 11,628   | 156,238               | 167,866         |
| 1977               | 6,083                     | 60,967                | 67,050   | 14,896      | 82,065                | 96,961   | 20,978   | 143,032               | 164,011         |
| 1978               | 2,717                     | 66,991                | 69,708   | 9,937       | 47,303                | 57,240   | 12,654   | 114,295               | 126,948         |
| 1979               | 6,407                     | 81,332                | 87,739   | 12,359      | 72,299                | 84,658   | 18,766   | 153,632               | 172,398         |
| 1980               | 10,271                    | 45,504                | 55,775   | 14,725      | 71,608                | 86,333   | 24,996   | 117,113               | 142,108         |
| 1981               | 5,883                     | 51,831                | 57,714   | 25,115      | 92,129                | 117,245  | 30,998   | 143,960               | 174,958         |
| 1982               | 17,117                    | 39,694                | 56,811   | 15,229      | 92,600                | 107,829  | 32,347   | 132,293               | 164,640         |
| 1983               | 6,112                     | 42,570                | 48,682   | 12,735      | 48,831                | 61,566   | 18,847   | 91,401                | 110,248         |
| 1984               | 19,594                    | 51,772                | 71,366   | 19,873      | 67,733                | 87,607   | 39,467   | 119,505               | 158,972         |
| 1985               | 15,869                    | 103,698               | 119,566  | 13,987      | 105,753               | 119,740  | 29,856   | 209,450               | 239,306         |
| 1986               | 11,283                    | 113,875               | 125,158  | 12,511      | 102,434               | 114,945  | 23,793   | 216,310               | 240,103         |
| 1987               | 9,981                     | 76,861                | 86,842   | 10,291      | 97,930                | 108,222  | 20,273   | 174,791               | 195,063         |
| 1988               | 12,594                    | 128,725               | 141,319  | 16,921      | 69,228                | 86,149   | 29,515   | 197,953               | 227,468         |
| 1989               | 10,212                    | 67,296                | 77,508   | 15,668      | 59,387                | 75,055   | 25,880   | 126,683               | 152,563         |
| 1990               | 13,464                    | 50,225                | 63,689   | 8,428       | 32,973                | 41,401   | 21,892   | 83,198                | 105,090         |
| 1991               | 10,031                    | 35,259                | 45,290   | 17,435      | 56,144                | 73,579   | 27,466   | 91,403                | 118,869         |
| 1992               | 6,257                     | 31,734                | 37,991   | 15,831      | 27,723                | 43,554   | 22,088   | 59,457                | 81,545          |
| 1993               | 7,056                     | 55,144                | 62,200   | 19,778      | 55,412                | 75,190   | 26,834   | 110,556               | 137,390         |
| 1994               | 11,585                    | 66,383                | 77,968   | 20,972      | 66,647                | 87,619   | 32,556   | 133,030               | 165,586         |
| 1995               | 24,810                    | 112,235               | 137,045  | 17,017      | 141,252               | 158,269  | 41,827   | 253,487               | 295,314         |
| 1996               | 18,848                    | 131,268               | 150,116  | 15,712      | 135,803               | 151,516  | 34,561   | 267,071               | 301,632         |
| 1997               | 44,590                    | 167,353               | 211,943  | 20,651      | 112,246               | 132,897  | 65,241   | 279,599               | 344,840         |
| 1998               | 42,400                    | 60,713                | 103,113  | 35,364      | 107,431               | 142,795  | 77,763   | 168,144               | 245,908         |
| 1999               | 23,194                    | 256,629               | 279,823  | 22,917      | 97,089                | 120,006  | 46,112   | 353,718               | 399,830         |
| 2000               | 20,793                    | 152,923               | 173,716  | 27,530      | 216,291               | 243,821  | 48,323   | 369,214               | 417,537         |
| 2001               | 23,710                    | 179,198               | 202,908  | 35,650      | 358,217               | 393,867  | 59,360   | 537,415               | 596,775         |
| 2002               | 61,895                    | 474,812 <sup>c/</sup> | 536,707  | 25,278      | 207,883               | 233,161  | 87,173   | 682,695               | 769,868         |
| 2003               | 82,882                    | 164,802               | 247,684  | 26,696      | 248,636               | 275,332  | 109,578  | 413,438               | 523,016         |
| 2004               | 52,145                    | 70,548                | 122,693  | 31,262      | 132,930               | 164,192  | 83,407   | 203,478               | 286,885         |
| 2005               | 139,979                   | 96,716                | 236,695  | 45,320      | 113,990               | 159,310  | 185,299  | 210,706               | 396,005         |
| 2006               | 56,819                    | 89,933                | 146,752  | 23,087      | 105,191               | 128,278  | 79,906   | 195,124               | 275,030         |
| 2007               | 11,543                    | 36,079                | 47,622   | 9,833       | 33,919                | 43,752   | 21,376   | 69,998                | 91,374          |
| 2008               | 10,181                    | 36,274                | 46,455   | 8,331       | 10,578                | 18,909   | 18,512   | 46,852                | 65,364          |
| 2009               | 5,433                     | 12,277                | 17,710   | 12,103      | 11,060                | 23,163   | 17,536   | 23,337                | 40,873          |
| 2010 <sup>d/</sup> | 8,666                     | 25,682                | 34,348   | 31,036      | 59,969                | 91,005   | 39,702   | 85,651                | 125,353         |
| Goal               |                           |                       |          |             |                       |          |          |                       | 122,000-180,000 |

a/ Above the Feather River; 1971-1985 estimates include Tehama-Colusa Spawning Channel.

b/ Fish spawning in natural areas are the result of hatchery and natural production; estimates generally based on carcass surveys.

c/ Estimation methodology was changed due to an extremely high Battle Creek escapement in 2002.

d/ Preliminary.

TABLE II-2. Klamath River adult inriver fall Chinook run size, spawning escapement, recreational catch, Indian gillnet harvest, and non-landed fishing mortalities in numbers of fish and percent of the total inriver run size.

| Year               | Spawning Escapement |                       |         |         | Inriver<br>Recreational Catch |         | Indian Net Catch |         | Non-landed<br>Fishing Mortality |         | Inriver Run<br>Size   |
|--------------------|---------------------|-----------------------|---------|---------|-------------------------------|---------|------------------|---------|---------------------------------|---------|-----------------------|
|                    | Hatchery            | Natural               | Total   | Percent | Numbers                       | Percent | Numbers          | Percent | Numbers                         | Percent | Numbers               |
| 1978               | 12,979              | 58,492                | 71,471  | 77%     | 1,694                         | 2%      | 18,200           | 20%     | 1,618                           | 2%      | 92,983                |
| 1979               | 3,636               | 30,637                | 34,273  | 67%     | 2,141                         | 4%      | 13,650           | 27%     | 1,231                           | 2%      | 51,295                |
| 1980               | 6,511               | 21,483                | 27,994  | 61%     | 4,496                         | 10%     | 12,013           | 26%     | 1,137                           | 2%      | 45,640                |
| 1981               | 4,425               | 33,857                | 38,282  | 48%     | 5,983                         | 7%      | 33,033           | 41%     | 2,994                           | 4%      | 80,292                |
| 1982               | 10,411              | 31,951                | 42,362  | 64%     | 8,339                         | 13%     | 14,482           | 22%     | 1,429                           | 2%      | 66,612                |
| 1983               | 13,865              | 30,784                | 44,649  | 78%     | 4,235                         | 7%      | 7,890            | 14%     | 772                             | 1%      | 57,546                |
| 1984               | 7,496               | 16,064                | 23,560  | 50%     | 3,340                         | 7%      | 18,670           | 40%     | 1,691                           | 4%      | 47,261                |
| 1985               | 22,534              | 25,677                | 48,211  | 75%     | 3,582                         | 6%      | 11,566           | 18%     | 1,079                           | 2%      | 64,438                |
| 1986               | 32,891              | 113,360               | 146,251 | 75%     | 21,027                        | 11%     | 25,127           | 13%     | 2,614                           | 1%      | 195,019               |
| 1987               | 29,123              | 101,717               | 130,840 | 63%     | 20,169                        | 10%     | 53,096           | 25%     | 5,029                           | 2%      | 209,134               |
| 1988               | 33,458              | 79,386                | 112,844 | 59%     | 22,203                        | 12%     | 51,651           | 27%     | 4,944                           | 3%      | 191,642               |
| 1989               | 21,991              | 43,868                | 65,859  | 53%     | 8,775                         | 7%      | 45,565           | 37%     | 4,141                           | 3%      | 124,340               |
| 1990               | 8,067               | 15,596                | 23,663  | 66%     | 3,553                         | 10%     | 7,906            | 22%     | 760                             | 2%      | 35,882                |
| 1991               | 6,484               | 11,649                | 18,133  | 56%     | 3,383                         | 10%     | 10,198           | 31%     | 956                             | 3%      | 32,670                |
| 1992               | 7,360               | 12,028                | 19,388  | 73%     | 1,002                         | 4%      | 5,785            | 22%     | 523                             | 2%      | 26,698                |
| 1993               | 21,643              | 21,858                | 43,501  | 76%     | 3,172                         | 6%      | 9,636            | 17%     | 903                             | 2%      | 57,212                |
| 1994               | 17,072              | 32,333                | 49,405  | 77%     | 1,832                         | 3%      | 11,692           | 18%     | 1,054                           | 2%      | 63,983                |
| 1995               | 37,859              | 161,794               | 199,653 | 90%     | 6,081                         | 3%      | 15,557           | 7%      | 1,477                           | 1%      | 222,768               |
| 1996               | 20,033              | 81,326                | 101,359 | 58%     | 12,766                        | 7%      | 56,476           | 32%     | 5,172                           | 3%      | 175,773               |
| 1997               | 18,662              | 46,144                | 64,806  | 77%     | 5,676                         | 7%      | 12,087           | 14%     | 1,167                           | 1%      | 83,736                |
| 1998               | 29,219              | 42,488                | 71,707  | 79%     | 7,710                         | 9%      | 10,187           | 11%     | 1,043                           | 1%      | 90,647                |
| 1999               | 14,327              | 18,457                | 32,784  | 64%     | 2,282                         | 4%      | 14,660           | 29%     | 1,322                           | 3%      | 51,048                |
| 2000               | 97,611              | 82,728                | 180,339 | 83%     | 5,650                         | 3%      | 29,415           | 13%     | 2,673                           | 1%      | 218,077               |
| 2001               | 55,112              | 77,834                | 132,946 | 71%     | 12,134                        | 6%      | 38,645           | 21%     | 3,608                           | 2%      | 187,333               |
| 2002               | 27,183              | 65,635                | 92,818  | 58%     | 10,495                        | 7%      | 24,574           | 15%     | 2,351                           | 1%      | 160,788 <sup>a/</sup> |
| 2003               | 61,782              | 87,642                | 149,424 | 78%     | 9,680                         | 5%      | 30,034           | 16%     | 2,810                           | 1%      | 191,948               |
| 2004               | 22,982              | 23,831                | 46,813  | 59%     | 4,003                         | 5%      | 25,803           | 33%     | 2,325                           | 3%      | 78,944                |
| 2005               | 27,699              | 26,789                | 54,488  | 84%     | 1,985                         | 3%      | 8,016            | 12%     | 738                             | 1%      | 65,227                |
| 2006               | 19,522              | 30,163                | 49,685  | 81%     | 62                            | 0%      | 10,283           | 17%     | 1,344                           | 2%      | 61,374                |
| 2007               | 35,050              | 60,670                | 95,720  | 72%     | 6,312                         | 5%      | 27,573           | 21%     | 2,526                           | 2%      | 132,131               |
| 2008               | 13,552              | 30,850                | 44,402  | 48%     | 1,919                         | 2%      | 22,259           | 24%     | 24,178                          | 26%     | 92,758                |
| 2009               | 19,614              | 44,409                | 64,023  | 64%     | 5,651                         | 6%      | 28,387           | 28%     | 2,583                           | 3%      | 100,644               |
| 2010 <sup>b/</sup> | 18,050              | 37,221                | 55,271  | 61%     | 3,035                         | 3%      | 29,996           | 33%     | 2,670                           | 3%      | 90,972                |
| Goal               |                     | ≥35,000 <sup>c/</sup> |         |         |                               |         |                  |         |                                 |         |                       |

a/ Inriver run size includes a USFWS estimate of 30,550 fish (19% of the run) that died prior to spawning in September 2002.

b/ Preliminary.

c/ In 2008-2010, fisheries were managed for a natural area spawning escapement of 40,700 adults.

TABLE II-3. Oregon coastal spring and fall Chinook hatchery return and harvest in estuary and freshwater fisheries.

| Year                        | Return to Facilities          |      |         | Estuary and Freshwater Harvest <sup>b/</sup> |      |
|-----------------------------|-------------------------------|------|---------|--|------|
|                             | Public Hatchery <sup>a/</sup> |      | Private | Spring                                       | Fall |
|                             | Spring                        | Fall | All     |  |      |
| <b>THOUSANDS OF CHINOOK</b> |                               |      |         |  |      |
| 1976                        | 2.9                           | 0.5  | -       | 13.5   | 24.3 |
| 1977                        | 2.4                           | 4.2  | -       | 13.8   | 35.6 |
| 1978                        | 4.4                           | 1.6  | -       | 13.1   | 42.7 |
| 1979                        | 7.0                           | 2.0  | 0.4     | 16.4   | 30.8 |
| 1980                        | 7.9                           | 1.8  | 3.4     | 11.9   | 22.1 |
| 1981                        | 2.5                           | 1.8  | 5.1     | 11.2   | 29.6 |
| 1982                        | 4.1                           | 2.3  | 12.1    | 11.6   | 24.7 |
| 1983                        | 3.9                           | 4.0  | 6.1     | 4.9  | 21.1 |
| 1984                        | 5.6                           | 3.3  | 6.3     | 4.1  | 29.0 |
| 1985                        | 8.7                           | 3.5  | 34.6    | 9.0  | 29.5 |
| 1986                        | 30.6                          | 5.8  | 70.8    | 17.3   | 36.5 |
| 1987                        | 22.8                          | 7.1  | 38.7    | 20.2   | 54.8 |
| 1988                        | 22.0                          | 6.4  | 25.0    | 28.9   | 61.4 |
| 1989                        | 32.7                          | 4.3  | 14.7    | 23.7   | 53.9 |
| 1990                        | 6.3                           | 3.4  | 7.8     | 15.5   | 39.9 |
| 1991                        | 5.4                           | 3.1  | 4.1     | 11.1   | 47.7 |
| 1992                        | 2.7                           | 4.4  | -       | 8.0  | 44.7 |
| 1993                        | 10.6                          | 2.8  | -       | 16.4   | 54.7 |
| 1994                        | 4.8                           | 3.0  | -       | 9.2  | 46.7 |
| 1995                        | 55.0                          | 3.3  | -       | 31.1   | 54.3 |
| 1996                        | 26.7                          | 3.6  | -       | 25.6   | 51.0 |
| 1997                        | 29.1                          | 2.0  | -       | 14.7   | 37.0 |
| 1998                        | 11.0                          | 2.6  | -       | 8.2  | 31.5 |
| 1999                        | 18.1                          | 3.3  | -       | 8.2  | 29.3 |
| 2000                        | 24.5                          | 3.1  | -       | 11.4   | 37.4 |
| 2001                        | 26.8                          | 5.7  | -       | 18.6   | 53.3 |
| 2002                        | 24.7                          | 2.9  | -       | 30.9   | 58.8 |
| 2003                        | 17.2                          | 3.9  | -       | 33.1   | 72.3 |
| 2004                        | 20.1                          | 2.9  | -       | 19.4   | 78.4 |
| 2005                        | 11.7                          | 2.6  | -       | 14.6   | 51.6 |
| 2006                        | 7.5                           | 2.7  | -       | 7.1  | 47.7 |
| 2007                        | 6.3                           | 2.1  | -       | 5.7  | 28.9 |
| 2008                        | 6.1                           | 2.7  | -       | 7.2  | 21.9 |
| 2009                        | 7.2                           | 4.2  | -       | 10.6   | 28.8 |
| 2010 <sup>c/</sup>          | 10.3                          | 4.6  | -       | NA   | NA   |

a/ Adults only.

b/ Freshwater harvests are derived from ODFW salmon/steelhead angler catch record card information and represent fish larger than 24 inches (i.e., adults). Includes both hatchery and natural fish.

c/ Preliminary.

TABLE II-4. Spawner indices for naturally produced Oregon coastal fall Chinook and south migrating/localized spring Chinook.<sup>a/</sup>

| Year               | Fall Chinook Spawner Indices                  |   | South/local Migrating Spring Chinook Spawner Indices |                                       |
|--------------------|---|---|--|---------------------------------------|
|                    | North Migrating Peak Count<br>Adults Per Mile | Rogue River                                     | Rogue River  |                                       |
|                    |   | (South/local migrating)<br>Adult Carcass Counts | Gold Ray Dam Counts                                  | Umpqua River<br>Winchester Dam Counts |
| 1976               | 45  | -   | 20   | 6                                     |
| 1977               | 71  | 1,356   | 15   | 7                                     |
| 1978               | 73  | 9,174   | 40   | 5                                     |
| 1979               | 81  | 8,272   | 29   | 6                                     |
| 1980               | 89  | 2,221   | 24   | 6                                     |
| 1981               | 82  | 5,228   | 13   | 5                                     |
| 1982               | 90  | 2,812   | 23   | 7                                     |
| 1983               | 42  | 2,737   | 10   | 3                                     |
| 1984               | 98  | 3,267   | 8  | 5                                     |
| 1985               | 132   | 5,486   | 28   | 8                                     |
| 1986               | 109   | 17,177  | 40   | 8                                     |
| 1987               | 121   | 25,918  | 37   | 8                                     |
| 1988               | 214   | 31,613  | 39   | 8                                     |
| 1989               | 138   | 7,408   | 8  | 8                                     |
| 1990               | 121   | 1,868   | 18   | 6                                     |
| 1991               | 150   | 2,799   | 9  | 2                                     |
| 1992               | 138   | 2,366   | 2  | 3                                     |
| 1993               | 63  | 5,447   | 13   | 4                                     |
| 1994               | 125   | 7,366   | 4  | 3                                     |
| 1995               | 103   | 3,958   | 21   | 6                                     |
| 1996               | 147   | 2,448   | 10   | 4                                     |
| 1997               | 105   | 1,643   | 10   | 3                                     |
| 1998               | 99  | 3,601   | 4  | 4                                     |
| 1999               | 124   | 2,493   | 6  | 3                                     |
| 2000               | 85  | 3,366   | 3  | 3                                     |
| 2001               | 203   | 6,380   | 9  | 6                                     |
| 2002               | 269   | 11,836  | 7  | 7                                     |
| 2003               | 279   | 14,620  | 19   | 8                                     |
| 2004               | 198   | 5,326 <sup>b/</sup>                             | 13   | 5                                     |
| 2005               | 118   | d/  | 6  | 4                                     |
| 2006               | 100   | d/  | 5  | 3                                     |
| 2007               | 42  | d/  | 3  | 2                                     |
| 2008 <sup>c/</sup> | 40  | d/  | 4  | 3                                     |
| 2009 <sup>c/</sup> | 61  | d/  | 5  | 5                                     |
| 2010 <sup>c/</sup> | 87  | d/  | 10   | 6                                     |
| Goal               | 60-90   |   |  |                                       |

a/ North migrating peak counts are taken on nine miles of standard index surveys over nine river systems (see Appendix B, Table B-11 for individual system counts). Complete carcass counts are listed in Appendix B, Table B-10. Complete counts for Gold Ray and Winchester dams are listed in Appendix B, Table B-9.

b/ In 2004 one of the standard survey sections was not sampled. In the previous two years this section accounted for 33% of the total adult carcass counts.

c/ Preliminary.

d/ Surveys were not conducted.

TABLE II-5. Performance of Chinook salmon stocks in relation to 2010 conservation objectives (preliminary data). (Page 1 of 2)

| System and Stock  | 2010 Conservation Objective(s)   | Achievement  |
|---|--|--|
| <b>Sacramento River Chinook</b>   |  |  |
| Fall  | 122,000-180,000 hatchery and natural area adult spawners. 180,000 target for 2010.   | 125,353 hatchery and natural area adult spawners; 3% above the lower end of the escapement goal range. |
| Winter (Endangered)   | NMFS ESA consultation standard defines specific limits on management measures to protect Sacramento River winter and spring Chinook.                 | Commercial and recreational seasons south of Point Arena conformed with the consultation standard.     |
| Spring (Threatened)   | Same objective as for winter Chinook.  | Objective met-see winter Chinook achievement.  |
| <b>California North Coast Chinook</b>   |  |  |
| Klamath River Fall  | Minimum escapement of 40,700 natural adult spawners.   | 37,221 natural area spawners, 106% of FMP conservation objective; 91% of 2010 management objective.    |
| California Coastal (Threatened)   | No greater than 16.0% ocean harvest rate on age-4 Klamath River fall Chinook.  | Preseason projection of 12.3%; no postseason estimate is currently available.                          |
| <b>Oregon Coast Chinook</b>   |  |  |
| North and South/Local Migrating Stocks  | 150,000-200,000 natural adult spawners (equivalent to peak spawner index counts of 60-90 adults per mile).   | 79 natural adult spawners per mile, above the lower bound of the aggregate stock index range.          |
| <b>Columbia River Basin Fall Chinook</b>  |  |  |
| LRW (Component of threatened lower Columbia River Chinook ESU)                          | MSY objective of 5,700 natural North Lewis River adult spawners (no specific NMFS ESA guidance for 2010).  | Preliminary estimate of 8,674 is 152% of the conservation objective.                                   |
| Lower Columbia natural tules (Component of threatened lower Columbia River Chinook ESU) | Total (ocean plus inriver) AEQ exploitation rate on ESA-listed natural tules of no more than 38.0%.  | Preseason projection of 37.5%. No postseason estimate is currently available.                          |
| LRH   | 14,100 adult hatchery spawners.  | Preliminary projection of 39,943 adult hatchery spawners, 283% of goal.                                |
| SCH   | 7,000 adult hatchery spawners.   | 30,740 adult hatchery spawners, 439% of target.  |
| MCB   | No FMP objective; target of 7,750 hatchery adults.   | 35,084 adult hatchery spawners, 453% of target.  |
| URB   | 40-45,000 natural and hatchery adults above McNary Dam, plus meet treaty Indian obligations. <i>U.S. v. Oregon</i> parties agreed to 60,000 in 2010. | 138,256 natural and hatchery adults over McNary Dam, 307% of MSY target in FMP.                        |

TABLE II-5. Performance of Chinook salmon stocks in relation to 2010 conservation objectives (preliminary data).  
(Page 2 of 2)

| System and Stock   | 2010 Conservation Objective(s)  |                     |             | Achievement   |                     |             |
|--|---|---------------------|-------------|---|---------------------|-------------|
| <b>Columbia River Basin Fall Chinook (continued)</b>       |   |                     |             |   |                     |             |
| Snake River Fall Chinook<br>(Threatened; component of URB) | SRFI $\leq$ 0.700 for all ocean fisheries combined (i.e., no less than a 30.0% reduction from the 1988-1993 base period exploitation rate).                           |                     |             | Preseason SRFI projection of 0.440. No postseason estimate is currently available.  |                     |             |
| <b>Washington Coastal Chinook</b>                          |   |                     |             |   |                     |             |
| Fall   | Natural spawner escapement objectives as provided in state-tribal agreements; meet hatchery egg-take goals and meet treaty Indian obligations.                        |                     |             | Based on preliminary estimates, Quillayute natural, and Hoh River natural objectives were met. Other estimates are not yet available.   |                     |             |
| Spring/Summer  | Natural spawner escapement objectives as provided in state-tribal agreements; meet hatchery egg-take goals and meet treaty Indian obligations.                        |                     |             | <b>Based on preliminary estimates, objectives were not met for Hoh and Queets spring/summer natural, and Quillayute summer natural. An estimate is not available for Grays Harbor spring Chinook.</b> |                     |             |
| <b>Puget Sound Chinook</b><br>(Threatened)                 |   |                     |             |   |                     |             |
|  | Minor part of Washington ocean harvest; Council ocean management not directed at these stocks. Adult equivalent exploitation rate standard developed for some stocks: |                     |             | Postseason estimates not available. Preseason predictions of adult equivalent exploitation rates and spawner objectives were:   |                     |             |
|  | <u>Exploitation Rate</u>  | <u>Spawner Esc.</u> | <u>ISBM</u> | <u>Exploitation Rate</u>  | <u>Spawner Esc.</u> | <u>ISBM</u> |
| · Nooksack spring  | · 7% SUS  | -                   | $\leq$ 60%  | 7.0%  |                     | 25%         |
| · Skagit summer/fall                                       | · 50% SUS   | -                   | $\leq$ 60%  | 43.9%   |                     | 34%         |
| · Skagit spring  | · 18% Total   | -                   | $\leq$ 60%  | 17.9%   |                     | 25%         |
| · Stillaguamish summer/fall                                | · 25% SUS   | -                   | $\leq$ 60%  | 15.8%   |                     | NA          |
| · Snohomish summer/fall                                    | · 21% SUS   | -                   | $\leq$ 60%  | 20.3%   |                     | 24%         |
| · Lake Wash. summer/fall                                   | · 20% pre-term SUS  | -                   | $\leq$ 60%  | 17.5%   |                     | 55%         |
| · White River spring                                       | · 20% pre-term SUS  | -                   | -           | 19.3%   |                     |             |
| · Green River summer/fall                                  | · 15% pre-term SUS  | 5,800               | $\leq$ 60%  | 9.0%  | 5,800               | 55%         |
| · Puyallup summer/fall                                     | · 50% Total   | -                   | -           | 50.0%   |                     |             |
| · Nisqually summer/fall                                    | · 65% Total   | -                   | -           | 64.4%   |                     |             |
| · Skokomish summer/fall                                    | · 50% pre-term SUS  | -                   | -           | 49.8%   |                     |             |
| · Mid-Hood Canal fall                                      | · 12% pre-term SUS  | -                   | -           | 11.7%   |                     |             |
| · Dungeness spring   | · 12% pre-term SUS  | -                   | -           | 4.2%  |                     |             |
| · Elwha summer/fall  | · 12% pre-term SUS  | -                   | -           | 4.0%  |                     |             |

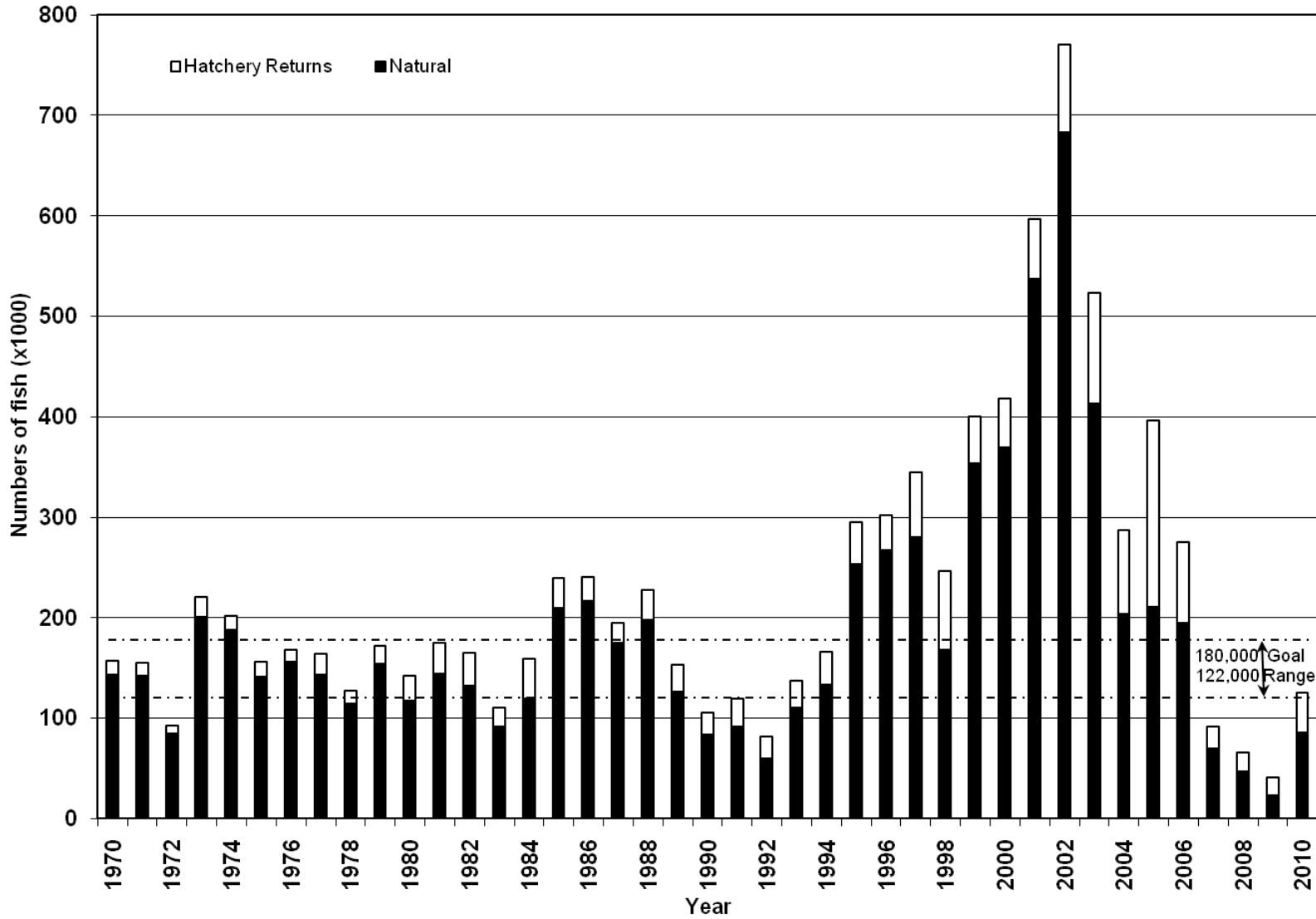


Figure II-1. Sacramento River adult fall Chinook spawning escapement, 1970-2010.

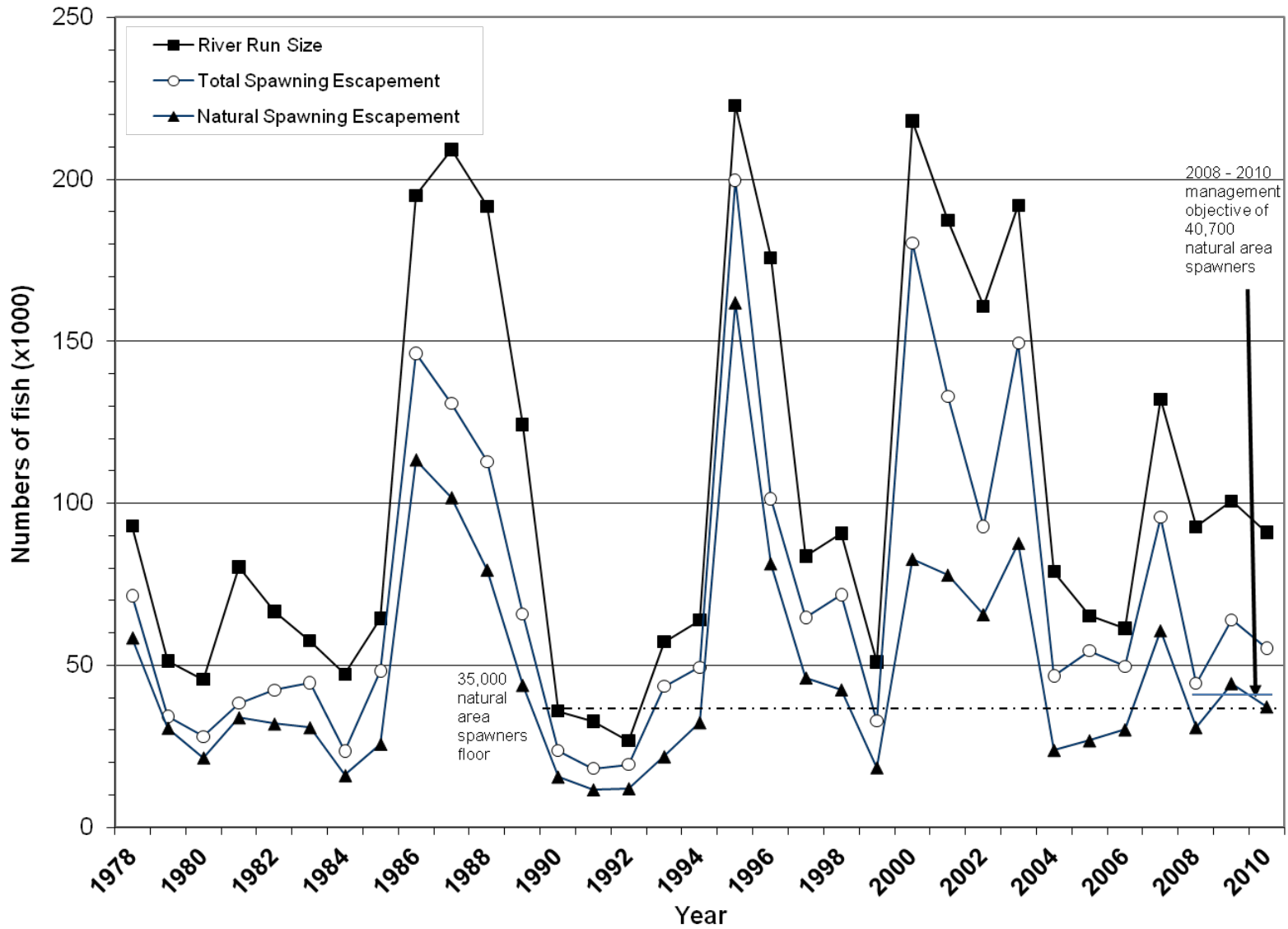


Figure II-2. Klamath River adult fall Chinook returns and spawning escapement, 1978-2010.



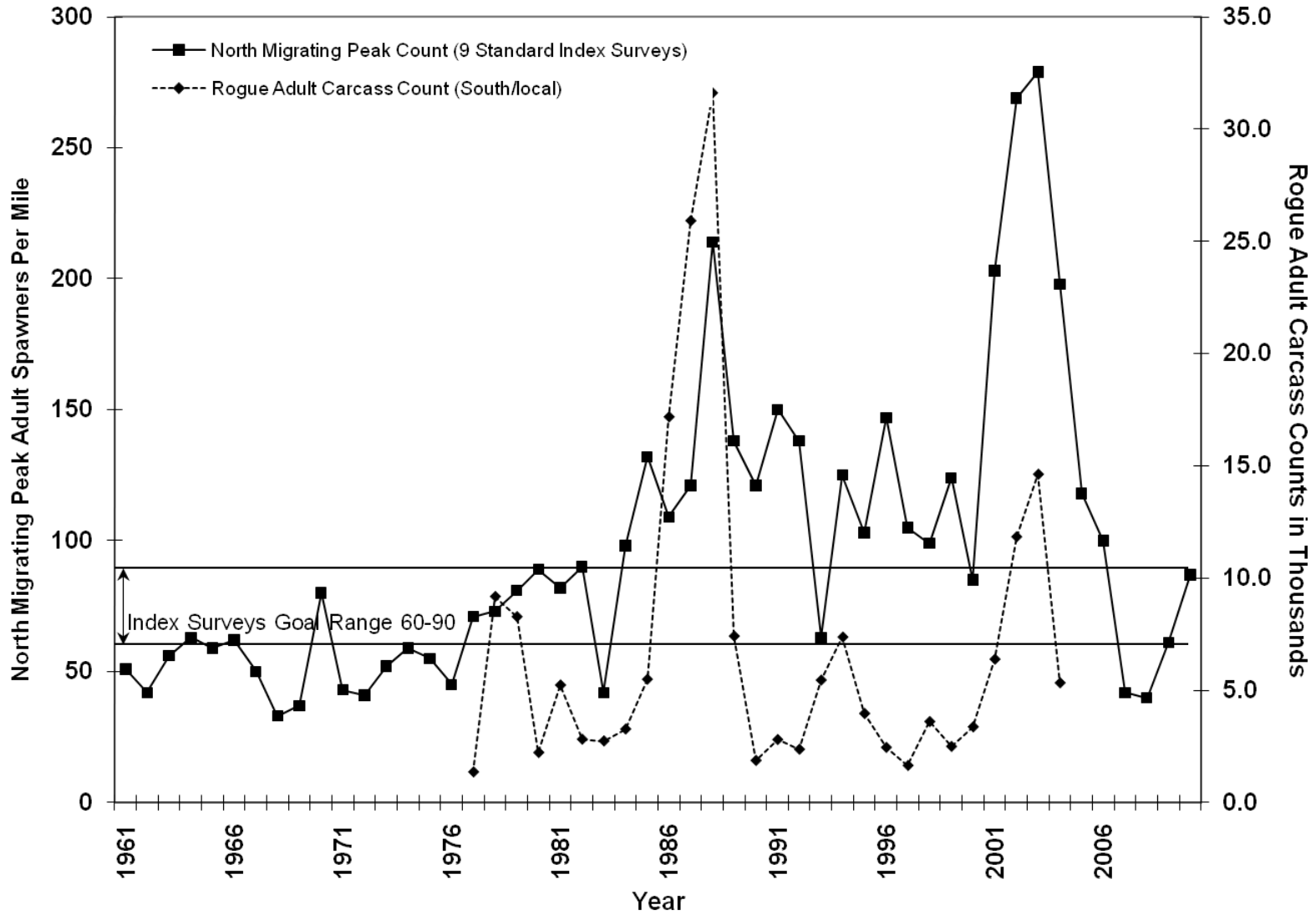


Figure II-3. Spawner indices for naturally produced Oregon coastal fall Chinook, 1961-2010.

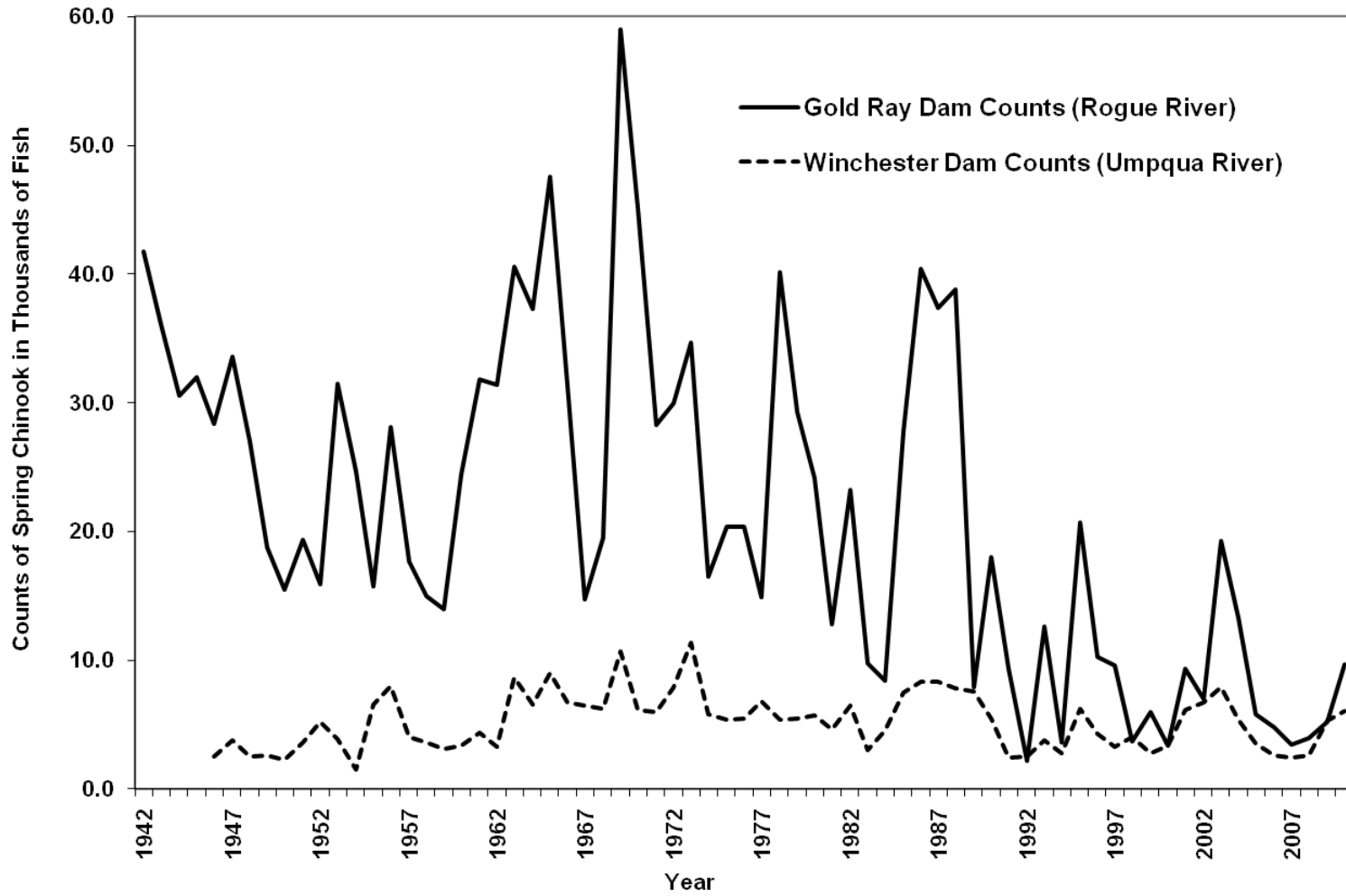


Figure II-4. Escapement indices for naturally produced Oregon coastal south/local migrating spring Chinook, 1942-2010.

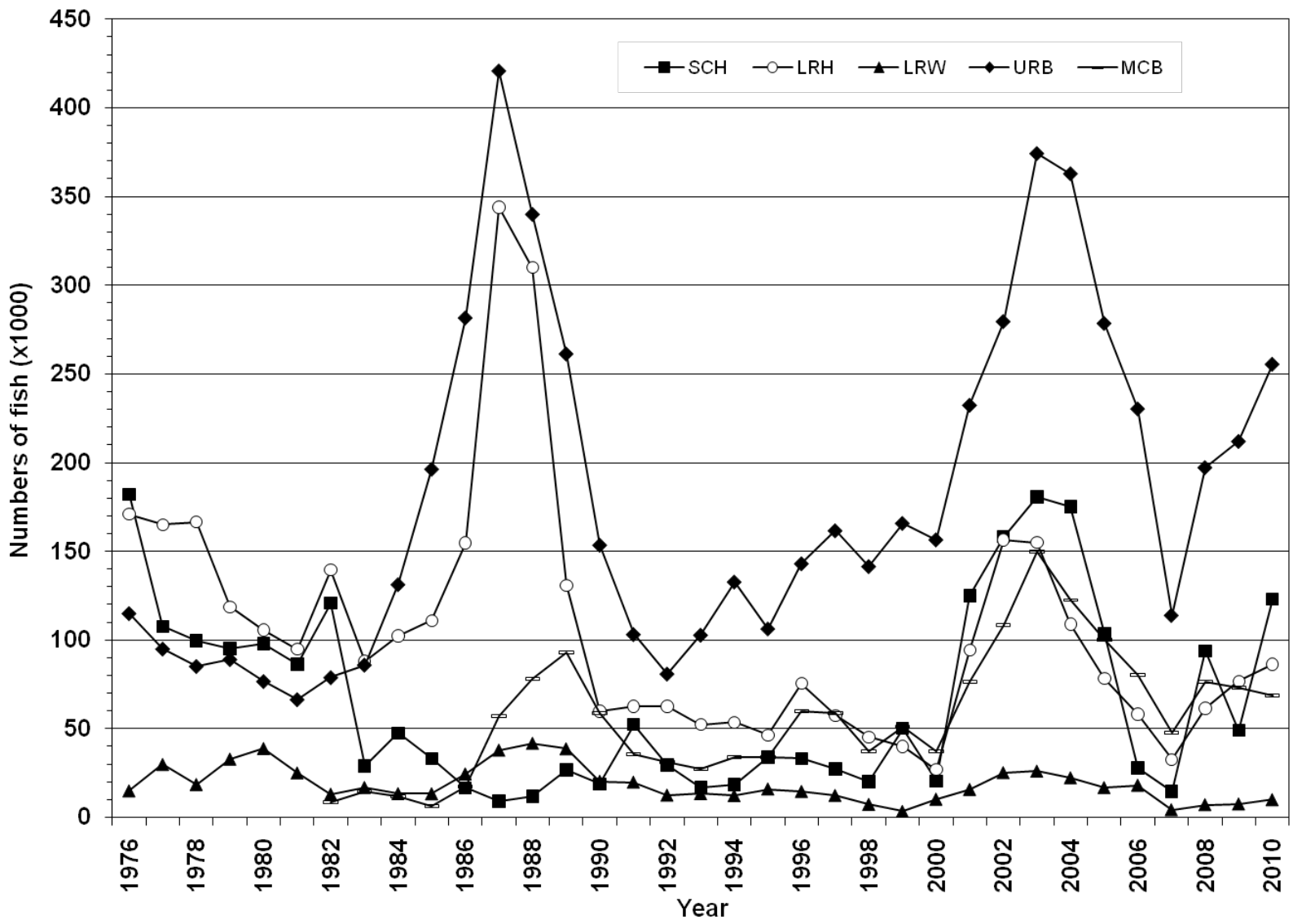


Figure II-5. Columbia River mouth adult returns of the five major fall Chinook stock groups, 1976-2010.

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