REVIEW OF 2016
OCEAN SALMON FISHERIES

Stock Assessment and Fishery Evaluation Document
for the Pacific Coast Salmon Fishery Management Plan

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LIST OF ACRONYMS AND ABBREVIATIONS

AABM	aggregate abundance-based management
ADFG	Alaska Department of Fish and Game
AEQ	adult equivalents
CCC	central California coast (coho)
CDFW	California Department of Fish and Wildlife
Council	Pacific Fishery Management Council
CVI	Central Valley Index
CWT	coded-wire tag
EEZ	exclusive economic zone (from 3-200 miles from shore)
EMAP	Environmental Monitoring and Assessment Program
ESA	Endangered Species Act
ESU	evolutionarily significant unit
FEAM	Fishery Economic Assessment Model
FMP	fishery management plan
F_{MSY}	maximum sustainable yield exploitation rate
FRAM	Fisheries Regulatory Assessment Model
ISBM	individual stock-based management
KMZ	Klamath management zone (ocean zone between Humbug Mountain and Horse Mountain where management emphasis is on KRFC)
KRFC	Klamath River Fall Chinook
LCN	Lower Columbia Natural (coho)
LCR	Lower Columbia River (natural tule Chinook)
LRH	Lower Columbia River hatchery (tule fall Chinook returning to hatcheries below Bonneville Dam)
LRW	Lower Columbia River wild (bright fall Chinook spawning naturally in tributaries below Bonneville Dam)
MCB	mid-Columbia River brights (bright hatchery fall Chinook released below McNary Dam)
MFMT	maximum fishery mortality threshold
MOC	mid-Oregon coast
MSST	minimum stock size threshold
MSY	maximum sustainable yield
NA	not available
NMFS	National Marine Fisheries Service
NOC	north Oregon coast
ODFW	Oregon Department of Fish and Wildlife
OCN	Oregon coastal natural (coho)
OPI	Oregon Production Index (coho salmon stock index south of Leadbetter Point)
PacFIN	Pacific Coast Fisheries Information Network
PSC	Pacific Salmon Commission
PST	Pacific Salmon Treaty
RER	rebuilding exploitation rate
RK	Rogue/Klamath (coho)
S_{ACL}	annual catch limit spawner abundance
SAFE	stock assessment and fishery evaluation (document)
SCH	Spring Creek Hatchery (tule fall Chinook returning to Spring Creek Hatchery)
SDC	status determination criteria
SEAK	Southeast Alaska
S_{MSY}	MSY spawning escapement
SONCC	southern Oregon/northern California coastal (coho)
SRFC	Sacramento River fall Chinook
SRFI	Snake River Fall Index
SRS	Stratified Random Sampling
SRW	Snake River Wild
SRWC	Sacramento River winter Chinook

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

STEP	Salmon Trout Enhancement Program
STT	Salmon Technical Team (formerly the Salmon Plan Development Team)
SUS	Southern United States
TAC	total allowable catch
URB	upper river brights (naturally spawning fall Chinook primarily migrating past McNary Dam)
USFWS	U.S. Fish and Wildlife Service
WCVI	West Coast Vancouver Island
WDFW	Washington Department of Fish and Wildlife

INTRODUCTION

The Salmon Technical Team (STT) and staff of the Pacific Fishery Management Council (Council) have prepared this stock assessment and fishery evaluation (SAFE) document as a postseason review of the 2016 ocean salmon fisheries off the coasts of Washington, Oregon, and California to help assess Council salmon fishery management performance, the status of Council-area salmon stocks, and the socioeconomic impacts of salmon fisheries. This postseason report will also provide a detailed description of the salmon fishery portions of the affected environment to be incorporated by reference into an Environmental Assessment (EA) to comply with National Environmental Policy Act (NEPA) requirements for the 2017 ocean salmon management measures. The STT and Council staff will provide three additional reports prior to the beginning of the ocean salmon season to help guide the Council's selection of annual fishery management measures: Preseason Report I, Preseason Report II, and Preseason Report III. These reports will provide forecasts of stock abundance, determine annual catch limits, and will analyze the biological and economic impacts of the Council's proposed alternatives and adopted fishery management recommendations. Preseason Report I will also constitute the first part of the EA for 2017 ocean salmon fishery management measures, and include a statement of the purpose and need, a description of the affected environment, and a description and analysis of the status quo (no action) alternative. Preseason Report II will constitute the second and final part of the EA, and will include a description and analysis of the alternative management measures considered for 2017 ocean salmon fisheries. The alternatives analyzed in Preseason Report II will provide a reasonable range of environmental effects, which will bound those of the final fishery management measures included in Preseason Report III. Together, these two parts of the EA will provide the necessary components to determine if a finding of no significant impact (FONSI) is warranted.

West Coast fisheries in Council-managed waters (ocean fisheries between the U.S./Canada border and the U.S./Mexico border from 3 to 200 nautical miles offshore) are directed toward and harvest primarily Chinook or king salmon, *Oncorhynchus tshawytscha*, and coho or silver salmon, *Oncorhynchus kisutch*. Small numbers of pink salmon, *Oncorhynchus gorbuscha*, also are harvested, especially in odd numbered years. There are no directed fisheries for other Pacific salmon species, which are rarely caught in Council-managed fisheries.

The Council's annual review of ocean salmon fisheries provides a summary of important biological and socioeconomic data from which to assess the status of managed stocks, impacts of past management actions, to determine how well management objectives are being met, and to improve regulations for the future. The Council will formally review this SAFE document at its March meeting prior to the development of management alternatives for the approaching fishing season.

Chapter I summarizes ocean salmon fishery regulations and landings within the Council management area and management actions and landings under the jurisdiction of the Pacific Salmon Commission (PSC). Appendix A tables detail historical effort and harvest data by state and by management area. Appendix C summarizes historical ocean fishery regulations.

For Chinook and coho salmon, respectively, Chapters II and III assess, where possible, the achievement of pertinent management objectives by salmon stock (including those listed under the Endangered Species Act [ESA]), outline regulations used to achieve the objectives, and summarize inside fisheries catch and spawner escapement data. Appendix B tables detail historical spawning escapement and inside fisheries catch information. Detailed information for other salmon species is not included since Council fisheries have minor impacts on pink salmon escapements and no measurable impacts on sockeye or chum salmon or steelhead trout; however, catch and escapement data and objectives for Puget Sound pink salmon are summarized in Appendix B, Table B-43.

In 2011 the Council also adopted status determination criteria (SDC) for overfishing, approaching an overfished condition, overfished, not overfished/rebuilding, and rebuilt under Salmon Fishery Management Plan (FMP) Amendment 16. These criteria, approved and implemented in December 2011, were:

- Overfishing occurs when a single year exploitation rate exceeds the maximum fishing mortality threshold (MFMT), which is based on the maximum sustainable yield exploitation rate (F_{MSY});
- Approaching an overfished condition occurs when the geometric mean of the two most recent postseason estimates of spawning escapement, and the current preseason forecast of spawning escapement, is less than the minimum stock size threshold (MSST);
- Overfished status occurs when the most recent 3-year geometric mean spawning escapement is less than the MSST;
- Not overfished/rebuilding status occurs when a stock has been classified as overfished and has not yet been rebuilt, and the most recent 3-year geometric mean spawning escapement is greater than the MSST but less than maximum sustainable yield (MSY) spawning escapement (S_{MSY});
- A stock is rebuilt when the most recent 3-year geometric mean spawning escapement exceeds S_{MSY}.

All SDC rely on the most recent estimates available, which in some cases may be a year or more in the past because of incomplete broods or data availability. The above criteria for rebuilt status are the default criteria provided in the FMP; however, alternative criteria may be developed through a rebuilding plan if warranted by stock specific circumstances. Relevant stocks were evaluated relative to these new SDC as required by the FMP. In addition, new conservation objectives were adopted for some stocks based on revised estimates of S_{MSY} and F_{MSY}, which are the reference points used to establish stock-specific SDC. Stock specific reference points and recent year estimates for relevant stocks are presented in Tables II-6 and III-6.

Status determinations for overfishing, overfished, not overfished/rebuilding, and rebuilt are reported in this SAFE document; however, because approaching an overfished condition relies on a preseason forecast, that status determination is reported in Preseason Report I. In addition, some status determinations may be updated in Preseason Report I if more recent spawning escapement or exploitation rate estimates become available between the time this SAFE document and Preseason Report I are published.

Socioeconomic impacts of the fisheries are discussed in Chapter IV. Appendix D provides historical fishery-related socioeconomic data.

The annual review of ocean salmon fisheries is drafted as early as analyses of landings and escapement data are available. The most recent entries are noted as preliminary and later updated when the data become final. If updated information or error corrections that could substantially affect the development of management measures for the upcoming season are available, an errata sheet will be included as an appendix in one of the subsequent STT preseason planning documents.

COMMON TABLE CONVENTIONS

All 2016 data provided in this report are preliminary. The following conventions apply to all tables in this report:

1. Due to rounding, the total values may not equal the sum of individual values.

2. A single dash indicates there are no data appropriate for a particular table cell, or in the case of fishing effort or landings, that the season was closed.

3. A double dash indicates no records are available, for example, a fishery may not have been sampled due to low and sporadic effort.

4. "NA" indicates data are not available at the time of publication, but are likely to be available at a future date.

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CHAPTER I

COASTWIDE OCEAN FISHING SUMMARY

Chapter I contains or references tables summarizing the current and historical ocean salmon fishing regulations and harvest data. In addition, this chapter provides a brief summary of the Pacific Fishery Management Council's (Council) regulatory objectives, by management area, for the most recent fishing year, reports on the results of the Council's selective fisheries for marked hatchery Chinook and coho, and bycatch mortality of Chinook and coho salmon. The final section in the chapter provides a brief summary of management information and harvests under the authority of the Pacific Salmon Commission (PSC).

COUNCIL-AREA REGULATIONS AND LANDINGS

Summaries of the 2016 regulations for non-Indian commercial troll, treaty Indian commercial troll, and recreational ocean salmon fishing in both the exclusive economic zone (EEZ) (3 to 200 nautical miles from shore) and state territorial waters (0 to 3 nautical miles from shore) are provided in Tables I-1, I-2, and I-3, respectively. Historical summaries of regulations for each of the three West Coast states and for treaty Indian troll fisheries are provided in Appendix C, Tables C-1 through C-7. Table C-9 provides a summary of inseason regulatory actions and events during the 2016 season.

Catch, quota, and fishing effort statistics are presented in the following series of tables:

Table I-4: Council-area commercial and recreational ocean salmon fishing effort and landings of Chinook, coho, and pink salmon by state of landing.

Table I-5: Council-area commercial and recreational ocean salmon fishing effort and landings of Chinook, coho, and pink salmon by management area.

Table I-6: The coho and Chinook quotas for each fishery compared with actual harvests.

Appendix A, Tables A-1 through A-19: Historical monthly ocean salmon harvest data by state and port area.

Tables A-20 through A-28: Historical monthly ocean salmon harvest data by management area.

Appendix B, Tables B-1 through B-46: Historical inside harvest and escapement data.

Appendix C, Table C-8: Historical record of annual preseason catch quotas for the area north of Cape Falcon, as well as the stocks that were critical for ocean salmon management actions.

REGULATORY OBJECTIVES BY MANAGEMENT AREA

The following sections provide a brief outline of the regulatory objectives that shaped the 2016 ocean salmon fisheries by management area and species. Further details of the conservation and allocation objectives by salmon stock and an assessment of performance are provided in Chapters II and III for Chinook and coho, respectively.

Horse Mountain to U.S./Mexico Border

Chinook Fisheries

Chinook fisheries management in this area is guided by Fishery Management Plan (FMP) - defined control rules for Sacramento River fall Chinook (SRFC), Klamath River fall Chinook (KRFC), and by National Marine Fisheries Service (NMFS) Endangered Species Act (ESA) consultation standards for Sacramento River winter Chinook (SRWC), California Coastal Chinook, Oregon Coast Natural (OCN) coho, and Southern Oregon/Northern California Coast (SONCC) coho. The Council structured 2016 Chinook salmon fisheries south of Horse Mountain (near Shelter Cove, California) to meet the following objectives (in order of most to least constraining):

1. A Klamath basin natural area spawning escapement of no less than 30,909 fall Chinook adults which is produced, in expectation, by a spawner reduction rate of 25.0 percent, along with the allocation objective of 50 percent of the allowable adult harvest for federally-recognized tribal subsistence and commercial fisheries.

2. The SRWC ESA consultation standard requiring:
    a. A maximum forecast age-3 impact rate for the area south of Point Arena of 19.9 percent.
    b. Commercial seasons between Point Arena and the U.S./Mexico border shall open no earlier than May 1 and close no later than September 30, with the exception of a permissible October season conducted Monday through Friday between Point Reyes and Point San Pedro, which shall end no later than October 15; the minimum size limit shall be at least 26 inches total length.
    c. The recreational season between Point Arena and Pigeon Point shall open no earlier than the first Saturday in April and close no later than the second Sunday in November; the recreational season between Pigeon Point and the U.S./Mexico Border shall open no earlier than the first Saturday in April and close no later than the first Sunday in October; the minimum size limit shall be at least 20 inches total length.

3. A SRFC spawner escapement of no less than 122,000 hatchery and natural area adults, which is produced, in expectation, by a total exploitation rate of 59.3 percent.

4. The California Coastal Chinook ESA consultation standard requiring a forecast KRFC age-4 ocean harvest rate of no greater than 16.0 percent.

5. The OCN coho allowable exploitation rate (marine and freshwater combined) of no greater than 20.0 percent as required by the exploitation rate matrix recommended by the OCN Coho Work Group that was adopted by the Council as expert biological advice in November 2000.

6. The SONCC coho ESA consultation standard requirement of no greater than a 13.0 percent marine exploitation rate on Rogue/Klamath (RK) hatchery coho.

Objectives 1 and 2 were the constraining factors for 2016 Chinook fisheries management in this area. Additional SRWC focused management measures recommended by California Department of Fish and Wildlife (CDFW) further constrained fisheries south of Point Arena. The adopted regulations (Table I-1 and I-3) resulted in the following projections: a KRFC spawning escapement of 30,909 natural area adults, a SRWC age-3 impact rate of 12.8 percent for the area south of Point Arena, a SRFC spawner escapement of 151,128 hatchery and natural area adults, and a coastwide ocean fishery harvest rate of 8.4 percent on age-4 KRFC.

Coho Fisheries

Coho fishery management for 2016 in this area was guided by the ESA consultation standard for Central California Coast (CCC) coho, which prohibits retention of coho in this area. No projection of non-retention fishery impacts on CCC coho was available; projected non-retention exploitation rates on Lower Columbia Natural (LCN), OCN and RK coho were 0.1, 1.5, and 3.3 percent, respectively, in this area. Retention of coho has been prohibited south of the Oregon/California border since 1996. Coho are managed as a unit south of Cape Falcon, and details of the Council's management objectives shaping the 2016 fisheries are presented more fully in the Cape Falcon to Humbug Mountain section.

Humbug Mountain to Horse Mountain

Chinook Fisheries

The area between Humbug Mountain (near Port Orford, Oregon) and Horse Mountain (near Shelter Cove, California) is referred to as the Klamath Management Zone (KMZ). Chinook fisheries management in this area is guided by FMP-defined control rules for KRFC, SRFC, and by NMFS ESA consultation standards for California Coastal Chinook, LCN coho, OCN coho, and SONCC coho. The Council structured 2016 Chinook salmon fisheries in the KMZ to meet the following objectives (in order of most to least constraining):

1. A Klamath basin natural area spawning escapement of no less than 30,909 fall Chinook adults, which is produced, in expectation, by a spawner reduction rate of 25.0 percent, along with the allocation objective of 50 percent of the allowable adult harvest for federally-recognized tribal subsistence and commercial fisheries.
2. A SRFC spawner escapement of no less than 122,000 hatchery and natural area adults which is produced, in expectation, by a total exploitation rate of 59.3 percent.
3. The California Coastal Chinook ESA consultation standard requiring a forecast KRFC age-4 ocean harvest rate of no greater than 16.0 percent.
4. The LCN coho ESA consultation standard requirement of no greater than an 18.0 percent exploitation rate (marine and mainstem Columbia River combined).
5. The OCN coho allowable exploitation rate (marine and freshwater combined) of no greater than 20.0 percent as required by the exploitation rate matrix recommended by the OCN Coho Work Group that was adopted by the Council as expert biological advice in November 2000.
6. The SONCC coho ESA consultation standard requirement of no greater than a 13.0 percent marine exploitation rate on RK hatchery coho.

Objective 1 was the constraining factor for 2016 Chinook fisheries management in the KMZ. The adopted regulations (Table I-1 and I-3) resulted in the following projections: a KRFC spawning escapement of 30,909 natural area adults, a SRFC spawner escapement of 151,128 hatchery and natural area adults, and a coastwide ocean fishery harvest rate of 8.4 percent on age-4 KRFC

Coho Fisheries

Coho fisheries management in this area is guided by the ESA consultation standards for LCN, OCN, SONCC, and CCC coho, which prohibits retention of coho south of the Oregon/California border. No projection of non-retention fishery impacts on CCC coho was available; projected exploitation rates on LCN, OCN, and RK coho in this area were 0.1, 0.9, and 2.9 percent, respectively. Coho are managed as a

unit south of Cape Falcon, and details of the Council's management objectives shaping the 2016 fisheries are presented more fully in the Cape Falcon to Humbug Mountain section.

Cape Falcon to Humbug Mountain

Chinook Fisheries

Chinook fisheries management in this area is guided by FMP-defined control rules for SRFC, KRFC, and by NMFS ESA consultation standards for California Coastal Chinook, Lower Columbia River (LCR) natural tule Chinook, Snake River wild (SRW) Chinook, LCN coho, OCN coho, and SONCC coho. The Council structured 2016 Chinook salmon fisheries in this area to meet the following objectives (in order of most to least constraining):

1. A Klamath basin natural area spawning escapement of no less than 30,909 fall Chinook adults, which is produced, in expectation, by a spawner reduction rate of 25.0 percent, along with the allocation objective of 50 percent of the allowable adult harvest for federally-recognized tribal subsistence and commercial fisheries.
2. A SRFC spawner escapement of no less than 122,000 hatchery and natural area adults which is produced, in expectation, by a total exploitation rate of 59.3 percent.
3. The California Coastal Chinook ESA consultation standard requiring a forecast KRFC age-4 ocean harvest rate of no greater than 16.0 percent.
4. NMFS consultation standards and annual guidance for ESA-listed LCR natural tule Chinook, which required a total exploitation rate not to exceed 41.0 percent in marine and freshwater fisheries combined.
5. The LCN coho ESA consultation standard requirement of no greater than an 18.0 percent exploitation rate (marine and mainstem Columbia River combined).
6. The OCN coho allowable exploitation rate (marine and freshwater combined) of no greater than 20.0 percent as required by the exploitation rate matrix recommended by the OCN Coho Work Group that was adopted by the Council as expert biological advice in November 2000.
7. The SONCC coho ESA consultation standard requirement of no greater than a 13.0 percent marine exploitation rate on RK hatchery coho.

Objective 1 was the constraining factor for 2016 Chinook fisheries management in this management area. The adopted regulations (Table I-1 and I-3) resulted in the following projections: a KRFC spawning escapement of 30,909 natural area adults, a SRFC spawner escapement of 151,128 hatchery and natural area adults, and a coastwide ocean fishery harvest rate of 8.4 percent on age-4 KRFC.

Coho Fisheries

Coho fisheries management in this area is guided by NMFS ESA consultation standards for LCN coho, OCN coho, and SONCC coho. The Council structured 2016 coho salmon fisheries in this area to meet the following objectives:

1. The LCN coho ESA consultation standard requirement of no greater than an 18.0 percent exploitation rate (marine and mainstem Columbia River combined).

2. The OCN coho allowable exploitation rate (marine and freshwater combined) of no greater than 20.0 percent as required by the exploitation rate matrix recommended by the OCN coho work group which was accepted by the Council as expert biological advice in November 2000.

3. The SONCC coho ESA consultation standard requirement of no greater than 13.0 percent marine exploitation rate on RK hatchery coho.

Objective 1 above was the most constraining factor on 2016 coho fisheries management in this area. The Council adopted seasons in this area with projected impacts of 3.1, 6.9, and 0.6 percent on LCN natural coho, OCN coho, and RK coho, respectively. In all relevant fisheries, projected exploitation rates were 13.0, 13.1, and 7.3 percent, respectively.

U.S./Canada Border to Cape Falcon

Chinook Fisheries

Management objectives for Chinook fisheries in this area were to comply with NMFS ESA consultation standards for LCR natural tule, Lower Columbia River Wild (LRW) fall Chinook, Snake River Wild (SRW) fall Chinook and Puget Sound Chinook; meet treaty Indian sharing obligations, the allocation provisions in the Salmon FMP, and provisions of the Pacific Salmon Treaty (PST); and to the extent possible, provide for viable ocean and in-river fisheries while meeting natural stock escapement objectives and hatchery fall Chinook brood stock needs. Columbia lower river hatchery (LRH) and Spring Creek Hatchery (SCH) fall Chinook have historically been the major contributors to ocean fishery catches in the Council-area north of Cape Falcon.

The Council structured Chinook salmon fisheries between Cape Falcon, Oregon and the U.S./Canada border to meet the following objectives:

1. The LCR natural tule Chinook ESA consultation standard requirement for a combined marine and freshwater exploitation rate of no greater than 41.0 percent.

2. The Snake River fall Chinook ESA consultation standard of at least a 30.0 percent reduction in the total ocean age-3 and age-4 adult-equivalent (AEQ) exploitation rate from the 1988-1993 average.

3. For select Chinook stocks of concern to the PSC, keep the Individual Stock-Based Management (ISBM) index at or below 60.0 percent of the 1979-1982 base period average.

Objective 1 above was the primary constraint for 2016 ocean fisheries in this area. Under the adopted regulations (Tables I-1, I-2, and I-3), fisheries were projected to have a 38.2 percent total AEQ exploitation rate on LCR natural tules (12.6 percent in Council-area fisheries), and a 40.9 percent reduction of the 1988 to 1993 base period AEQ exploitation rate for SRW.

Coho Fisheries

The Council structured coho salmon fisheries to meet the following objectives:

1. The LCN coho ESA consultation standard requirement for a combined marine and mainstem Columbia River exploitation rate of no greater than 18.0 percent.

2. An exploitation rate on Interior Fraser coho of no more than 10.0 percent in southern U.S. (SUS) fisheries in accordance with the provisions of the southern coho management plan adopted by the PSC in February 2002.

3. The OCN coho ESA consultation standard requirement for a combined marine and freshwater exploitation rate of no greater than 20.0 percent.

4. Meet FMP conservation objectives and obligations under the PST Southern Coho Management plan for stocks originating on the Washington coast, Puget Sound, and British Columbia, and inside/outside and treaty Indian/non-Indian allocation objectives with special attention to low run size predictions for Grays Harbor, Queets, Hoh, and Quillayute Fall Natural Coho.

5. Meet FMP objectives for allocation of impacts between commercial and recreational ocean fisheries, and among port areas for the recreational fishery.

Objective 4 above was the primary constraint for 2016 ocean fisheries in this area. The adopted regulations (Tables I-1, I-2, and I-3) were projected to have a 13.0 percent total exploitation rate on LCN coho (7.2 percent in Council-area fisheries), an exploitation rate in SUS fisheries of less than 10.0 percent on Interior Fraser (Thompson River) coho (0.8 percent in Council-area fisheries), and a total exploitation rate of 13.1 percent on OCN coho (10.4 percent in Council-area fisheries). Per the PST Southern Coho Management Plan, Tribal and Washington Department of Fish and Wildlife (WDFW) co-managers agreed to 2016 escapement objectives of 31,000 Grays Harbor wild coho, 2,900 Queets wild coho, 1,800 Hoh wild coho, and 4,000 Quillayute wild coho; the adopted regulations were projected to meet these escapement objectives.

SELECTIVE FISHERIES AND SALMON BYCATCH

Estimated incidental Chinook and coho mortalities are reported in Tables I-7, I-8, and I-9. Unless otherwise noted, Chinook mortality estimates south of Humbug Mountain, Oregon were based on expansion of dockside sampling data.

The Council assumed a hook-and-release mortality rate of 26 percent in commercial troll fisheries coastwide and 14 percent in recreational fisheries north of Point Arena. In recreational fisheries south of Point Arena, the Council assumed 15 percent based on the proportion of fish caught using mooching versus trolling gear, and the estimated rates of 42.2 and 14 percent for these gear types, respectively. In addition, the Council assumes drop-off mortality for both Chinook and coho equal to 5 percent of total encounters.

Selective Chinook Fisheries

No recreational fisheries selective for marked Chinook were planned for the four ocean subareas between Cape Falcon, Oregon, and the U.S./Canada border in 2016. Recreational fisheries in the Strait of Juan de Fuca operated under mark-selective retention restrictions for Chinook in Area 5 and the portion of Area 6 west of Port Angeles, from July 1 through August 15, 2016 (Figure I-1). The Area 5 mark-selective fishery was managed to a threshold of total legal-sized encounters for the fishery (13,363) and the Area 6 mark-selective fishery was managed as a season. After August 15, the fisheries in Areas 5 and 6 closed to salmon retention. Catch and release estimates, derived from creel census programs conducted during the mark-selective fishery for Chinook in Area 5 from July 1 through August 15 are presented in Table I-8. No inseason estimate was made for Area 6, which was open from July 1 through August 15 for mark-selective Chinook fishing. The observed Chinook mark rates were higher than predicted preseason. Observed non-retention mortality was lower than anticipated, and the catch was less than expected for Chinook (Table I-8).

Mark-selective Chinook fisheries were also held in Puget Sound Area 7 from July 1 through 31 and October 1 through October 31, in Area 9 from July 16 through August 4, in Area 10 from July 16 through August 15, in Area 11 June 24 through August 14, and in Area 12 July 1 through September 30 (Figure I-1). Winter mark-selective fisheries were held in Area 6 from December 1, 2016 through April 10, 2017 and Area 7

from December 1, 2016 through April 30, 2017. Winter mark-selective Chinook fisheries were held in Areas 8-1 and 8-2 November 1, 2016 through April 30, 2017. Area 9 had mark-selective Chinook opportunity November 1-30, 2016 and January 16 through April 15, 2017. Area 10 had mark-selective Chinook fisheries from November 1, 2016 through January 31, 2017. Area 11 had mark-selective Chinook opportunity from February 1 through April 30, 2017, and Area 12 had mark-selective Chinook opportunity from October 1, 2016 through April 30, 2017.

Selective Coho Fisheries

Recreational fisheries selective for marked coho were planned for the area between Cape Falcon and the OR/CA border, the Columbia River ocean subarea north of Cape Falcon, and the inside fishery at Buoy 10 (Figure I-1). Other inside and freshwater recreational fisheries in Washington and Oregon had mark-selective restrictions for coho. Preseason and postseason assessments of mark rates, catch, number of coho released, and incidental (bycatch) mortality for Council-area and some mixed stock inside fisheries are summarized in Table I-9. Fisheries were sampled by a combination of on-water observers, voluntary trip reports, and dockside interviews. The observed mark rates in the ocean fisheries both north and south of Cape Falcon were lower than what was predicted preseason. Observed non-retention mortality was lower than expected south of Cape Falcon and slightly higher than expected north of Cape Falcon.

PACIFIC SALMON COMMISSION

The PSC was established to implement the 1985 Pacific Salmon Treaty (PST) between the U.S. and Canada. Because many of the stocks under the jurisdiction of the Council are significantly affected by management actions taken in Canadian and Alaskan waters, considerable interaction between the Council and the PSC occurs at both the policy and technical levels. Actual catches for PSC fisheries of the most relevance to the Council are summarized in Tables I-10 and I-11. Note that these catches result from inseason management of fisheries for compliance with aggregate abundance-based management (AABM; see below) under the PST. They do include incidental mortality associated with regulation of these fisheries, except as noted.

Chinook Fisheries

Northern British Columbia (B.C.) and Southeast Alaska (SEAK) fisheries affect far-north migrating Chinook stocks from Washington, Oregon, and Idaho. These include Washington coastal stocks, Columbia and Snake River bright fall and summer stocks, and far-north migrating Oregon coastal Chinook stocks. The West Coast Vancouver Island (WCVI) troll and Georgia Strait troll and recreational fisheries affect far-north migrating stocks (including LRW) to a lesser degree, but have a major impact on more southerly-distributed Columbia River tule and Puget Sound stocks.

In June 1999, the U.S. and Canada reached agreement on a framework for Chinook fishing regimes for 1999 through 2008. Under this agreement, SEAK (all gear), Northern B.C. (troll and recreational), and WCVI (troll and outside recreational) fisheries were regulated under aggregate AABM regimes. These fishery regimes had catch ceilings derived from indices for total aggregate abundance of stocks contributing to specific components of the fisheries and target fishery harvest rates. For example, the allowable catches for WCVI troll and outside recreational fisheries were determined by the abundance index estimated for the WCVI troll fishery. The allowable catch for the WCVI AABM fisheries was designed to reduce harvest rates for the combined troll and outside recreational fisheries by approximately 35 percent from levels observed during 1985 through 1996. Provisions of a new ten-year agreement took effect January 1, 2009. The 2009 agreement reduced catch ceilings in SEAK and WCVI AABM fisheries by 15 percent and 30 percent respectively, from those in the 1999 agreement.

For fisheries not driven by AABM regimes, including Council-area fisheries, the 1999 agreement established conservation obligations to reduce harvest rates on depressed Chinook stocks (those not meeting escapement goals) by 36.5 percent for Canadian fisheries and 40 percent for U.S. fisheries, relative to levels

observed during 1979 through 1982. This individual stock-based management (ISBM) obligation was taken into account during Council and inside fisheries preseason management planning processes. However, relative to meeting the provisions of the PST, the ISBM indices are evaluated on a post-season basis only.

As in previous years, AABM fisheries were conducted in accordance with the obligations set forth in the 2009 PST agreement. Unlike in 2015, the PSC reached agreement in 2016 on calibration of the PST Chinook Model that produces the Abundance Index (AI) for the three AABM fisheries. The AI corresponds to a total allowable catch of "Treaty" Chinook per provisions in the PST. Treaty Chinook are those fish that are counted against the AABM catch ceiling; they represent total landed catch minus terminal exclusions (fish taken in terminal net fisheries where escapement goals are achieved) and hatchery add-ons (fish attributed to production from Alaskan hatchery facilities in excess of levels observed prior to the 1985 PST). The 2016 AI for the SEAK fisheries was 2.06, which corresponds to a total allowable catch of 355,600 Chinook. The AIs for Northern B.C. and WCVI were 1.70 and 0.89 respectively, corresponding to total allowable catches of 248,000 and 133,300 Chinook. The preliminary estimate of 2016 total catch of Chinook by SEAK fisheries was 388,700 while the catch of Treaty Chinook was 353,300 (Table I-10). These catches are similar to the total catch of 405,300 Chinook and 337,800 Treaty fish in 2015. The catch in the Northern B.C. AABM fisheries (Northern B.C. troll plus Haida Gwaii (Queen Charlotte Islands) recreational) in 2016 was 190,200 Chinook (147,400 troll; 42,800 recreational) and an increase from the total catch of 158,900 in 2015. The Northern B.C. troll fishery in 2016 was conducted under a system of individual transferable quotas that was fully implemented beginning in 2008.

In addition to the overall catch ceiling determined by the PST, Canada's principal management objectives for the 2016 WCVI Chinook fisheries were to meet domestic allocation objectives as well as address concerns for Lower Strait of Georgia Chinook, WCVI Chinook stocks, spring run upper Fraser River Chinook, and Interior Fraser (Upper Fraser and Thompson) coho. The catch in 2016 was 93,300 Chinook (55,500 troll, and 37,800 recreational; Table I-11), a decrease from the 102,500 Chinook caught in 2015.

Since 1999, the WCVI troll fishery has been managed to distribute the catch throughout the year with fisheries in the summer shaped to reduce impacts on coho and WCVI, Lower Strait of Georgia, and early-run Fraser River Chinook stocks. During accounting year 2016 (October 2015 through September 2016) troll fisheries were open for retention of Chinook in October through May, August, and September (Table I-12). To protect Interior Fraser coho, only marked coho could be retained and revival tanks were required for released coho.

The WCVI outside recreational fishery (the area where non-local stocks predominate) operated under a 45 cm (17.7 inches) total length minimum size limit, but with the additional restriction that Chinook over 77 cm (30.3 inches) could not be retained in the surf zone corridor (within 1 mile of shore) to protect local-origin stocks. The fishery harvested 37,800 fish, significantly less than the 48,800 caught in 2015.

Catch estimates for all Canadian ISBM fisheries in Northern B.C. were incomplete; the reported Chinook catch in 2016 was approximately 2,500 by commercial gillnets. Approximately 5,600 Chinook were caught by anglers from lodges in Rivers Inlet, Hakai Pass, and Bella Bella and by private anglers on the mainland coast. Tidal area recreational catch estimates near the mainland coast of Northern B.C. in 2016 were not available except for creel estimates for Area 3 and 4 where the catch was estimated to be about 10,000 Chinook. Catches by First Nations were approximately 9,100 Chinook for the North Coast. Catches by First Nations were not available for Haida Gwaii and Central Coast.

Southern B.C. ISBM fisheries in 2016 harvested 171,100 Chinook (15,700 commercial, 61,200 First Nations, and 94,200 recreational).

No direct management measures for Chinook salmon within the Council management area were specified under the 2009 PST agreement, except for the ISBM commitment. The Council's ocean fisheries and inside fisheries conducted by the state and tribal managers were designed to minimize impacts on spawning escapements of depressed stocks, and preseason estimates of impacts were in compliance with terms of the PST agreement. Information necessary to evaluate the postseason impacts of Council-area fisheries was not available.

Coho Fisheries

In 2002, the PSC adopted a management plan for coho salmon originating in Washington and Southern B.C. river systems. The plan is directed at the conservation of key management units, four from Southern B.C. (Interior Fraser, Lower Fraser, Strait of Georgia Mainland, and Strait of Georgia Vancouver Island) and nine from Washington (Skagit, Stillaguamish, Snohomish, Hood Canal, Strait of Juan de Fuca, Quillayute, Hoh, Queets, and Grays Harbor). Under the plan, the U.S. and Canada were required to constrain total fishery exploitation rates to levels associated with the categorical status (low, moderate, and abundant) and target exploitation rates of the key management units as determined by domestic managers. Ceilings on exploitation rates by intercepting fisheries were established through formulas specified in the plan.

The forecast of 2016 abundance indicated that the status of interior Fraser River coho remained depressed, but there are indications in recent years that their condition might be improving. In 2016, Canadian fisheries were managed for an exploitation rate of 3 to 5 percent on interior Fraser River coho, less than the 10 percent ceiling allowed under the PSC coho management plan and less than the rates used for management in 2014 (16 percent ceiling) and 2015 (8.5 percent). The lower Fraser, Georgia Basin, and the Johnstone Strait coho management units were all forecast to be at low or moderate status. The PSC coho status categories of low, moderate, and abundant are analogous to the FMP categories of critical, low, and normal.

In 2016, approximately 256,800 coho were retained in troll and net fisheries in Northern and Central B.C. Catches in Southern B.C. commercial fisheries were minor, limited by the status of Interior Fraser coho. Coho kept and released by marine commercial fisheries are summarized in Table I-13.

For recreational fisheries, mark-selective coho retention was permitted in mixed stock areas, and barbless hooks were required. Mark-selective fisheries were implemented in most of Southern B.C. (Johnstone Strait, Strait of Georgia, Juan de Fuca Strait, and WCVI). The estimated total retained catch of coho in Southern B.C. marine recreational fisheries in 2016 was 37,325. Coho kept and released by marine recreational fisheries in Southern B.C. are summarized in Table I-14. First Nations fisheries in Southern B.C. harvested 11,600 coho.

TABLE I-1. Summary of actual ocean non-Indian commercial troll salmon fishing regulations for 2016. (Page 1 of 3)

Area and Season	Salmon Species	Actual Quota Chinook	Actual Quota Coho	Special Restrictions[a/]
U.S./Canada border to Cape Falcon, OR				
May 1-3, May 6-31, June 3-5, June 10-16, June 24-30 **EXCEPT closed effective June 10** in area from Cape Alava south to Queets R (MA-3).	All except coho	14,000 [b/] with sub-allocation by area	-	Five days per week May 6-31. Chinook minimum size limit of 28 inches total length. Landing limits were adjusted throughout the season, see Tables C.3 and C.5 for details. Mandatory Yelloweye Rockfish Conservation Area, Cape Flattery and Columbia Control Zones closed. Vessels must land and deliver their fish within 24 hours of any closure of this fishery and landings were generally restricted to area of catch. Refer to complete 2016 ocean salmon regulations for detailed landing and notification requirements.
July 8-14, July 22-28, Aug. 1-7, Aug. 15-23	All except coho. No chum retention north of Cape Alava in Aug. and Sept.	21,000 [c/] with sub-allocation by area.	-	Chinook minimum size limit of 28 inches total length. Landing limits were adjusted throughout the season, see Tables C.3 and C.5 for details. Mandatory Yelloweye Rockfish Conservation Area, Cape Flattery and Columbia Control Zones, and beginning August 8, Grays Harbor Control Zone Closed. Vessels must land and deliver their fish within 24 hours of any closure of this fishery and landings were generally restricted to area of catch. Refer to complete 2016 ocean salmon regulations for detailed landing and notification requirements.
Cape Falcon to Humbug Mt., OR				
Apr. 8- Aug. 24	All except coho	None	-	Open for a total of 100 days during this 139-day period. see Table C.3 for details. Chinook minimum size limit of 28 inches total length. All vessels fishing in the area must land their fish in the State of Oregon. Shoreward of the 15 fathom curve off Tillamook Bay between Twin Rocks and Pyramid Rock, only fin-clipped Chinook may be retained or on board while fishing prior to Aug. 1.
Sept. 1-7, 15-30	All except coho	None	-	Landing and possession limit of 45 Chinook per vessel per landing week (Thurs.-Wed.).
Oct. 1-31	All except coho	None	-	Open shoreward of the 40-fathom regulatory line. Chinook minimum size limit of 28 inches total length. Landing and possession limit of 45 Chinook per vessel per landing week (Thurs.-Wed.).
Elk River Ocean Terminal Area Inside of a line from Cape Blanco to Black Rock to Best Rock to 42°40'30" N. Lat. 124°29'00" W. Long. to Humbug Mt.				
Nov. 1-30	Chinook only	None	-	Chinook minimum size limit of 26 inches total length. Landing and possession limit of 20 Chinook per vessel day. Landings restricted to Port Orford.
Humbug Mt. to OR/CA border				
Apr. 8-May 31	All except coho	None	-	Chinook minimum size limit of 28 inches total length. Prior to June 1, all fish caught in this area must be landed and delivered in the State of Oregon. After May 31 a daily landing and possession limit of 15 Chinook is in place and all vessels fishing in this area must land and deliver all fish to Gold Beach, Port Orford or Brookings within 24 hours of any closure of this fishery, and prior to fishing outside of this area. State regulations require fishers landing from any quota managed season in this area to notify ODFW within one hour of delivery or prior to transporting their catch to other locations.
June 5-10, 15-30	All except coho	720	-	
July 8-31	All except coho	594 [d/]	-	

TABLE I-1. Summary of actual ocean non-Indian commercial troll salmon fishing regulations for 2016. (Page 2 of 3)

Area and Season	Salmon Species	Actual Quota Chinook	Actual Quota Coho	Special Restrictions[a/]
Chetco River Terminal Area Tw in Rocks to OR/CA border inside 3 nm Oct. 10-31	Chinook only	300	-	Chinook minimum size limit of 28 inches total length. Landing and possession limit of 5 Chinook per vessel through Oct. 25 then 10 per vessel thereafter. Landings restricted to Brookings.
OR/CA border to Humboldt South Jetty Sept. 9-27	All except coho	1,000	-	Five days per w eek Friday through Tuesday. Chinook minimum size limit of 28 inches total length. Landing and possession limit of 20 Chinook per vessel per day. All fish caught in this area must be landed w ithin the area and w ithin 24 hours of any closure of the fishery and prior to fishing outside the area. Klamath Control Zone closed. See California State regulations for additional closures adjacent to the Smith and Klamath rivers. When the fishery is closed betw een the OR/CA border and Humbug Mountain and open to the south, vessels w ith fish on board caught in the open area off California may seek temporary mooring in Brookings, Oregon prior to landing in California only if such vessels first notify the Chetco River Coast Guard Station via VHF channel 22A betw een the hours of 0500 and 2200 and provide the vessel name, number of fish on board, and estimated time of arrival.
Humboldt South Jetty to Horse Mt.	Closed	-	-	
Horse Mt. to Pt. Arena June 13-30, Aug. 3-27, Sept. 1-30	All except coho	None	-	Seven days per w eek. Chinook minimum size limit of 27 inches total length. All fish must be landed in California. All salmon caught prior to September 1 must be landed and offloaded no later than 11:59 p.m., August 30. When the CA KMZ fishery is open, all fish caught in the area must be landed south of Horse Mt. During September, all fish must be landed north of Pt. Arena.
Pt. Arena to Pigeon Pt. May 6-31, June 13-30, Aug. 3-28, Sept. 1-30	All except coho	None	-	Seven days per w eek. Chinook minimum size limit of 27 inches total length prior to September 1, 26 inches thereafter. All fish must be landed in California. All salmon caught prior to September 1 must be landed and offloaded no later than 11:59 p.m., August 30. During September, all fish must be landed south of Point Arena.
Fall Area Target Zone Pt. Reyes to Pt. San Pedro Oct. 3-7, 10-14	All except coho	None	-	Chinook minimum size limit of 26 inches total length. All vessels fishing in this area must land and deliver all fish betw een Point Arena and Pigeon Point.
Pigeon Pt. to Pt. Sur May 1-31, June 1-30	All except coho	None	-	Seven days per w eek. Chinook minimum size limit of 27 inches total length. All fish must be landed in California. All salmon caught prior to September 1 must be landed and offloaded no later than 11:59 p.m., August 30.
Pt. Sur to U.S./Mexico Border May 1-31, June 1-30	All except coho	None	-	Seven days per w eek. Chinook minimum size limit of 27 inches total length. All fish must be landed in California. All salmon caught prior to September 1 must be landed and offloaded no later than 11:59 p.m., August 30.

TABLE I-1. Summary of actual ocean non-Indian commercial troll salmon fishing regulations for 2016. (Page 3 of 3)

a/ Single-point, single-shank barbless hooks required in all open areas coastwide. Limited to no more than 4 spreads per wire for all seasons between Cape Falcon and the OR/CA border and no more that 6 spreads per wire from the OR/CA border south to the U.S./Mexico border. Unless otherwise noted, min. size limits (total length) for Chinook is 28 inches. May 1, 2016 through Dec. 31, 2016 and Apr. 1-30, 2017, license holders may land or possess no more than one Pacific halibut per each three Chinook, except one Pacific halibut may be possessed or landed without meeting the ratio, and no more than 20 halibut may be possessed or landed per trip, unless modified by inseason action (regulation reviewed on June 22 and remained unchanged for remainder of season).

b/ No more than 4,600 from U.S./Canada border to Queets R. and 4,600 between Leadbetter Pt. and Cape Falcon. In-season actions included changes to weekly landing limits.

c/ No more than 8,300 of which may be caught in the area between the U.S./ Canada border and the Queets River. In-season actions included changes to weekly landing limits.

d/ Increased from 200 by an impact-neutral transfer of remaining June quota.

TABLE I-2. Summary of actual treaty Indian commercial ocean and Area 4B troll salmon seasons for 2016.

	Seasons[a/]			Minimum Size Limit (Inches)		
Tribe and Area	Salmon Species	Dates	Days	Chinook	Coho	Special Restrictions
Quinault						
Areas 2-3	All except coho	May 1-June 30	61	24	-	
	All	July 1- Aug. 31	62	24	16	No Coho retention
Hoh						
Areas 2-3	All except coho	May 1-June 30	61	24	-	
	All	July 1- Aug. 31	62	24	16	No Coho retention
Quileute						
Area 3	All except coho	May 1-June 30	61	24	-	
	All	July 1- Aug. 31	62	24	16	No Coho retention
	All	Sept. 16-Oct. 15	30	24	16	Closed: Ceremonial and subsistence only
Makah						
Areas 3N, 4, and 4A	All except coho	May 1-June 4	35	24	-	Area Closure: Swiftsure
	All except coho	June 5-30	26	24	-	All areas open
	All	July 1-Aug. 6	37	24	16	No Coho retention; Gear restriction plugs only
	All	Aug. 7-31	25	24	16	No Coho retention; No gear restrictions
Area 4B	All except coho	May 1-June 30	61	24	-	
	All[b/]	Jan. 1-Apr. 15; Nov. 1-Dec. 31	166	22[c/]	16	
	All[b/]	July 1-Aug. 6	37	24	16	No Coho retention; Gear restriction plugs only
	All[b/]	Aug. 7-31	25	24	16	No Coho retention; No gear restrictions
S'Klallam						
Area 4B	All except coho	May 1-June 30	61	24	-	
	All[b/]	Jan. 1-Apr. 15; Nov. 1-Dec. 31	166	22[c/]	16	
	All[b/]	July 1- Aug. 31	62	24	16	No Coho retention

a/ The overall quotas for these fisheries was 40,000 Chinook. These quotas included troll catch by the S'Klallam and Makah tribes in Washington State Statistical Area 4B. The overall Chinook quota was divided preseason to provide 20,000 Chinook for the May 1-June 30 season and 20,000 Chinook for the July 1-Aug. 31 season, including Sept.-Oct. catch from the Quileute tribe's ceremonial and subsitance fishery. Single point, single shank barbless hooks were required in all ocean fisheries.

b/ Retention of steelhead prohibited; retention of chum prohibited prior to Sept. 30.

c/ Minimum size limit 24 inches after May 1.

TABLE I-3. Summary of actual ocean recreational salmon fishing regulations for 2016. (Page 1 of 2)

Area and Season	Salmon Species	Actual Quota Chinook	Actual Quota Coho[a/]	Daily Limit and Special Restrictions[b/]
U.S./Canada Border to Cape Falcon, OR				
U.S./Canada Border to Cape Alava, WA (Neah Bay subarea)				
July 1-Aug. 21	All except coho	6,200 [c/]	-	Two salmon daily. No chum retention beginning Aug. 1. Chinook non-retention east of the Bonilla-Tatoosh line during Council managed ocean fishery beginning Aug. 1.
Cape Alava to Queets R., WA (La Push subarea)				
July 1-Aug. 21	All except coho	2,000 [c/]	-	Two salmon daily.
Queets R. to Leadbetter Pt., WA (Westport subarea)				
July 1-Aug. 21	All except coho	16,000 [c/]	-	One salmon daily through Jul. 22, then two fish per day thereafter. Grays Harbor Control Zone closed beginning Aug. 8
Leadbetter Pt., WA to Cape Falcon, OR (Columbia River subarea)				
July 1- Aug. 27	All salmon	10,200 [c/]	18,900	Two salmon daily; daily limit incudes no more than one Chinook through Aug. 15, then two Chinook allowed thereafter. Columbia River Control Zone closed.
Cape Falcon to Humbug Mt.				
Mar. 15-June 24, Aug. 8-Sept. 2	All except coho	-	-	Two salmon daily. Shoreward of the 15 fathom curve off Tillamook Bay between Twin Rocks and Pyramid Rock, only fin-clipped Chinook may be retained or on board while fishing prior to Aug. 1. Fishing in the Stonewall Bank groundfish conservation area restricted to trolling only on days the all depth recreational halibut fishery is open.
Sept. 3-30	All salmon	-	7,500	
Oct. 1-31	All except coho	-		
Elk River Ocean Terminal Area Inside of a line from Cape Blanco to Black Rock to Best Rock to 42º40'30" N. Lat. 124º29'00" W. Long. to Humbug Mt.				
Nov. 1-30	Chinook only	-	-	Two Chinook daily, one of which can be unmarked; no more than 10 unmarked per season in aggregate with Elk R., Sixes R., Floras Ck., and New R.
Cape Falcon to OR/CA border				
June 25-Aug. 7	All salmon	-	26,000	Two salmon daily. All coho must be marked. Shoreward of the 15 fathom curve off Tillamook Bay between Twin Rocks and Pyramid Rock, only fin-clipped Chinook may be retained or on board while fishing prior to Aug. 1. Fishing in the Stonewall Bank groundfish conservation area restricted to trolling only on days the all-depth recreational halibut fishery is open.
Humbug Mt. to OR/CA border (Oregon KMZ)				
May 28-June 24	All except coho	-	-	Two salmon daily.
Sept. 3-5	All except coho	-	-	Two salmon daily.
Chetco River Terminal Area Twin Rocks to OR/CA border inside 3 nm				
Oct. 1-3, 8-9	Chinook only	-	-	Two Chinook daily, one of which can be unmarked.

TABLE I-3. Summary of actual ocean recreational salmon fishing regulations for 2016. (Page 2 of 2)

Area and Season	Salmon Species	Actual Quota Chinook	Actual Quota Coho[a/]	Daily Limit and Special Restrictions[b/]
OR/CA border to Horse Mt. (California KMZ)				
May 16-31, June 16-30, July 16-Aug.16, Sept.1-5	All except coho	None	-	Two salmon daily. Chinook minimum size limit of 20 inches total length. Klamath Control Zone closed in August. Additional closures adjacent to Smith, Eel, and Klamath Rivers. See California regulations for details.
Horse Mt. to Pt. Arena (Fort Bragg)				
Apr. 2-Nov. 13	All except coho	None	-	Two salmon daily. Chinook minimum size limit of 20 inches total length.
Pt. Arena to Pigeon Pt. (San Francisco)				
Apr. 2-Oct. 31	All except coho	None	-	Two salmon daily. Chinook minimum size limit of 24 inches total length through April 30, 20 inches thereafter.
Pigeon Pt. to Pt. Sur (Monterey North)				
Apr. 2-July 15	All except coho	None	-	Two salmon daily.
Pt. Sur to U.S./Mexico Border (Monterey South)				
Apr. 2-May 31	All except coho	None	-	Two salmon daily.

a/ All coho fisheries and quotas are mark-selective for fish with a healed adipose fin clip unless otherwise noted.

b/ Unless otherwise noted, minimum size limits are 24 inches for Chinook and 16 inches for coho. Seasons open 7 days per week. For a complete description of gear restrictions, see the annual ocean salmon regulations or the annual Preseason Report III, Table 2.

c/ Total Chinook quota for the North of Falcon area is 35,000 fish.

TABLE I-4. Council area commercial and recreational ocean salmon fishing effort and landings by state. Data are provisional, pending further review of data compilation methods. A double dash ("- -") indicates no records are available. Fewer than 500 pounds may be shown as zero. (Page 1 of 4)

Year or Average	COMMERCIAL TROLL							RECREATIONAL					
	Effort (boat days fished)	Catch						Effort (salmon angler trips)	Catch (numbers of fish)				Salmon Per Angler Trip
		Numbers of Fish			Thousands of Pounds (Dressed Weight)								
		Chinook	Coho	Pink	Chinook	Coho	Pink		Chinook	Coho	Pink	Total	
						WASHINGTON[a/]							
1966-70	- -	172,500	717,200	96,200	1,810	4,557	432	401,900	152,600	427,700	14,600	594,900	1.5
1971-75	56,200	275,400	870,300	31,600	2,926	4,801	147	482,900	210,400	567,400	6,100	783,900	1.6
1976-80	43,787	188,610	717,302	412,880	2,364	3,675	789	429,809	114,092	511,827	23,544	649,463	1.5
1981-85[b/]	12,782	71,326	217,754	149,974	944	1,039	358	163,344	54,662	172,399	5,915	232,976	1.4
1986-90	6,078	71,534	137,942	33,565	847	633	117	119,412	26,075	165,058	1,919	193,051	1.6
1991-95	4,156	42,477	76,334	32,072	453	335	112	104,949	11,156	131,364	2,484	145,003	1.4
1996-2000	660	25,267	28,492	1,682	286	125	9	38,459	4,940	41,445	2,140	48,524	1.3
2001-2005	1,721	79,452	41,007	1,544	1,123	260	4	109,947	35,251	109,200	6,862	151,312	1.4
2006	2,243	47,314	33,203	0	634	255	0	65,263	10,667	36,087	0	46,754	0.7
2007	1,864	37,211	45,924	731	526	257	5	72,683	8,944	83,788	4,670	97,402	1.3
2008	1,803	29,543	15,970	0	352	134	0	37,610	14,635	18,870	0	33,505	0.9
2009	2,818	24,542	80,718	935	316	548	9	101,560	12,351	138,493	7,627	158,471	1.6
2010	3,293	77,475	13,565	0	928	96	0	80,955	36,874	36,278	0	73,152	0.9
2011	2,664	58,726	16,617	1,289	740	93	2	73,596	29,203	39,582	10,828	79,613	1.1
2012	3,020	91,644	40,798	0	1,100	220	2	77,659	33,729	31,434	0	65,163	0.8
2013	3,335	89,971	53,383	209	1,035	275	2	80,014	28,918	46,140	7,668	82,726	1.0
2014	3,010	100,254	71,361	0	1,243	405	4	119,617	40,025	123,057	0	163,082	1.4
2015	3,757	113,805	6,854	190	1,323	37	1	97,114	39,431	74,737	0	114,168	1.2
2016[c/]	2,223	40,176	11	0	470	0	0	51,437	16,907	16,059	0	32,966	0.6

TABLE I-4. Council area commercial and recreational ocean salmon fishing effort and landings by state. Data are provisional, pending further review of data compilation methods. A double dash ("- -") indicates no records are available. Fewer than 500 pounds may be shown as zero. (Page 2 of 4)

Year or Average	COMMERCIAL TROLL							RECREATIONAL					
	Effort (boat days fished)	Catch						Effort (salmon angler trips)	Catch (numbers of fish)				Salmon Per Angler Trip
		Numbers of Fish			Thousands of Pounds (Dressed Weight)								
		Chinook	Coho	Pink	Chinook	Coho	Pink		Chinook	Coho	Pink	Total	
						OREGON[d/]							
1966-70	- -	122,000	804,500	- -	1,159	5,358	- -	- -	- -	- -	- -	- -	- -
1971-75	47,400	208,500	979,000	- -	2,128	6,015	- -	- -	- -	- -	- -	- -	- -
1976-80	55,885	232,632	741,694	- -	2,427	4,252	139	387,743	39,974	289,189	- -	329,163	0.8
1981-85	25,496	145,503	301,499	2,100	1,432	1,537	117	233,544	33,085	165,393	2,700	201,178	0.9
1986-90	38,154	394,927	397,243	4,300	3,731	1,957	21	241,161	35,713	218,637	500	254,849	1.1
1991-95	9,016	100,945	119,367	380	940	325	2	99,547	9,234	103,001	60	112,296	1.1
1996-2000	7,187	129,523	6,133	380	1,414	14	2	45,609	11,231	12,459	60	23,750	0.5
2001-2005	12,019	282,567	5,749	124	3,109	39	0	118,845	39,942	66,017	0	105,959	0.9
2006	4,502	34,857	1,414	0	486	13	0	62,321	11,588	15,577	0	27,165	0.4
2007	5,217	35,487	17,109	80	464	101	0	88,264	6,941	60,653	0	67,594	0.8
2008	803	5,954	434	0	66	4	0	30,418	1,578	12,085	2	13,665	0.4
2009	1,234	1,149	21,962	18	15	131	0	84,518	1,585	89,606	0	91,191	1.1
2010	4,296	39,433	1,040	0	506	7	0	53,319	4,967	18,295	0	23,262	0.4
2011	3,752	32,081	464	49	402	3	0	48,756	5,164	18,832	0	23,996	0.5
2012	6,256	73,101	624	0	741	4	0	67,308	18,794	16,079	0	34,873	0.5
2013	8,986	112,757	452	0	1,291	2	0	85,535	30,234	14,536	0	44,770	0.5
2014	10,703	208,096	10,998	0	2,571	67	0	121,506	18,480	99,507	0	117,987	1.0
2015	8,729	104,259	2,213	0	1,189	11	0	66,039	9,442	28,282	0	37,724	0.6
2016[c/]	4,398	42,276	-	0	519	0	0	38,864	4,095	8,410	0	12,505	0.3

TABLE I-4. Council area commercial and recreational ocean salmon fishing effort and landings by state. Data are provisional, pending further review of data compilation methods. A double dash ("- -") indicates no records are available. Fewer than 500 pounds may be shown as zero. (Page 3 of 4)

Year or Average	COMMERCIAL TROLL							RECREATIONAL					
	Effort (boat days fished)	Catch						Effort (salmon angler trips)	Catch (numbers of fish)				Salmon Per Angler Trip
		Numbers of Fish			Thousands of Pounds (Dressed Weight)								
		Chinook	Coho	Pink	Chinook	Coho	Pink		Chinook	Coho	Pink	Total	
						CALIFORNIA[e/]							
1966-70	- -	486,300	319,700	7,400	4,925	2,352	37	189,800	120,800	33,200	0	154,000	0.8
1971-75	45,200	562,700	361,800	4,700	5,743	5,743	22	247,400	169,600	48,300	0	217,900	0.9
1976-80	95,003	618,637	210,303	500	5,867	1,184	3	163,469	92,422	31,158	0	123,580	0.8
1981-85	59,765	462,652	58,726	2,400	4,454	345	14	146,950	109,097	19,866	0	128,963	0.9
1986-90	58,511	794,703	46,780	300	8,097	262	2	240,667	166,395	40,388	0	206,783	0.9
1991-95	25,700	341,928	42,475	-	3,429	94	0	215,996	170,296	22,399	0	192,695	0.9
1996-2000	18,299	368,001	-	0	4,037	0	0	194,586	157,742	452	0	158,194	0.8
2001-2005	17,187	383,921	-	0	4,877	0	0	180,127	147,974	979	0	148,953	0.8
2006	8,259	69,728	-	0	1,043	0	0	126,506	96,292	1,626	0	97,918	0.8
2007	10,671	114,141	-	0	1,525	0	0	105,889	47,704	746	0	48,450	0.5
2008	-	-	-	-	-	-	-	391	6	-	0	6	0.0
2009	-	-	-	-	-	-	-	5,359	672	8	0	680	0.1
2010	1,975	15,088	-	0	228	-	0	48,667	14,809	175	0	14,984	0.3
2011	6,973	70,028	-	0	992	-	0	91,676	49,822	316	0	50,138	0.5
2012	14,522	215,585	-	0	2,530	-	0	148,007	123,926	101	0	124,027	0.8
2013	17,293	297,627	-	0	3,793	-	0	147,296	116,074	361	0	116,435	0.8
2014	14,394	168,283	-	0	2,253	-	0	120,307	74,840	479	0	75,319	0.6
2015	13,011	110,507	-	0	1,188	-	0	81,778	37,480	41	0	37,521	0.5
2016[c/]	7,160	55,051	-	0	614	-	0	69,687	37,680	70	0	37,750	0.5

TABLE I-4. Council area commercial and recreational ocean salmon fishing effort and landings by state. Data are provisional, pending further review of data compilation methods. A double dash ("- -") indicates no records are available. Fewer than 500 pounds may be shown as zero. (Page 4 of 4)

Year or Average	COMMERCIAL TROLL							RECREATIONAL					
	Effort (boat days fished)	Catch						Effort (salmon angler trips)	Catch (numbers of fish)				Salmon Per Angler Trip
		Numbers of Fish			Thousands of Pounds (Dressed Weight)								
		Chinook	Coho	Pink	Chinook	Coho	Pink		Chinook	Coho	Pink	Total	
						COUNCIL AREA[a/d/e/]							
1966-70	--	780,800	1,841,400	103,600	7,893	12,267	468	591,700	273,400	460,900	14,600	748,900	1.3
1971-75	148,800	1,046,600	2,211,100	36,300	10,796	16,559	170	730,300	380,000	615,700	6,100	1,001,800	1.4
1976-80	194,675	1,039,879	1,669,299	413,380	10,658	9,111	930	981,020	246,488	832,173	23,544	1,102,206	1.1
1981-85[b/]	98,043	679,481	577,980	154,474	6,830	2,921	489	543,838	196,845	357,658	8,615	563,117	1.0
1986-90	102,743	1,261,163	581,965	38,165	12,675	2,852	140	601,240	228,183	424,082	2,419	654,684	1.1
1991-95	38,873	485,349	238,176	32,452	4,821	754	114	420,491	190,686	256,764	2,544	449,993	1.1
1996-2000	26,146	522,792	34,625	2,062	5,736	139	11	278,654	173,912	54,356	2,200	230,468	0.8
2001-2005	30,927	745,940	46,757	1,668	9,109	299	4	408,920	223,168	176,195	6,862	406,224	1.0
2006	15,004	151,899	34,617	0	2,163	268	0	254,090	118,547	53,290	0	171,837	0.7
2007	17,752	186,839	63,033	811	2,516	358	6	266,836	63,589	145,187	4,670	213,446	0.8
2008	2,606	35,497	16,404	0	419	138	0	68,419	16,219	30,955	2	47,176	0.7
2009	4,052	25,691	102,680	953	331	678	9	191,437	14,608	228,107	7,627	250,342	1.3
2010	9,564	131,996	14,605	0	1,662	103	0	182,941	56,650	54,748	0	111,398	0.6
2011	13,389	160,835	17,081	1,338	2,133	96	2	214,028	84,189	58,730	10,828	153,747	0.7
2012	23,798	380,330	41,422	0	4,371	224	2	292,974	176,449	47,614	0	224,063	0.8
2013	29,614	500,355	53,835	209	6,120	277	2	312,845	175,226	61,037	7,668	243,931	0.8
2014	28,107	476,633	82,359	0	6,067	473	4	361,430	133,345	223,043	0	356,388	1.0
2015	25,497	328,571	9,067	190	3,700	48	1	244,931	86,353	103,060	0	189,413	0.8
2016[c/]	13,781	137,503	11	0	1,603	0	0	159,988	58,682	24,539	0	83,221	0.5

a/ For Washington, commercial effort and landings include: (1) treaty Indian fisheries (ocean and Area 4B only from May 1-Sept. 30) beginning in 1972; (2) prior to 1978, catch off British Columbia landed in Washington; (3) catch off Alaska landed in Washington; and (4) catch off Oregon and California beginning in 1976. Treaty Indian effort is in deliveries. Beginning in 1989, recreational angler trips and catch include state-managed, late-season Area 4B fishery when open (see Table IV-15).

b/ Recreational effort and catch includes WA-based effort and catch from OR state waters (July 26-Aug. 1) and Strait of Juan de Fuca after WDFW and NMFS ocean closures in 1982.

c/ Preliminary.

d/ OR commercial troll landings include small numbers of salmon caught in Alaska (prior to 1990), WA, and CA. Oregon recreational effort data are total angler trips prior to 1979 and salmon trips beginning in 1979. Significantly reduced salmon per angler trip in 1994-1998 reflects regulations requiring nonretention of coho in the recreational fishery south of Cape Falcon.

e/ California commercial effort and landings include salmon caught off Oregon and landed in California prior to 2005, which were relatively minor in all years except 2004 when 25,655 Chinook were landed and 227 days fished in Oregon waters.

TABLE I-5. Council area commercial and recreational ocean salmon fishing effort and landings by management area.

	COMMERCIAL TROLL				RECREATIONAL					
	Effort[a/] (days	Catch (numbers of fish)			Effort (salmon	Catch (numbers of fish)				Salmon Per
Year	fished)	Chinook	Coho	Pink	angler trips)	Chinook	Coho	Pink	Total	Angler Trip
- - - - - U.S./CANADA BORDER TO CAPE FALCON - - - - -										
Treaty Indian (U.S./Canada Border to Leadbetter Point)[b/]:										
2010	857	32,376	11,461	0	-	-	-	-	-	-
2011	600	31,824	13,564	1,074	-	-	-	-	-	-
2012	960	54,789	37,530	0	-	-	-	-	-	-
2013	1,027	49,881	47,342	209	-	-	-	-	-	-
2014	988	61,547	55,954	0	-	-	-	-	-	-
2015	1,112	58,492	3,982	122	-	-	-	-	-	-
2016[c/]	595	22,832	11	0	-	-	-	-	-	-
Non-Indian:										
2010	3,068	56,219	3,144	0	91,209	38,686	42,386	0	81,072	0.9
2011	2,353	29,738	3,517	264	80,979	30,822	45,628	10,828	87,278	1.1
2012	2,476	45,299	3,892	0	82,497	35,433	33,106	0	68,539	0.8
2013	2,595	42,035	6,493	141	86,150	30,836	50,153	7,668	88,657	1.0
2014	2,838	54,889	23,109	0	131,872	42,331	139,797	0	182,128	1.4
2015	3,463	66,195	5,059	141	105,743	42,188	83,577	0	125,765	1.2
2016[c/]	1,853	19,402	2,877	0	55,769	17,947	18,713	0	36,660	0.7
- - - - - CAPE FALCON TO HUMBUG MOUNTAIN - - - - -										
2010	3,483	27,444	-	0	37,115	2,331	12,127	0	14,458	0.4
2011	3,174	27,919	-	0	35,113	2,609	12,758	0	15,367	0.4
2012	5,458	59,213	-	0	43,649	7,767	14,198	0	21,965	0.5
2013	7,992	103,996	-	0	59,291	17,867	10,084	0	27,951	0.5
2014	9,117	175,768	3,296	0	92,183	9,355	82,200	0	91,555	1.0
2015	7,391	89,154	-	0	48,455	5,501	19,304	0	24,805	0.5
2016[c/]	4,046	39,820	-	0	30,344	2,552	5,704	0	8,256	0.3
- - - - - HUMBUG MOUNTAIN TO HORSE MOUNTAIN (KMZ) - - - - -										
2010	181	869	-	0	10,179	1,544	110	0	1,654	0.2
2011	490	3,717	-	0	21,209	10,923	126	0	11,049	0.5
2012	687	10,675	-	0	50,203	48,767	276	0	49,043	1.0
2013	1,368	16,994	-	0	49,936	44,430	676	0	45,106	0.9
2014	869	16,766	-	0	37,702	22,646	849	0	23,495	0.6
2015	552	4,269	-	0	17,894	4,874	150	0	5,024	0.3
2016[c/]	186	594	-	0	13,141	5,503	79	0	5,582	0.4
- - - - - HORSE MOUNTAIN TO U.S./MEXICO BORDER - - - - -										
2010	1,975	15,088	-	0	44,438	14,089	125	0	14,214	0.3
2011	6,772	67,637	-	0	76,727	39,835	218	0	40,053	0.5
2012	14,217	210,354	-	0	116,625	84,482	34	0	84,516	0.7
2013	16,632	287,449	-	0	117,468	82,093	124	0	82,217	0.7
2014	14,295	167,663	-	0	99,673	59,013	197	0	59,210	0.6
2015	12,979	110,461	-	0	72,839	33,790	29	0	33,819	0.5
2016[c/]	7,101	54,855	-	0	60,734	32,680	43	0	32,723	0.5

a/ Treaty Indian troll effort in number of deliveries.

b/ May through September only.

c/ Preliminary.

TABLE I-6. Coho and Chinook harvest quotas and guidelines (*) for 2016 Council managed fisheries compared with actual harvest by management area and fishery.

	Chinook			Coho		
Fishery Governed by Quota or Guideline	Quota or Guideline[a/]	Catch	Catch/ Quota	Quota	Catch	Catch/ Quota
NORTH OF CAPE FALCON						
TREATY INDIAN COMMERCIAL TROLL						
May-June, All salmon except coho	20,000	16,544	0.83	-	-	-
July-September, All salmon except coho	20,000 [b/]	6,288	0.31	-	-	-
Subtotal Treaty Indian Commercial Troll	40,000	22,832	0.57	-	-	-
NON-INDIAN COMMERCIAL TROLL						
May-June, All salmon except coho	14,000 *	12,662	0.90	-	-	-
July-August, All salmon except coho	21,000 *	6,740	0.32	-	-	-
Subtotal Non-Indian Commercial Troll	35,000	19,402	0.55	-	-	-
RECREATIONAL						
U.S./Canada Border to Cape Alava						
July 1-August 21, All salmon except coho	6,200 *	3,266	0.53	-	53	-
Cape Alava to Queets River						
July 1-August 21, All salmon except coho	2,000 *	255	0.13	-	5	-
Queets River to Leadbetter Pt.						
July 1-August 21, All salmon except coho	16,600 *	8,430	0.51	-	43	-
Leadbetter Pt. to Cape Falcon						
July 1-August 27, All salmon, coho non-mark-sele	10,200 *	5,997	0.59	18,900	18,612	0.98
Subtotal Recreational	35,000	17,948	0.51	18,900	18,713	0.99
TOTAL NORTH OF CAPE FALCON	110,000	60,182	0.55	18,900	18,713	0.99
SOUTH OF CAPE FALCON						
COMMERCIAL TROLL (all except coho)						
Humbug Mt. to OR/CA Border (June)	720	179	0.25	-	-	-
Humbug Mt. to OR/CA Border (July)	594 [b/]	21	0.04	-	-	-
OR/CA Border to Humboldt South Jetty (Sept.)	1,000	196	0.20	-	-	-
Subtotal Troll	2,314 [b/]	396	0.17	-	-	-
RECREATIONAL						
Cape Falcon to OR/CA Border coho mark-selective June 25-August 2	-	-	-	26,000	1,547	0.06
Cape Falcon to Humbug Mt.coho non-mark-selective September 3-30	-	-	-	7,500 [b/]	4,170	0.56
TOTAL SOUTH OF CAPE FALCON	2,314 [b/]	396	0.17	33,500 [b/]	5,717	0.17
GRAND TOTAL COUNCIL AREA	112,314 [b/]	60,578	0.54	52,400 [b/]	24,430	0.47

a/ Guidelines for Chinook fisheries are marked with an asterisk (*).

b/ Quotas do not match preseason quota/guidelines because inseason actions (i.e., trades, transferring quotas on an impact neutral basis, and converting to non-mark-selective fishery equivalence) resulted in increases or decreases to the overall quota. See Tables I-I, I-2, I-3, or Appendix Table C-9 for specifics of inseason adjustments.

TABLE I-7. Estimated incidental mortality of Chinook and coho in 2016 ocean salmon fisheries. Observed incidental mortality was calculated by scaling preseason projections of incidental mortality by the ratio of observed to projected catch.

Area and Fishery	2016 Catch Projection	2016 Bycatch Mortality[a/] Projection	2016 Bycatch Projection[b/]	Observed in 2016 Catch	Observed in 2016 Bycatch Mortality[a/]
			CHINOOK (thousands of fish)		
OCEAN FISHERIES:					
NORTH OF CAPE FALCON					
Treaty Indian Ocean Troll	40.0	4.1	10.3	22.8	2.3
Non-Indian Commercial Troll	35.0	16.8	60.9	19.4	9.3
Recreational	35.0	6.5	35.9	17.9	3.4
CAPE FALCON TO HUMBUG MT.[c/]					
Commercial Troll	44.7	6.8	17.8	39.8	5.9 [d/]
Recreational	5.8	0.5	1.6	2.6	0.3
HUMBUG MT. TO HORSE MT.[c/]					
Commercial Troll	2.8	0.4	1.1	0.6	0.7 [d/]
Recreational	6.4	0.6	1.7	5.5	0.4 [d/]
SOUTH OF HORSE MT.					
Commercial Troll	81.1	12.4	32.3	54.9	10.0 [d/]
Recreational	43.8	3.9	10.7	32.7	2.0 [d/]
TOTAL OCEAN FISHERIES					
Commercial Troll	203.6	40.6	122.5	137.5	28.2
Recreational	91.0	11.6	49.9	58.7	6.1
INSIDE FISHERIES:					
Area 4B	-	-	-	-	-
Buoy 10	45.9	2.6	13.7	17.8	1.5 [d/]
			COHO (thousands of fish)		
OCEAN FISHERIES:					
NORTH OF CAPE FALCON					
Treaty Indian Ocean Troll	-	0.4	1.6	0.0	0.4
Non-Indian Commercial Troll	-	3.8	14.6	0.0	3.8
Recreational	18.9	11.4	72.8	18.7	11.6
SOUTH OF CAPE FALCON[c/]					
Commercial Troll	-	5.3	20.6	-	2.8
Recreational	33.5	13.7	67.5	5.7	2.3
TOTAL OCEAN FISHERIES					
Commercial Troll	0.0	9.6	36.8	0.0	7.0
Recreational	52.4	25.1	140.3	24.4	14.0
INSIDE FISHERIES:					
Area 4B	-	-	-	-	-
Buoy 10	20.0	3.8	14.8	9.2	1.3 [d/]

a/ The bycatch mortality reported in this table consists of drop-off mortality (includes predation on hooked fish) plus hook-and-release mortality of Chinook and coho salmon in Council-area fisheries. Drop-off mortality for both Chinook and coho is assumed to be equal to 5% of total encounters. The hook-and-release mortality (HRM) rates used for both Chinook and coho are:

Commercial: 26%.

Recreational, north of Pt. Arena: 14%.

Recreational, south of Pt. Arena: 15% (based on the proportion of fish caught using mooching versus trolling gear, and the HRM rates of 42.2% and 14% for these gear types, respectively).

b/ Bycatch calculated as drop-off mortality plus fish released.

c/ Includes Oregon territorial water, late season Chinook fisheries.

d/ Based on reported released Chinook or coho. Reported releases in California fisheries are used as a surrogate in Oregon fisheries.

TABLE I-8. Summary of 2016 recreational fisheries selective for marked hatchery Chinook (preliminary data).

Area	Anticipated Mark Rate	Observed Mark Rate	Preseason Quota	Anticipated Nonretention Mortality[a/]	Landed Chinook Catch			Legal sized Chinook Released[b/]	Sub-legal Sized Chinook Released[b/]	Estimated Nonretention Mortality[a/]	Effort[c/]
					Total	Marked	Unmarked				
Recreational											
Ocean Fisheries (no mark-selective fisheries in 2016)											
Neah Bay/La Push	-	-	-	-	-	-	-	-	-	-	-
Westport	-	-	-	-	-	-	-	-	-	-	-
Columbia River	-	-	-	-	-	-	-	-	-	-	-
North of Cape Falcon Total	-	-		-	-	-	-	-	-	-	-
Inside Fisheries											
Strait of Juan de Fuca[d/]	51%	70%	6,166 [e/]	4,259	3,395	3,393	2	1,919	19,505	4,189	14,669
Grand Total	-	-	6,166	4,259	3,395	3,393	2	1,919	19,505	4,189	14,669

a/ Hook-and-release plus drop-off mortality of marked plus unmarked fish; computation of estimated nonretention mortality differs from 2010 and prior years.

b/ Calculated from dockside sampling.

c/ Recreational effort measured in angler trips.

d/ Includes Area 5 (July 1 - Aug. 15, 2016) selective fishery only. Data are preliminary.

e/ Expected catch; not a quota.

TABLE I-9. Summary of 2016 recreational and commercial fisheries selective for marked hatchery coho (preliminary data).

Area	Anticipated Mark Rate	Observed Mark Rate	Preseason Quota	Anticipated Nonretention Mortality[a/]	Landed Coho Catch			Unmarked Coho Released[b/]	Estimated Nonretention Mortality[a/]	Effort[c/]
					Total	Marked	Unmarked			
Recreational										
Ocean Fisheries										
Neah Bay	-	-	-	-	-	-	-	-	-	-
La Push	-	-	-	-	-	-	-	-	-	-
Westport	-	-	-	-	-	-	-	-	-	-
Columbia River	69%	63%	18,900	2,860	18,612	18,580	32	9,937	3,024	28,574
North of Cape Falcon Total	-	-	18,900	2,860	18,612	18,580	32	9,937	3,024	28,574
Cape Falcon to OR/CA Border	42%	39%	26,000	8,603	1,547	1,537	10	2,381	530	10,625
Ocean Fisheries Total	-	-	44,900	11,463	20,159	20,117	42	8,886	2,770	39,199
Inside Fisheries										
4B Add-on	-	-	-	-	-	-	-	-	-	-
Strait of Juan de Fuca[d/]	-	-	-	-	-	-	-	-	-	-
Buoy 10	61%	66%	20,000 [e/]	3,834	9,182	9,139	43	4,679	1,348	94,950
Inside Fisheries Total	-	-	20,000	3,834	9,182	9,139	43	4,679	1,348	94,950
Commercial										
Neah Bay	-	-	-	-	-	-	-	-	-	-
La Push	-	-	-	-	-	-	-	-	-	-
Westport	-	-	-	-	-	-	-	-	-	-
Columbia River	-	-	-	-	-	-	-	-	-	-
Commercial Total	-	-	0	0	0	0	0	0	0	0
Grand Total	-	-	64,900	15,297	29,341	29,256	85	13,565	4,118	-

a/ Hook-and-release plus drop-off mortality of marked plus unmarked fish; computation of estimated nonretention mortality differs from 2010 and prior years; computation of North of Falcon recreational fisheries estimated nonretention mortality differs from 2011 and prior years.

b/ Calculated from observed mark rates where available; where unavailable, anticipated mark rates are used. Cape Falcon-OR/CA border and Buoy 10 recreational fishery observed mark rates based on dockside sampling.

c/ Recreational effort measured in angler trips, commercial effort measured in days fished; includes effort from coho mark-selective fisheries only.

d/ Includes Area 5 selective fishery only. No coho MSF occurred in 2016.

e/ Expected catch; not a quota.

TABLE I-10. Chinook catch by Southeast Alaska marine fisheries in thousands of fish.

	Total Catches			Treaty Chinook			Additional Catch	
Year	Troll	Net	Sport	Troll	Net	Sport	Terminal Exclusion[a/]	Hatchery Add-On[b/]
1985	215.8	33.9	24.9	211.9	33.3	23.0	0.0	6.2
1986	237.7	22.1	22.6	231.6	20.6	19.0	0.0	11.1
1987	242.6	15.5	24.3	231.1	14.0	20.3	0.0	17.1
1988	231.4	21.8	26.2	217.1	17.4	22.3	0.0	22.5
1989	235.7	24.2	31.1	224.2	18.5	26.8	0.0	21.5
1990	287.9	27.7	51.2	263.5	16.1	41.4	0.0	45.9
1991	264.1	34.9	60.5	231.8	21.0	45.1	0.0	61.5
1992	183.8	32.1	42.9	162.6	24.0	35.3	0.0	36.8
1993	226.9	28.0	49.2	212.3	16.2	42.7	0.0	32.9
1994	186.3	35.7	42.4	177.1	22.6	35.5	0.0	29.2
1995	138.1	48.0	49.7	115.1	26.4	35.5	0.0	58.8
1996	141.5	37.3	57.5	107.6	8.4	39.0	8.7	72.6
1997	246.4	25.1	71.5	221.9	11.4	53.3	9.8	46.5
1998	192.1	23.5	55.0	183.5	13.4	46.3	2.4	25.0
1999	146.2	32.7	72.1	132.7	12.9	53.2	4.5	47.7
2000	158.7	41.4	63.2	134.0	11.1	41.4	2.5	74.3
2001	153.3	40.2	72.3	128.7	13.5	44.7	1.5	77.3
2002	325.3	31.7	69.5	298.1	13.5	45.5	1.2	68.2
2003	330.7	39.4	69.4	307.4	23.5	49.2	2.1	57.2
2004	354.7	64.0	80.6	321.9	39.7	55.4	6.3	76.0
2005	338.5	68.1	86.6	304.9	20.4	63.3	40.2	64.3
2006	282.3	67.4	85.8	264.0	26.7	69.4	27.0	48.4
2007	268.1	53.6	82.8	240.5	25.4	62.3	8.1	68.4
2008	151.9	43.0	49.3	126.4	13.8	32.6	5.3	66.1
2009	175.6	48.5	69.6	159.2	20.7	48.1	3.7	61.9
2010	195.6	30.6	58.5	178.0	8.4	44.3	0.5	53.4
2011	242.2	48.2	66.6	220.4	16.3	54.0	0.7	65.6
2012	209.0	39.5	46.5	191.5	13.3	37.7	1.1	51.4
2013	149.5	51.3	56.4	134.6	13.5	43.3	0.3	65.6
2014	355.6	50.0	86.9	340.0	21.2	74.0	0.7	56.6
2015	269.8	53.7	81.8	251.1	18.8	67.9	0.2	67.3
2016[c/]	276.4	42.3	70.0	265.7	25.9	61.7	0.4	35.1

a/ Catch in terminal net fisheries. These catches are not subject to PST limitations.

b/ Catch of increased production of Alaska hatchery fish. These catches are not subject to PST limitations.

c/ Preliminary.

TABLE I-11. Chinook and coho catches by Canadian marine fisheries in thousands of fish.

Year or	Northern B.C.		Central B.C.		North-Central	WCVI				Strait of Georgia				Juan de Fuca		
									Outside			Sport				
Avg.	Troll	Net	Troll	Net	B.C. Sport	NW Troll	SW Troll	Net	Sport	Troll	Net[a/]	North[b/]	South	Troll	Net	Sport
CHINOOK																
1986-1990	168.9	28.1	41.6	14.1	17.8	110.3	215.9	17.8	28.6	39.1	35.8	68.1	34.7	0.1	11.5	30.6
1991-1995	143.9	30.1	25.2	14.0	30.9	111.8	98.5	20.4	45.7	25.3	22.2	62.5	17.7	0.0	6.2	16.6
1996-2000	51.5	17.8	3.3	4.7	35.6	16.6	19.8	0.6	18.9	0.8	11.2	28.9	8.8	0.2	0.2	14.3
2001	13.1	25.4	0.0	6.5	49.1	23.9	53.6	0.0	40.2	0.5	4.5	25.6	9.6	0.0	0.0	23.5
2002	103.0	14.9	0.5	4.7	62.4	43.0	90.8	0.5	32.1	0.6	9.6	47.4	9.1	0.0	0.0	24.1
2003	137.4	14.7	0.0	2.8	70.6	58.0	93.8	9.1	24.0	0.7	12.6	23.9	6.4	0.0	0.3	26.6
2004	167.5	16.2	0.0	6.3	92.7	85.4	88.7	12.5	42.5	0.6	12.5	26.3	3.8	0.0	0.0	40.9
2005	174.8	8.2	0.0	6.3	85.8	110.0	38.8	23.6	53.9	0.0	5.6	26.4	1.9	0.0	0.2	30.5
2006	151.5	13.7	0.0	5.2	81.9	53.9	55.3	20.3	37.9	0.0	3.6	20.3	2.4	0.0	0.2	26.4
2007	83.2	11.4	0.0	5.5	75.1	28.4	58.8	26.9	46.2	0.0	2.7	22.3	2.1	0.0	0.1	26.5
2008	52.1	7.4	0.0	1.1	58.4	15.3	74.4	8.3	50.6	0.0	4.2	10.9	2.5	0.0	0.2	22.3
2009	75.5	4.3	0.0	3.1	46.4	17.2	31.8	9.8	68.9	0.0	4.8	23.9	5.5	0.0	0.4	25.6
2010	90.2	3.1	-	1.5	58.0	34.7	44.5	1.7	54.9	0.0	9.6	21.5	4.0	-	0.2	15.6
2011	74.7	4.6	-	4.8	70.1	70.0	54.0	21.8	78.4	0.0	0.5	27.4	6.1	-	0.0	13.6
2012	80.2	1.4	0.0	3.6	52.9	32.3	23.2	10.2	65.4	0.0	1.9	26.9	3.4	0.0	0.3	22.1
2013	69.3	2.7	0.0	5.3	61.4	8.2	26.9	8.7	60.6	0.0	0.4	28.2	4.1	0.0	0.0	34.2
2014	172.0	2.6	0.0	2.3	69.6	90.8	19.0	19.0	48.3	0.0	0.0	42.4	3.8	0.0	0.0	21.1
2015	106.7	3.2	0.0	5.3	75.6	40.0	14.3	10.0	48.2	0.0	0.0	47.0	4.5	0.0	0.0	41.3
2016[c/]	147.4	1.7	0.0	3.2	58.4	51.0	4.5	5.1	37.8	0.0	0.0	35.8	-	0.0	0.0	22.9
COHO																
1986-1990	716.3	139.9	275.2	132.2	28.0	600.0	1,277.9	14.2	19.1	178.4	109.2	512.9	106.0	0.7	194.4	66.2
1991-1995	574.2	147.7	98.5	55.0	42.2	501.3	921.2	4.9	31.7	95.1	56.2	221.0	67.6	0.0	92.1	105.9
1996-2000	116.7	30.5	4.1	8.5	24.1	47.2	110.5	0.2	11.1	0.0	2.3	6.2	2.9	0.1	0.9	38.9
2001	1.1	9.9	0.0	2.7	NA	0.0	0.0	0.0	6.1	0.0	0.0	9.3	1.7	0.0	0.0	0.2
2002	118.9	1.2	8.5	0.0	49.3	0.0	0.0	1.0	4.9	0.0	0.0	3.1	1.5	0.0	0.0	3.8
2003	195.0	6.9	18.9	3.5	NA	0.0	0.1	5.4	13.4	0.0	0.0	1.1	7.5	0.0	0.0	11.8
2004	225.5	24.2	31.7	47.3	27.0	0.1	0.0	2.9	20.3	0.0	0.2	1.4	1.6	0.0	0.0	11.1
2005	260.3	48.5	49.5	52.5	NA	0.6	1.4	4.0	12.4	0.0	0.0	0.7	0.7	0.0	0.0	8.8
2006	125.7	1.1	12.7	5.0	62.0	1.2	1.2	2.2	33.7	0.0	0.0	2.7	0.9	0.0	0.0	2.9
2007	153.1	61.7	28.9	18.9	53.2	1.4	0.0	4.8	25.3	0.0	0.0	6.5	2.0	0.0	0.0	6.7
2008	62.8	0.0	13.9	0.0	NA	0.0	0.3	5.0	27.7	0.0	0.0	1.2	0.3	0.0	0.0	1.2
2009	61.0	0.1	0.0	15.9	48.0	0.0	0.0	0.9	50.0	0.0	0.0	2.6	0.6	0.0	0.0	9.5
2010	138.3	0.1	-	0.4	78.7[d/]	0.1	0.4	0.8	15.1	0.2	0.6	1.2	1.1	-	0.0	0.7
2011	280.7	11.2	15.9	0.0	97.5[e/]	0.0	0.0	1.0	54.0	0.0	0.3	0.6	0.6	0.0	15.6	10.2
2012	215.5	0.0	0.0	0.5	6.0[d/]	0.4	1.7	0.3	46.2	0.0	0.0	1.2	2.5	0.0	0.0	16.6
2013	378.2	21.0	21.1	24.5	NA	5.3	0.8	1.1	72.3	0.0	2.6	19.7[f/]	4.6	0.0	0.0	19.7
2014	177.5	26.7	0.0	11.6	NA	2.2	32.8	0.6	23.4	0.0	1.9	13.0[f/]	1.2	0.0	0.0	21.1
2015	255.7	20.2	0.0	1.0	96.7	3.1	3.1	0.3	29.3	0.0	0	0.8	1.9	0.0	0.0	10.7
2016[c/]	214.6	37.7	4.3	0.2	82.7	0.1	0.1	0.8	21.8	0.0	0	4.4	8.1	0.0	0.0	7.6

a/ Includes Johnstone Strait nets, net fisheries in Strait of Georgia, and Fraser seine.
b/ Includes Johnstone Strait sport (Chinook). North catch in 2016 includes south catch.
c/ Preliminary.
d/ Does not include catch from Areas 5, 6, and 10.
e/ Does not include catch from Area 6.
f/ Does not include areas 15 (North) and 16 (South).

TABLE I-12. West Coast Vancouver Island aggregate abundance based management troll Chinook salmon catch by month.

Season	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.[a/]	Sept.	Total
2005-2006	12,198	2,156	1,689	1,468	5,154	7,883	20,561	7,078	20,807	-	886	24,098	103,978
2006-2007	16,000	1,200	800	5,500	2,600	2,300	5,200	23,500	25,000	-	-	6,000	88,100
2007-2008	3,137	-	-	1,634	1,911	-	1,717	11,105	15,944	-	9,099	45,157	89,704
2008-2009	1,882	1,209	1,107	3,394	1,540	586	3,616	18,062	12,165	-	9,630	-	53,191
2009-2010	-	-	-	-	-	-	8,553	31,296	23,652	-	11,642	3,980	79,123
2010-2011	-	-	-	-	1,849	875	8,670	41,239	34,394	15,619	21,284	-	123,930
2011-2012	-	-	245	129	542	243	10,493	22,334	-	-	4,280	17,264	55,530
2012-2013	3,344	230	312	1,018	358	501	1,374	25,737	-	-	-	2,519	35,393
2013-2014	2,358	28	25	49	586	1,422	13,345	40,336	-	26,494	10,002	15,360	110,005
2014-2015	213	56	-	186	612	731	3,841	27,405	-	-	13,953	7,341	54,338
2015-2016[b/,c/]	178	13	1	51	342	315	6,456	31,799	-	-	7,574	2,390	49,119

a/ Fishery restricted to plugs only.

b/ Does not included 353 test fish in July and August or T'aaq-w iihak catch of 6,049.

TABLE I-13. Summary of 2016 coho catch and release in British Columbia commercial fisheries.

Gear/Area	Coho Kept	Coho Released
Northern Troll	214,610	16,483
Northern Net	37,739	414
North Central Troll	4,343	7
South Central Troll	-	-
Central Net	231	10,417
Johnstone Strait Troll	0	89
Johnstone Strait Net	176	831
Strait of Georgia Net	0	285
Strait of Georgia Troll	0	0
Fraser Gill Net	181	930
Northw est Vancouver Island Troll	123	2,368
Southw est Vancouver Island Troll	130	875
Northw est Vancouver Island Net	0	60
Southw est Vancouver Island Net	808	486

TABLE I-14. Summary of 2016 coho catch and release in British Columbia recreational fisheries.

Area	Kept	Released
Juan de Fuca Strait	6,664	14,439
Strait of Georgia	4,399	15,475
Johnstone Strait	4,449	4,461
WCVI[a/]	21,813	17,018
Total	37,325	51,393

a/ Includes impacts of mark-selective fisheries and inside fisheries.

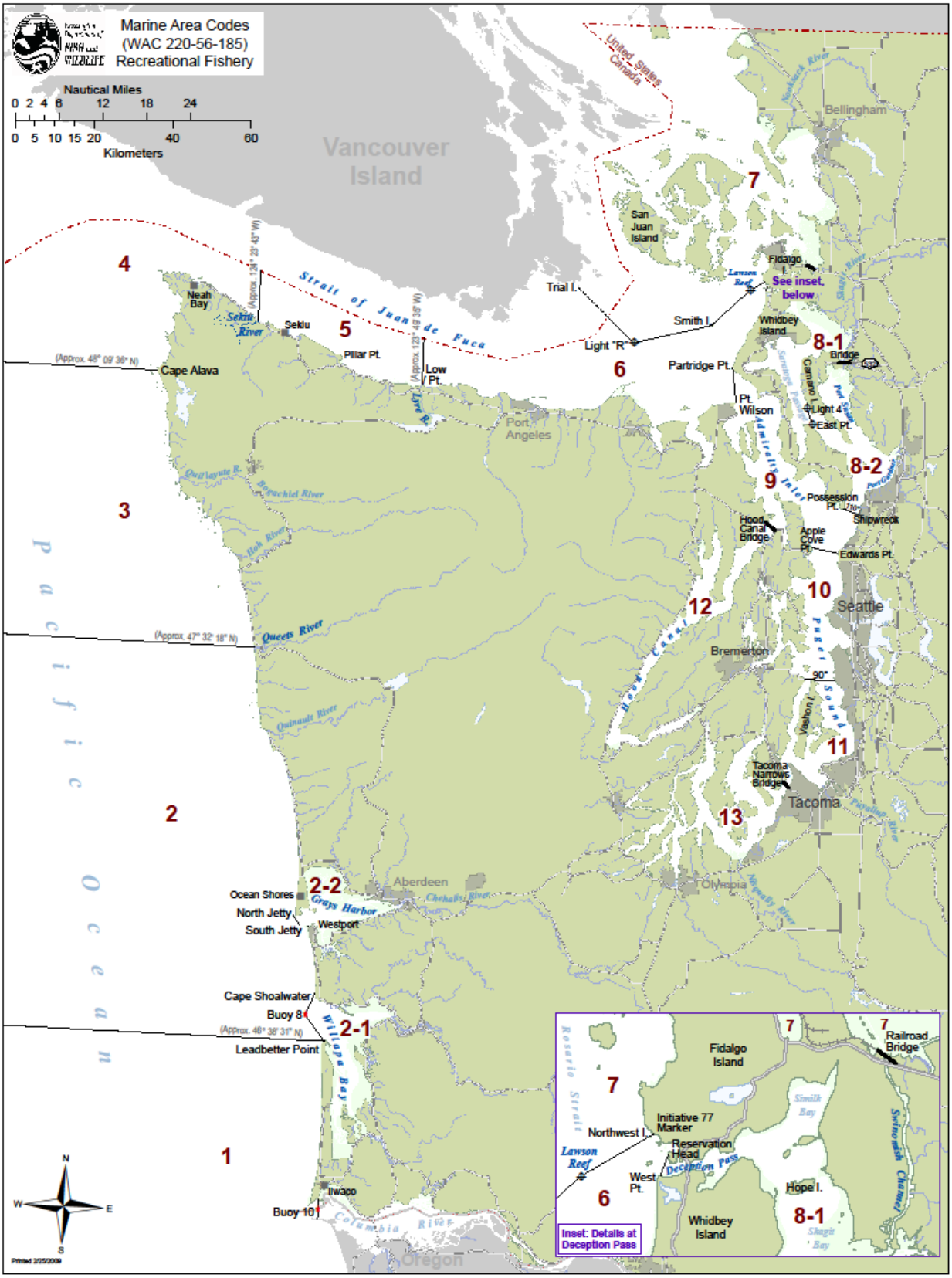

Figure I-1. Washington marine area code numbers and locations.

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 objectives guided Council management of Central Valley Chinook salmon stocks in the 2016 fisheries: (1) for SRWC, the ESA consultation standard specifying a maximum allowable age-3 impact rate of 19.9 percent and restrictions concerning the duration, timing, and minimum size limits for commercial and recreational ocean salmon fisheries south of Point Arena; and (2) for SRFC, an escapement of at least 122,000 hatchery and natural area adults. Harvest impacts on Central Valley Chinook were a primary management concern in fisheries south of Point Arena.

Regulations to Achieve Objectives

In 2016, fishing opportunity south of Cape Falcon was primarily constrained by the control rule-defined maximum exploitation rate of 25 percent on KRFC. Fisheries south of Point Arena were also constrained by the SRWC consultation standard and adopted management measures intended to further reduce impacts on SRWC. Season and size limit details are presented in Tables I-1 and I-3.

Commercial

Fishery impacts on SRWC were a primary management concern south of Point Arena while no specific restrictions were required for ocean salmon fisheries to meet the escapement goal for SRFC. SRFC were projected to have a 2016 hatchery and natural area adult escapement of 151,128, which exceeded the minimum allowable escapement, defined by the control rule, of 122,000 adults.

The fishery south of Pigeon Point was open for the months of May and June. The area between Point Arena and Pigeon Point was open for portions of May, June, and August, and for the entire month of September. An October 3-14 fishery was open Monday through Friday between Point Reyes and Point San Pedro. Commercial fisheries south of Point Arena had a 27-inch minimum size limit through August, which reduced to 26 inches for September and October. The more restrictive regulations for southerly areas were driven by SRWC conservation concerns.

The Fort Bragg area was open for portions of June and August, and the entire month of September, with a 27-inch minimum size limit. The California KMZ was restricted to a small September quota fishery. The Oregon KMZ had monthly quota fisheries in June and July, and was open without quotas for a portion of April and the entire month of May. Oregon fisheries between Cape Falcon and Humbug Mountain were open for portions of April through October with closures of various durations in all months except May and October. These regulations were adopted primarily to meet KRFC management objectives.

Recreational

Recreational fisheries south of Point Arena were structured primarily to limit impacts on SRWC while no specific restrictions were implemented to meet the SRFC escapement goal.

Recreational fisheries south of Horse Mountain opened on April 2. The seasons closed earlier in more southern areas; closing dates ranged from November 13 in the Fort Bragg area to May 31 in the area south of Point Sur. The minimum size limit for recreational fisheries in the Fort Bragg area was 20 inches. From Point Arena to Pigeon Point the minimum size limit was 24 inches in April, and 20 inches thereafter. South of Pigeon Point the minimum size limit was 24 inches for the entire season. The California KMZ was open for portions of May through August and the first five days of September with a 20 inch minimum size limit. The Oregon KMZ opened May 28 and remained opened through August 7. The fishery reopened for the Labor Day weekend, September 3-5. The Chinook fishery between Cape Falcon and Humbug Mountain was open from March 15 through October 31. The minimum size limit in Oregon fisheries was 24 inches.

Inside Harvest

Recreational angling for salmon in Sacramento River and its tributaries was expected to result in a catch of 24,600 adult SRFC. Harvest of SRFC during 2016 fisheries in the Sacramento River and its tributaries was not available in time for this report.

Since 1990, regulations have closed the mainstem Sacramento River to retention of salmon from January 15 through July 15, a period when SRWC 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 the recovery of SRWC coded-wire tags (CWTs) in the sport fishery. To further protect SRWC spawners, an additional closure was implemented in 2015 from approximately May 1 through July 31. This closure prohibited all fishing in the uppermost six miles of the Sacramento River from the Highway 44 Bridge to Keswick Dam. Owing to low Chinook escapement to the Stanislaus, Tuolumne, and Merced rivers, the majority of the San Joaquin River has been closed to recreational salmon fishing. However, beginning in 2012, recreational angling opportunity was reintroduced on the Mokelumne River, the first such opportunity since 2007. Harvest in the Mokelumne River in 2016 was not available in time for this report.

Escapement and Management Performance

Total Chinook catch in commercial and recreational fisheries south of Cape Falcon was below preseason expectations. Overall, commercial Chinook fisheries caught approximately 74 percent of preseason expectations and recreational Chinook fisheries caught approximately 73 percent of preseason expectations (Table I-7).

Sacramento River Fall Chinook

Under the 2016 regulations, the projected spawning escapement in the Sacramento River Basin was 151,100 hatchery and natural area fall Chinook adults. A total of 89,173 hatchery and natural area adult spawners were estimated to have returned to the Sacramento River basin in 2016 (Table II-1, Figure II-1).

Fall Chinook returns to Sacramento River hatcheries in 2016 totaled 34,547 adults, and escapement to natural areas was 54,626 adults. Table II-1 and Figure II-1 display historical natural area and hatchery fall spawner escapement estimates. For a more detailed breakdown of the historical escapement see Appendix B, Table B-1. It is important to note that available data indicate that hatchery origin fish generally constitute a large portion of the Sacramento River naturally spawning fall Chinook population.

Under the terms of Amendment 16 to the salmon FMP, SRFC are considered to be overfished when the 3-year geometric mean spawning escapement falls below the minimum stock size threshold (MSST) of 91,500 hatchery and natural area adult spawners. The geometric mean of adult spawning escapement for years 2014-2016 is 128,865 and therefore SRFC are not overfished.

SRFC are considered to have been subject to overfishing if the estimated exploitation rate exceeds their maximum fishing mortality threshold (MFMT) of 0.78. An estimate of the 2016 SRFC exploitation rate is not yet available. However, fisheries in 2015 resulted in an exploitation rate of 0.56, which is below the MFMT. Therefore, overfishing did not occur in 2015 (Table II-6).

Sacramento River Winter and Spring Chinook

Spawner escapement of endangered SRWC in 2016 was estimated to be 924 adults and 622 jacks. This estimate was derived from a carcass survey conducted on the upper Sacramento River and includes SRWC captured in the Keswick trap, which provides brood stock to Livingston Stone National Fish Hatchery.

SRWC spawner escapement estimates derived from Red Bluff Diversion Dam counts began in 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 SRWC migration period). Escapement estimates from the carcass survey are considered a better representation of SRWC spawner escapement due to the small proportion of the SRWC migration sampled during the Red Bluff Diversion Dam operation period. Red Bluff Diversion Dam gates were permanently removed in 2012, and escapement estimates based on dam passage are no longer available.

Escapement of spring Chinook to the Sacramento River system in 2016 totaled 7,743 fish (jacks and adults), most of which (an estimated 6,093 fish) returned to upper Sacramento River tributaries; the remaining 1,650 fish returned to the Feather River Hatchery. Estimates of spring Chinook escapement to the upper mainstem Sacramento River are no longer made owing to the permanent removal of the Red Bluff Diversion Dam gates in 2012. 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. Since 2005, 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 SRWC and spring Chinook salmon are presented in Appendix B, Table B-3.

Sacramento River Late-Fall Chinook

Late-fall Chinook spawning escapement in 2016 was estimated to be 4,637 adults and 973 jacks. These Chinook returned primarily to the Coleman National Fish Hatchery and the upper Sacramento River. These numbers also include late-fall Chinook that returned to upper Sacramento River tributaries and those captured in the Keswick trap for use as broodstock at Coleman National Fish Hatchery (Appendix B, Table B-3 provides historical spawner escapement)

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 2016 totaled 16,454 jacks and adults in natural areas and 9,877 jacks and adults to hatcheries (Appendix B, Table B-2 provides historical spawner escapements). Salmon production in the San Joaquin River is determined largely by spring outflows three years earlier. In most years 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. However, in 2016, returns to the San Joaquin River made up 20 percent of the total fall run escapement to the Central Valley.

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

KRFC were managed in accordance with their control rule, which in 2016 specified a maximum exploitation rate of 25.0 percent, resulting in an expected spawner escapement of 30,909 adults in natural areas. The available harvest of KRFC was shared equally between non-tribal and Klamath River tribal fisheries (tribes with federally-recognized fishing rights). The NMFS ESA consultation standard for California Coastal Chinook limited the ocean harvest rate on age-4 KRFC to a maximum of 16 percent.

Regulations to Achieve Objectives

To achieve the management objectives for KRFC and California Coastal Chinook, the adopted regulations were designed to result in: (1) a Klamath River run of 52,100 fall Chinook adults, resulting in a spawner escapement of 30,900 adults to natural areas, taking into account projected river fishery impacts of 9,200 adults and returns to basin hatcheries; (2) 50 percent (7,400) of the allowable adult harvest for tribal subsistence and commercial fisheries; (3) 15 percent (1,100) of the non-tribal harvest to the Klamath River recreational fishery; and (4) 10.2 percent (approximately 600 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 8.4 percent. Season and size limit details are presented in Tables I-1 and I-3.

Commercial

The primary constraint to commercial fisheries south of Cape Falcon in 2016 was the control rule-defined maximum exploitation rate for KRFC. The Oregon KMZ had monthly quota fisheries in June and July, and was open without quotas in April and May. The California KMZ was closed except for a small September quota fishery. Commercial fishing opportunity north and south of the KMZ was more constrained relative to recent years (Table I-1).

Recreational

Recreational fisheries were open in the KMZ from May through September, but seasons varied between the California and Oregon portions. In the California portion of the KMZ, the fishery was open during the latter halves of May, June, and July, the first half of August, and the first five days of September. In the Oregon portion, the fishery was open May 28 through August 7, and then reopened for the Labor Day weekend (September 3-5). Fisheries both north and south of the KMZ began earlier in the spring; March 15 for the area between Cape Falcon and Humbug Mountain and April 2 for the area south of Horse Mountain. Oregon and northern California fisheries straddling the KMZ extended later into the fall than in the KMZ, while fisheries south of Pigeon Point ended substantially earlier than the KMZ (Table I-3).

Inside Harvest

Yurok and Hoopa tribes shared a federally-reserved right of 50 percent (7,404) of the available harvest surplus of adult Klamath fall Chinook. Tribal adult harvest was 5,159, which was 70 percent of the quota (Appendix B, Tables B-4 and B-5). The State of California managed the river recreational fishery under a 1,111 adult fall Chinook quota. The estimated recreational fishery harvest was 1,310 adult fish, which was 118 percent of the quota (Table B-4). Harvest estimates for streams outside the Klamath River Basin were not available.

Escapement and Management Performance

In the Oregon portion of the KMZ, the June quota was not met and the unused portion was transferred to the July quota on an impact-neutral basis. The commercial catch in September for the California KMZ was well below the quota (Table I-6).

Threatened California Coastal 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 began in 2000, but in 2014 and 2015 these counts were derived using alternative sources because a new counting facility was under construction. Though construction of the new Mirabel counting facility was completed for the 2016 season, there was a period of refinement associated with the video sampling techniques that led to uncertainty regarding the total number of salmon observed during operation. Additionally, only one camera on the west side of the Russian River was utilized, whereas in previous years of Mirabel Dam operation both east and west side cameras were used simultaneously. Other environmental challenges associated with early rain storms truncated the operation period of the dam, further limiting the ability to provide a reliable escapement estimate. Because of these issues, a minimum passage number was determined using only the video count from the west side camera at Mirabel Dam. This number is reported in Appendix B, Table B-7, though it is not comparable to Mirabel Dam counts from previous years and should be considered a minimum value as opposed to a true escapement estimate.

Klamath River Fall Chinook

The 2016 preliminary postseason river run size estimate for KRFC was 24,567 adults compared to the preseason-predicted ocean escapement (river run size) of 52,138. The escapement to natural spawning areas was 13,924 adults, which was 45 percent of the preseason prediction of 30,909 adults. The estimated hatchery return was 3,578 adults. Jack returns to the Klamath Basin totaled 2,786 including 1,894 that escaped to natural spawning areas. Table II-2, Figure II-2, and Appendix B, Table B-4 present historical harvest and escapement estimates 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 5,162 adults. The Shasta River has historically been the most important Chinook salmon spawning stream in the upper Klamath River, supporting a spawning escapement of 27,600 adults as recently as 2012 and 63,700 in 1935. The escapement in 2016 to the Shasta River was 2,754 adults. Escapement to the Salmon and Scott Rivers was 1,032 and 1,376 adults, respectively (Appendix B, Table B-6).

Under the terms of Amendment 16 to the salmon FMP, KRFC are considered to be overfished when the 3-year geometric mean spawning escapement falls below the minimum stock size threshold (MSST) of 30,525 natural area adult spawners. The geometric mean of adult spawning escapement in natural areas for years 2014-2016 is 33,390 and therefore KRFC are not overfished (Table II-6).

KRFC are considered to have been subject to overfishing if the estimated exploitation rate exceeds their maximum fishing mortality threshold (MFMT) of 0.71. An estimate of the 2016 KRFC exploitation rate is not yet available. However, fisheries in 2015 resulted in an exploitation rate of 0.59, which is lower than the MFMT. Therefore, overfishing did not occur in 2015 (Table II-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 from the Elk River north, 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 in terminal area fisheries. 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 the northern and central Oregon Coast Chinook stock complexes 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. These stocks have been abundant historically; therefore, preseason abundance estimates were not developed and it has not been of critical management concern. Council-area Chinook fisheries have minor impacts on most of the stocks originating from these areas, which have a northerly marine distribution pattern. For the southern Oregon Coast Chinook stock complex, the conservation objective is assessed using the escapement estimate at Huntley Park on the Rogue River. 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.

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, impacts on these stocks from Council-area fisheries have not significantly affected achievement of management objectives in recent years.

Oregon State waters terminal area fisheries in 2016 were adopted to provide additional harvest on robust hatchery or naturally produced fall Chinook. Special regulations for each of these seasons were implemented to maintain fishery impacts within conservation objectives. 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 some recreational fisheries. Season and size limit details are presented in 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 2016 fisheries, regulations were adopted with the intention of reducing impacts on some of these stocks. Complete estimates of the 2016 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 2016 catch estimate for the two fall terminal area commercial fisheries was 334 Chinook.

Under the 2016 regulations, the Salmon Technical Team (STT) expected the aggregate conservation objectives for these stocks would be met with the constraints required for California Coastal Chinook, KRFC, and LCN coho. Actual escapement was not estimated for the northern and central 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.). The aggregate northern and central Oregon Coast goal was likely met in 2016. ODFW is developing alternate methodologies for establishing escapement goals for these Oregon coastal Chinook stocks, including fall Chinook PSC indicator stocks. The aggregate southern Oregon Coast Chinook goal of at least 41,000 naturally produced fall Chinook adults passing Huntley Park in the Rogue River was not met in 2016.

North Migrating Chinook

Index counts of adult spawners (peak count per index mile) were conducted for seven of the nine standard streams and used to measure natural spawner escapement trends for north-migrating fall Chinook in 2016. Data have been collected since about 1950 for most systems. Overall peak Chinook adult index spawner counts in 2016 were preliminarily estimated at 118 adults per mile, higher than the maximum sustainable yield (MSY) spawner escapement level of 60 adults per mile.

The geometric mean of north-migrating Oregon Coast Chinook adult escapement in 2014, 2015, and 2016 was 166 fish per mile, which exceeded both the MSST (30) and the MSY spawner escapement level. Estimates of exploitation rates were not available for 2015 or 2016, but earlier fisheries resulted in exploitation rates that were lower than the MFMT (0.78). Therefore, north-migrating Oregon Coast Chinook should not be considered overfished or subject to overfishing (Table II-6).

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). The 2016 preliminary estimate was reported at 34 adults per mile. The escapement goal prior to 2015 was assessed using this methodology.

Two trend indicators of escapement for naturally produced spring Chinook are utilized: (1) Rogue River counts at Gold Ray Dam, and (2) Umpqua River counts at Winchester Dam (Table II-4). Gold Ray Dam was removed in October 2010. For recent years, an estimate of natural spring Chinook escapement above the Gold Ray Dam site was made using the relationship of 2004-10 spawning ground surveys to the Gold Ray Dam passage (Figures II-3 and II-4).

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). Passage estimates of naturally produced fall Chinook at Huntley Park in the lower Rogue River are presented in Table B-10.

The geometric mean of south/local migrating Oregon Coast Chinook adult escapement in 2014, 2015, and 2016 was 35,435, which exceeded the MSST (20,500); therefore, south/local-migrating Oregon Coast Chinook should not be considered overfished. Estimates of exploitation rates were not available, so an

assessment of overfishing status was not possible, but based on exploitation rates for KRFC, it is unlikely that south/local-migrating Oregon Coast Chinook were subject to overfishing (Table II-6).

COLUMBIA RIVER BASIN CHINOOK STOCKS

Columbia River Basin Chinook salmon stocks include fall, summer, and spring stocks. NMFS has listed five Chinook evolutionarily significant units (ESUs) within the Columbia Basin under the ESA: (1) SRW fall Chinook listed as threatened in April 1992; (2) Snake River spring/summer listed as threatened in April 1992; (3) upper Columbia River spring listed as endangered in March 1999; (4) LCR Chinook listed as threatened in March 1999; and (5) upper Willamette River spring listed as threatened in March 1999.

The assessment below focuses on the five major stock groups of Columbia Basin fall Chinook: lower river hatchery (LRH) tule stock and lower river wild (LRW) bright stock, both of which are part of the ESA-listed LCR Chinook ESU; Spring Creek Hatchery (SCH) tule stock; upriver bright (URB) stock, which includes the ESA-listed SRW Chinook ESU; and mid-Columbia bright (MCB) hatchery stock. A brief assessment of Columbia River upper river summer Chinook is also included. Management details for Columbia River spring Chinook stocks are not discussed. Council-managed ocean salmon fisheries have very limited impacts on these stocks (less than a 2 percent exploitation rate in base-period fisheries); as a result, mid-Columbia spring stocks were removed from the FMP under Amendment 16 in December 2011. 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 and inriver fisheries 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 2016 were managed to access SCH and LRH stocks while meeting the NMFS ESA consultation standards for the ESA-listed LCR Chinook ESU (both LCR natural tules and LRW) and SRW fall Chinook ESU. The standard for ESA-listed LCR natural tules was a total (ocean plus inriver) AEQ exploitation rate of no more than 41.0 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 LCR natural tules. The NMFS ESA consultation standard for LRW was a North Lewis River fall Chinook spawning escapement of 5,700 (equivalent to 6,900 ocean escapement); the preseason forecast was for an ocean escapement of 22,200. 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 AEQ exploitation rate for all ocean fisheries combined.

The NMFS ESA consultation standard for the threatened LCR natural tule Chinook was the primary constraint on Council-area Chinook fisheries north of Cape Falcon, and to a lesser extent, south of Cape Falcon. Also, although the impacts on Puget Sound Chinook in Council-area fisheries are minor, these impacts are part of the annual ESA assessment for ocean and inside fisheries for this ESU

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 2016 forecast for the combined abundance of Chinook stocks contributing to AABM fisheries was lower than in 2015 but slightly higher than the most recent ten year average. Forecasts for Columbia River summer and bright and tule fall Chinook were again favorable in 2016. The impact of northern fisheries on Columbia River stocks are included in the modeling of Council-area fisheries.

The 2016 overall non-Indian Chinook total allowable catch (TAC) for North of Cape Falcon was 70,000. These compare to a 2015 non-Indian TAC of 131,000, including a coastwide 10,000 mark-selective Chinook quota for a portion of the recreational fishery; the equivalent non-mark-selective TAC was 125,000. The 2016 overall TAC was divided into 35,000 commercial and 35,000 recreational. The treaty Indian ocean troll TAC was 40,000 Chinook, and is applicable to the May-September period. This compares to a 2015 treaty Indian TAC of 60,000. Season and size limit details are presented in Tables I-1, I-2, and I-3.

Commercial

Non-Indian commercial fisheries north of Cape Falcon included a Chinook-directed fishery in May and June with a landing and possession limit of 40 Chinook per vessel per trip. Inseason action was taken to limit the days per week and institute landing and possession limits, with a limit of 14,000 Chinook, no more than 4,600 of which may be caught in the area between the U.S./Canada border and the Queets River and no more than 4,600 of which may be caught in the area between Leadbetter Pt. and Cape Falcon.

The July and August non-Indian commercial all-salmon fishery had a preseason quota of 21,000 Chinook with a landing and possession limit of 50 Chinook per vessel per open period. The fishery was open Friday through Thursday for the first two open periods and no more than 8,300 Chinook could be caught in the area between the U.S./Canada border and the Queets River.

Recreational

In the area between the U.S./Canada Border and Cape Falcon, the coastwide quota was 35,000 Chinook. Starting and ending dates were similar among subareas, opening on July 1 and closing August 21 in all areas except the Columbia River subarea which closed August 27.

Treaty Indian Ocean Harvest

The adopted management measures were generally similar in structure to recent years. The Tribal troll ocean fishery (also known as the Treaty troll fishery) quotas were defined by conservation concerns for ESA listed Chinook and coho stocks. For Chinook salmon quotas Lower Columbia River tule Chinook salmon, Mid-Hood Canal Chinook salmon and South Puget Sound Chinook salmon were the stocks that established the Chinook quota at 40,000. The Tribal troll fishery takes place in Washington ocean areas 2, 3, 4 and 4B. The Treaty Indian troll fishery opened on May 1 with a Chinook only fishery and continued through June 30 with a 20,000 sub-quota. The all-salmon fishery was open July 1 through August 31 with a sub-quota of 20,000 Chinook.

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.* v. *Oregon* parties. In 2008, a new 10-year management agreement was negotiated through the *U.S.* v. *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 8,000 SRW fall Chinook, the allowable URB impact rate would be 45.0 percent. NMFS used the URB impact rate as a proxy in the SRW consultation standard.

In 2016, the fall fisheries were managed to achieve the NMFS ESA consultation standards for threatened LCR natural tule and SRW Chinook, and the 2016 URB and SRW preseason forecast run sizes were both large enough to allow a 45.0 percent harvest rate in inriver fisheries.

Within the ESA limitations there were harvestable numbers of salmon available for all major stocks in 2016. The postseason fall Chinook run reconstruction, however, was not completed in time for this report.

The preliminary catch estimates (adults) for the non-Indian commercial net fisheries were 14,650 spring, 3,050 summer, and 70,400 fall Chinook, which included 10,496 spring, 60 summer, and 13,430 fall Chinook in Select Area (terminal) fisheries. The preliminary catch estimates (adults) for the treaty Indian fisheries were 17,066 spring, 20,515 summer, and 144,399 fall Chinook. The preliminary catch estimate (adults) for the recreational fisheries included 15,820 fall Chinook in the Buoy 10 fishery, and 12,767 spring, 3,706 summer, and 25,210 fall Chinook in mainstem fisheries below Bonneville Dam, 2,480 spring Chinook in mainstem fisheries above Bonneville Dam, and 22,430 fall Chinook above Bonneville Dam which include the Hanford Reach fishery above McNary Dam (Appendix B, Table B-20).

Escapement and Management Performance

All Columbia River summer and fall stocks met their escapement objectives (Table II-5). Preliminary estimates of river mouth returns were; 91,048 summer, 142,540 LRH; 22,420 LRW; 47,744 SCH; 419,472 URB; and 60,700 MCB. The total ocean escapement of the five fall stocks was 708,676 fall Chinook (Figure II-5). The estimated escapement (Rock Island Dam count) for summer Chinook in 2016 was 79,253, exceeding the MSY spawner escapement objective of 12,143 adults established under FMP Amendment 16. The preliminary estimated natural area escapement (Hanford Reach, Yakima River, and above Priest Rapids Dam) for URB Chinook in 2016 was 181,713 exceeding the MSY spawner escapement level of 39,625 adults established under FMP Amendment 16.

The preliminary 2016 URB inriver harvest rate estimate was 52 percent. The total adult SRW, hatchery, and supplementation fall Chinook count at Lower Granite Dam in 2016 was 34,714, about half the count of 59,299 in 2015. Estimates of SRW and supplementation fall Chinook spawning escapement in 2016 were not available.

Postseason estimates of exploitation rate on LCR natural tule or SRW for ocean fisheries were unavailable.

The overall ocean TACs for treaty Indian and non-Indian Chinook fisheries were not exceeded. All Council-area fisheries north of Cape Falcon were closed before exceeding their final quotas.

The geometric mean of Columbia upper river summer Chinook adult escapement in 2014, 2015 and 2016 was 81,840, which exceeded the MSST threshold (6,072); therefore, Columbia upper river summer Chinook should not be considered overfished (Table II-6). Estimates of combined ocean and inriver exploitation rates were not available for 2015 or 2016, but the 2014 exploitation rate of 0.74 was lower than the MFMT (0.75); therefore, Columbia upper river summer Chinook did not experience overfishing in 2014 (Table II-6).

The geometric mean of Columbia URB fall Chinook adult escapement in 2014, 2015, and 2016 was 222,350, which exceeded the MSST threshold (19,182); therefore, Columbia URB fall Chinook should not be considered overfished (Table II-6). Estimates of combined ocean and inriver exploitation rates were not available for 2015 or 2016, but the previous three years' exploitation rates were less than the MFMT (0.86); therefore, Columbia URB fall Chinook should not be considered subject to overfishing (Table II-6).

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 Quinault River). Coastal stocks are not impacted significantly by Council-area ocean fisheries.

Management Objectives

Willapa Bay natural fall Chinook did not have a defined conservation objective in the Salmon FMP during the preseason process, although WDFW has a spawning escapement objective of 4,350 natural Chinook, which is based on peak density estimates and watershed area. Amendment 16 to the Salmon FMP, adopted in December 2011, included a MSY spawning escapement objective of 3,393, which was based on the WDFW objective.

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 v. 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 v. 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. As provided for in Amendment 14, and pursuant to rules and procedures established under *U.S. v. Washington*, WDFW and the Quinault Indian Nation (QIN) presented new management objectives for Grays Harbor fall Chinook salmon. These objectives were reviewed by the Chinook Technical Committee of the Pacific Salmon Commission in February, 2014 and adopted in November, 2014. The new objectives are based on spawner-recruit relationships using estimates of production resulting from naturally spawning fish in the Chehalis and Humptulips river basins from brood years 1986 through 2005. It is the intent of WDFW and QIN to use for management purposes an aggregate natural spawning escapement goal of 13,500 for Grays Harbor fall Chinook salmon. No agreements on annual spawning targets for Washington coastal Chinook other than those in the FMP were made in 2016.

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. Because Council area fishery impacts to Washington coastal Chinook stocks are negligible, ocean regulations are not generally used to manage these stocks. Season and size limit details are presented in Tables I-1, I-2, and I-3.

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 and August 2016. Beginning in 2015, the Willapa Bay Salmon Management Policy (C-3622) prohibits Chinook directed non-Indian gillnet fisheries until after Labor Day.

The 2016 preseason forecast of Chinook returning to Willapa Bay was 39,447 fish (3,261 natural and 36,186 hatchery). There were 31 12-hour Chinook and coho directed non-Indian gillnet fishery openings September 6 through October 14. Retention of unmarked Chinook was prohibited. Total Chinook harvest in the non-Indian gillnet fisheries during 2016 was 3,502 fish, based on preliminary data. Non-directed openings were scheduled November 1 through November 25. An in-season chum conservation concern predicated an adjustment to the commercial fishing schedule resulting in the closure of eight 12-hour fishing openers. The fishery was re-opened in late November for the remainder of the scheduled fishing season.

Recreational fisheries in the marine waters of Willapa Bay were open from July 1 through July 31, 2016 concurrent with the Ocean Marine Area 2 (ocean rules applied). From August 1, 2016 through January 31, 2017 Willapa Bay was open to recreational fishing with a daily-bag-limit of 6 salmon, no more than 4 adults allowed to be harvested daily. Unmarked Chinook retention was prohibited. Barbless hooks were required when fishing for salmon. Anglers were allowed to fish with two poles if they had a Two-Pole Endorsement.

Recreational salmon fisheries in tributaries to Willapa Bay varied in duration but were generally open as early as August 1, 2016 through January 31, 2017. Retention of unmarked Chinook was prohibited. Single-point, barbless hooks were required in all areas except Naselle, South Fork Willapa, and Bear rivers where only barbless hooks were required. Recreational harvest estimates for 2016 were not available.

Escapement and Management Performance

During 2015, hatchery origin Chinook returning to the Willapa Bay watershed totaled 26,584 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 2016.

An estimate of the 2016 natural spawning escapement was not available; the 2015 natural escapement was 2,824 Chinook, below the FMP objective of 3,393.

The geometric mean of Willapa fall Chinook adult escapement in 2013, 2014 and 2015 was 2,235, which exceeded the MSST (1,696); therefore, Willapa Bay fall Chinook should not be considered overfished (Table II-6). Exploitation rate estimates were not available for 2015 and 2016. Estimates of exploitation rates for all Washington Coast fall Chinook are based on Queets River fall Chinook CWT analyses, and while ocean impacts for these fall stocks may be assumed to be similar, inside impacts may vary substantially. The MFMT for Willapa Bay fall Chinook is 0.78. In 2012, 2013, and 2014 the Willapa Bay fall Chinook exploitation rates, using Queets stock as a surrogate, were 0.86, 0.74, and 0.47 respectively; therefore, in 2012 Willapa Bay fall Chinook were subject to overfishing (Table II-6). The MFMT for Willapa Bay fall Chinook is also based on a proxy derived from an average value of other Chinook stocks; therefore, overfishing status based on total exploitation rates for Willapa Bay fall Chinook are less certain than for some other Washington Coast Chinook stocks.

Grays Harbor Chinook

Inside Harvest

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

The Quinault Indian Nation conducted a spring/summer commercial gillnet fishery on the Chehalis River and in Grays Harbor commercial fishing Areas 2A, 2A-1, C, and D in 2016. Seven spring Chinook were reported in the harvest during these fisheries.

The non-Indian recreational season allowed a modified spring Chinook fishery in the Chehalis River during the spring Chinook management period. The non-Indian recreational season was open for the retention of one Chinook per day from May 1 through June 30 in the mainstem Chehalis River. Preliminary catch data are not available for the 2016 fishery, however, preliminary data indicate that 36 Chinook were harvested during this fishery scheduled in 2015. The 2016 report on harvest of spring Chinook by the Chehalis Tribe fishery was 104 fish. No summer non-Indian gillnet fishery directed at non-local Chinook stocks occurred in 2015.

The Quinault Indian Nation conducted a 2016 fall gillnet fishery harvesting a total of 2,061 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 and excluding the area known as the "South Channel" in the Chehalis River, and Areas 2D, 2A, and 2A-1 to limit catch of Chinook, which tend to concentrate in deep areas off the mouths of the Johns and Elk rivers. The 2016 fishery was scheduled on the Chehalis side to run from week 36 to week 40, beginning the week of August 23 to the week beginning September 25 at weekly schedules of 2, 5, 2, 2, 2 days per week respectively, with a large mesh restriction of a minimum 8 ½ inches set, then finishing during week 45, the week beginning on October 30. Regulations during week 45 were set to operate without a mesh size restriction in order to allow increased harvest of Chum. The Chehalis side fall fishery then remained closed until steelhead season. The Chehalis area treaty Indian fishery caught 1,153 Chinook, which was about 16 percent of what was expected. The Humptulips area treaty Indian fishery schedule was also set with a large mesh restriction through the main fall period, except for the final week 47 when the mesh restriction was lifted. The schedule ran from weeks 36 to week 41, at weekly schedules of 2, 2, 4, 4, 2, 2 respectively then again in week 44 for 2 days and in week 47 for 5 days. The Humptulips reported harvest was 908 Chinook only about 48 percent of what was expected. The combined Grays Harbor treaty Indian Chinook catch was 22 percent of what was expected.

The non-Indian gillnet fishery in Humptulips commercial Area 2-C was scheduled for four 12-hour days in late October. Retention of all fall Chinook, coho, and chum was allowed. Total catch of Chinook in Area 2C was 18 fish, about 4 percent of predicted. The non-Indian gillnet fishery in the Chehalis River commercial Areas 2A and 2D was scheduled for three 12-hour days late October. During these fisheries, all areas of 2D were open. During all fisheries live boxes were required, and wild Chinook could not be retained. A total of 8 hatchery-origin Chinook were harvested during this fishery, 3 fish more than expected. There were 8 wild Chinook mortalities associated with release requirements during the non-Indian gillnet fishery.

A recreational fishery in the northern portion of Marine Area 2-2, Commercial Area 2C, was open from August 1 through September 24th. During this time, 2 adult salmon could be retained; wild coho must be released. The portion of Marine Area 2-2 east of a line from the mouth of Johns River to Brackenridge Bluff Tripod was scheduled from October 1 through November 30 for the retention of one adult salmon per day. During this time wild Chinook were required to be released.

The spring/summer recreational fishery in the Chehalis River was open to the retention of one Chinook per day from May 1 to the end of June. This fishery was allowed only in the mainstem Chehalis River from the mouth up to the Hwy 6 Bridge near the town of Adna.

Recreational mark-selective Chinook fisheries were scheduled on the mainstem Chehalis River from September 16 through the end of January 2017 and Satsop River from September 16 through the end of December. The Chehalis River fishery was limited to the mainstem upstream to the Weyerhaeuser 1000 line and allowed one salmon per day with wild Chinook release required. The Satsop River fishery was limited to the Satsop mainstem from the mouth upstream of the bridge at Schafer Park and allowed one adult salmon per day with wild Chinook release required. The fall recreational Humptulips River fishery from the mouth to confluence of the East and West forks was open from September 1 through November 15 with a daily limit of 2 adults, of which only one could be a wild Chinook. The 2016 recreational harvest estimates were not available at time of print.

Escapement and Management Performance

Chehalis River spring Chinook are of natural origin and managed for an escapement goal of 1,400 adults. The 2016 terminal run forecast for spring Chinook was 2,700 adult fish. The escapement estimate for 2015 spring Chinook is 1,841 and the preliminary estimate for 2016 is 1,367.

Grays Harbor fall Chinook were managed for a natural spawning escapement goal of 13,500 adults. The 2015 Gray Harbor fall Chinook run size forecast was for 26,511 natural and 8,649 hatchery adults. The total 2015 Gray Harbor fall Chinook natural run size was 30,570, with a hatchery run size of 8,526.

The 2016 Grays Harbor fall Chinook run size forecast was 27,800 natural and 7,430 hatchery adults. The return of hatchery-origin fall Chinook to Grays Harbor hatchery programs were sufficient to provide for 2016 fall Chinook production goals. The preliminary natural spawning escapement estimate for 2016 was not available at time of print. The final 2016 spawning ground escapement estimate for the Grays Harbor is in development by QIN and WDFW.

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. The tribal fishery harvested 41 spring/summer Chinook in 2016 primarily during its sockeye directed fishery.

The treaty Indian gillnet fishery harvested 5,137 fall Chinook. The commercial schedule in 2016 was similar to the 2015 schedule, providing harvest opportunity in the months of August through November. The Quinault River Fall gillnet fishery is designed to maximize harvest opportunity during hatchery coho and Chinook entry while reducing the schedule fishing days later in the season during primarily wild Chinook and wild coho entry.

Escapement and Management Performance

Quinault fall Chinook were managed for hatchery production. The 2016 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 2016 treaty Indian gillnet harvest of spring/summer Chinook remained closed through the summer months until mid-August, when the treaty commercial fishery was opened to target early entering hatchery coho. There were 72 Chinook and 2,350 coho taken in the Queets treaty commercial August opening during 3 day openings in weeks 34 and 35. The non-Indian in-river recreational fishery was closed to all salmon through August 31, and the Clearwater River remained closed to salmon fishing through the rest of the fall season. The Queets River below Hartzell's and the Salmon River outside the Quinault reservation were open September 1-30 for salmon, closed the rest of the season. Anglers in the Queets were required to

release wild Chinook and coho. In the Salmon River wild coho had to be released, and the daily bag of 2 salmon could only include one Chinook.

Fall Chinook were harvested in the treaty gillnet fishery from Week 36 beginning August 28 through week 40, the week of September 25, set at, 5, 5, 5, 2, and 2 days per week respectively, with 6 ½ inch maximum mesh size. The week of September 25 an 8 ½ minimum mesh was required to reduce wild coho catch. The fishery closed during weeks 41 and 42, then re-opened to finish the season with weeks 43 through 45 at 2 days per week with 8 ½ mesh in order to take remaining available Chinook while avoiding wild coho. The treaty Indian gillnet fishery harvested 804 fall Chinook during this schedule compared to a preseason expected catch of 1,880. The actual Chinook catch fell short of the projected Chinook catch primarily during weeks 40, 43, 44 and 45. Catch estimates for 2016 recreational salmon fisheries are not yet available.

Escapement and Management Performance

The 2015 spawning escapement estimate for Queets River spring/summer Chinook was 532 adults, which is 24 percent below the MSY spawner escapement goal of 700.

The geometric mean of Queets River spring/summer Chinook adult spawning escapement in 2013, 2014, and 2015 was 471, which is above the MSST (350); therefore, Queets River spring/summer Chinook should not be considered overfished (Table II-6).

The 2016 Queets River fall Chinook spawner survey estimate is not available. The indicator Chinook originate from wild brood stock taken each year in the river. The 2015 spawning escapement estimate for Queets River fall Chinook was 5,313 with an additional 164 wild and 6 Indicator Chinook taken for broodstock.

The geometric mean of Queets River fall Chinook adult spawning escapement in 2013, 2014, and 2015 was 3,740, which exceeded the MSST (1,250); therefore, Queets River fall Chinook should not be considered overfished (Table II-6).

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 2016 Hoh River spring/summer Chinook terminal abundance forecast was 944 fish. The treaty Indian gillnet fishery was closed May 2 through August 28 as a response to chronic low-abundance as per agreement with WDFW co-managers. Tribal regulation in 2016 required a minimum of an 8-inch stretch mesh April 17 and April 25, the last two days of fishing during the winter steelhead season in order to minimize incidental take of steelhead kelts. There were 4 wild spring/summer Chinook and 2 hatchery spring/summer Chinook harvested in April during the winter steelhead season. An additional 16 hatchery and 10 native wild spring/summer Chinook were harvested by the Hoh Tribe for Ceremonial and Subsistence purposes.

The non-Indian recreational fishery was closed from April 16 to August 31 to protect spring/summer Chinook.

Hoh River fisheries for fall Chinook were based on an expected terminal run size of 2,222 adults, allowing for a terminal harvest rate of 40 percent. The spawning escapement was expected to be 1,873 adults.

The treaty Indian fishery targeted 11.5 percent of the terminal run. The treaty Indian gillnet fishery was scheduled for three days per week during weeks 36, 37, 38, 39, 40, was closed weeks 41, 42, 43, 44, 45, 46, and 47 and was open one day during week 48. The Hoh treaty commercial fishery caught approximately 131 wild Chinook, with a pre-season expected catch of 255, an estimated 3 Chinook were harvested for ceremonial and subsistence purposes. Results of mark sampling indicated that 6 hatchery Chinook were also harvested by the Hoh treaty commercial fishery.

The non-Indian recreational fishery extended from September 1 through October 10, with the river below Willoughby Creek open and a daily-bag-limit of 6 salmon, only one of which could be an adult (release wild coho). The Hoh River was then closed to non-Indian recreational fishing until November 21, to protect an expected poor return of wild coho. The sport fishery harvest of wild Chinook was not available.

Escapement and Management Performance

The 2016 preliminary spawning escapement for Hoh River spring/summer Chinook is 1,144. The geometric mean of Hoh River spring/summer Chinook spawner escapement in 2014, 2015, and 2016 was 969, which exceeded the MSST (450); therefore, Hoh River summer Chinook should not be considered overfished (Table II-6). Estimates of exploitation rates were not available for Washington coastal spring/summer Chinook stocks, but based on the limited in river harvest rate and lack of ocean harvest data, it is difficult to assess the extent to which Hoh River spring/summer Chinook were subject to overfishing in SUS fisheries in recent years (Table II-6).

The preliminary 2016 spawning escapement estimate for Hoh River fall Chinook is 2,333. The geometric mean of Hoh River fall Chinook adult spawning escapement in 2014, 2015, and 2016 was 1,929, which exceeded the MSST (600); therefore, Hoh River fall Chinook should not be considered overfished (Table II-6). Estimates of exploitation rates were not available for Hoh River fall Chinook, but Queets River Fall Chinook can be used as a proxy. Exploitation rate estimates were not available for 2016 but earlier estimates were below the MFMT (0.90); given these assumptions, Hoh River fall Chinook should not be considered subject to overfishing (Table II-6).

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 brood stock 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 2016 was 1,073 spring and 262 summer Chinook. Catch for ceremonial and subsistence use is included in the Indian gillnet harvest numbers. WDFW required release of unmarked Chinook during July and August to reduce impacts of the recreational fishery on the natural summer Chinook stock. An estimate of 2016 recreational spring Chinook harvest was 599.

The total 2016 Quileute Tribal harvest of fall natural Chinook was 1,467. Fall hatchery Chinook catch was 6. Catch for ceremonial and subsistence use is included in the Indian gillnet harvest numbers. An estimate of the 2016 recreational catch was 73 fish (natural).

The fall recreational fishery in the Quillayute system was greatly reduced to protect wild, fall coho. The season ran from September 1-30 and November 16 to December 15 in the Quillayute and Sol Duc rivers and November 16-30 in the Dickie, Calawah and Bogachiel rivers. An estimate of the 2016 recreational fall Chinook catch was 73. The Quileute Tribe closed their fall fishery from October 3 through November 21 for stock conservation reasons.

Escapement and Management Performance

The 2016 management agreement called for an escapement goal of 200 hatchery spring Chinook. The actual rack return was 745 plus 59 jacks, which exceeded hatchery requirements.

The summer Chinook run was managed to achieve an MSY spawner escapement of 1,200 adults, jacks, and brood stock collection combined. The preliminary estimated natural spawning summer Chinook escapement of 893 was under the escapement goal.

The geometric mean of Quillayute River summer Chinook spawner escapement in 2014, 2015, and 2016 was 765, which exceeded the MSST threshold (600); therefore, Quillayute River summer Chinook should not be considered overfished (Table II-6). Estimates of exploitation rates were not available for Washington coastal spring/summer Chinook stocks, but based on the limited in-river harvest rate and ocean harvest rates of Queets fall Chinook, it is unlikely that Quillayute River summer Chinook were subject to overfishing in recent years (Table II-6).

Terminal area fisheries on fall Chinook were managed for a target 40 percent harvest rate, and an MSY spawner escapement goal of 3,000 adults. The preliminary 2016 escapement estimate of 3,508 fall Chinook was over the escapement goal.

The geometric mean of Quillayute River fall Chinook adult spawning escapement in 2014, 2015, and 2016 was 3,115, which exceeded the MSST threshold (1,500); therefore, Quillayute River fall Chinook should not be considered overfished (Table II-6). Estimates of exploitation rates were not available for Quillayute fall Chinook, but Queets River fall Chinook was used as a proxy. Exploitation rate estimates were not available for 2016, but earlier estimates were below the MFMT (0.87); therefore, Quillayute River fall Chinook should not be considered subject to overfishing (Table II-6).

Hoko River Chinook

Inside Harvest

Hoko River Chinook are primarily harvested in fisheries in southeast Alaska and northern British Columbia with minimal harvest in Council area and inside waters. There have been no tribal or recreational fisheries in the Hoko River for Chinook salmon since the early 1980's, although some catch is occasionally reported by anglers on WDFW Catch Record Cards.

Escapement and Management Performance

The preliminary 2016 escapement estimate were not available for Chinook, but are predicted to be well above the MSY spawner escapement goal of 850. (Appendix B, Table B-38).

The geometric mean of Hoko River summer/fall Chinook spawner escapement from 2013 through 2015 was 1,924, which exceeds the MSST threshold (425); therefore, Hoko River summer/fall Chinook should not be considered overfished (Table II-6). Estimates of exploitation rates were not available for 2016, but earlier estimates were well below the MFMT (0.78); therefore, Hoko River summer/fall Chinook should not be considered subject to overfishing (Table II-6).

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

Puget Sound Chinook stocks are listed under the ESA and 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 expressed in terms of constraints on total fishery rebuilding exploitation rates (RER) or of exploitation rates on fisheries south of the Canadian border for those stocks without RERs. The Council's annual management objectives for ESA-listed stocks are to meet the ESA consultation standards set forth by NMFS.

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. 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 regulations affecting any of these stocks was closing the Cape Flattery Control Zone for the non-Indian commercial troll fishery and holding the non-Indian commercial troll fishery to impacts in Area 3 and Area 4 not to exceed those modeled preseason. Season and size limit details are presented in Tables I-1, I-2, and I-3.

Inside Harvest

Commercial inside fishery harvest of Puget Sound Chinook was managed on the basis of 6 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-39. These catches included some fish of non-Puget Sound origin. The total commercial harvest in Puget Sound in 2016 was 55,288 Chinook, compared to 44,616 Chinook caught in 2015. The 2016 non-Indian net catch was 6,604 Chinook, compared to 3,367 Chinook caught in 2015. The 2016 treaty Indian net and troll harvest was 48,684 Chinook, compared to 41,249 Chinook caught in 2015.

Chinook catches in the Puget Sound recreational fishery for years beginning in 1971 are presented in Appendix B, Table B-40. Catch estimates for the 2016 Puget Sound recreational fishery were unavailable.

Escapement and Management Performance

Puget Sound Chinook management goals for fishery planning processes in 2016 were compared to predicted exploitation rates to assess compliance with ESA consultation standards (Table II-5). 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 2016. Preliminary data suggest no Puget Sound spring Chinook natural stocks met their escapement goals. Preliminary information on 2016 natural spawning escapements for summer/fall Chinook stocks indicate escapement goals were met in some areas, but not in many others. Escapement estimates for 2016 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

In 2016, abundance for many stocks was down from 2015 levels. Spawning escapements were below FMP objectives in 2016 for Sacramento River fall Chinook, Klamath River fall Chinook, and Southern Oregon Chinook. Information to assess compliance with FMP conservation objectives and ESA consultation standards in 2016 was unavailable for LCR natural tule Chinook, SRW fall Chinook, several Washington coast Chinook stocks, and all Puget Sound natural Chinook stocks.

Stock Status Determinations

In 2011 the Council adopted SDC for overfishing, overfished, not overfished/rebuilding, and rebuilt under FMP Amendment 16. These criteria, approved and implemented in December 2011, are:

- Overfishing occurs when a single year exploitation rate exceeds the MFMT (F_{MSY});
- Overfished status occurs when a 3-year geometric mean spawning escapement is less than the MSST;
- Not overfished/rebuilding status occurs when the most recent a 3-year geometric mean spawning escapement is greater than the MSST but less than S_{MSY};
- A stock is rebuilt when the most recent a 3-year geometric mean spawning escapement exceeds S_{MSY}.

All criteria rely on the most recent estimates available, which in some cases may be a year or more in the past because of incomplete broods or data availability. The above criteria for rebuilt status are the default criteria provided in the FMP; however, alternative criteria may be developed through a rebuilding plan if warranted by stock specific circumstances. Stock specific reference points and recent year estimates for relevant stocks are presented in Table II-6.

Based on the most recent available data on exploitation rates and spawning escapements, none of the relevant Chinook stocks were overfished, and no stocks were subject to overfishing in the most recent year with data available.

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

	Upper River[a/]			Lower River			Total		
Year	Hatchery	Natural[b/]	Subtotal	Hatchery	Natural[b/]	Subtotal	Hatchery	Natural[b/]	Grand Total
1980	8,800	45,504	54,304	14,725	71,609	86,334	23,525	117,113	140,638
1981	4,438	51,831	56,269	25,115	92,129	117,244	29,553	143,960	173,513
1982	16,225	39,694	55,919	15,229	92,600	107,829	31,455	132,294	163,749
1983	5,367	42,570	47,937	12,735	48,831	61,566	18,102	91,401	109,503
1984	18,668	51,772	70,440	19,873	67,733	87,606	38,541	119,505	158,046
1985	13,089	103,698	116,787	13,987	105,753	119,740	27,076	209,451	236,527
1986	11,283	113,875	125,158	12,511	102,435	114,946	23,793	216,310	240,103
1987	9,981	76,861	86,842	10,291	97,931	108,222	20,273	174,792	195,065
1988	12,594	128,725	141,319	16,921	69,227	86,148	29,515	197,952	227,467
1989	10,212	67,296	77,508	15,668	59,386	75,054	25,880	126,682	152,562
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	66,648	87,620	32,556	133,031	165,587
1995	24,810	112,235	137,045	17,017	141,251	158,268	41,827	253,486	295,313
1996	18,848	131,268	150,116	15,712	135,804	151,516	34,561	267,072	301,633
1997	44,590	167,353	211,943	20,651	112,247	132,898	65,241	279,600	344,841
1998	42,400	60,713	103,113	35,364	107,431	142,795	77,763	168,144	245,907
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 [c/]	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	8,666	25,682	34,348	31,036	58,886	89,922	39,702	84,568	124,270
2011	19,312	20,466	39,778	23,559	56,005	79,564	42,871	76,471	119,342
2012	77,318	67,190	144,508	44,946	95,975	140,921	122,264	163,165	285,429
2013	67,822	89,409	157,231	36,858	212,111	248,969	104,680	301,520	406,200
2014	18,280	80,056	98,336	26,469	87,663	114,132	44,749	167,719	212,468
2015	13,819	40,687	54,506	25,931	32,510	58,441	39,750	73,197	112,947
2016[d/]	8,247	9,618	17,865	26,300	45,008	71,308	34,547	54,626	89,173
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.

	Spawning Escapement				Inriver Recreational Catch		Indian Net Catch		Non-landed Fishing Mortality		Inriver Run Size
Year	Hatchery	Natural	Total	Percent	Numbers	Percent	Numbers	Percent	Numbers	Percent	Numbers
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 [a/]
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	63%	1,919	3%	22,259	32%	1,974	3%	70,554
2009	19,614	44,409	64,023	64%	5,651	6%	28,387	28%	2,583	3%	100,644
2010	18,052	37,225	55,277	61%	3,035	3%	29,887	33%	2,661	3%	90,860
2011	22,337	46,763	69,100	68%	4,147	4%	26,353	26%	2,377	2%	101,977
2012	55,939	121,543	177,482	60%	13,876	5%	95,386	32%	8,578	3%	295,322
2013	17,148	59,156	76,304	46%	19,800	12%	63,036	38%	5,885	4%	165,025
2014	31,276	95,104	126,380	79%	5,386	3%	25,967	16%	2,392	1%	160,396 [b/]
2015	11,085	28,112	39,197	50%	7,842	10%	28,048	36%	2,611	3%	77,821 [b/]
2016[c/]	3,578	13,924	17,502	71%	1,310	5%	5,159	21%	485	2%	24,567 [b/]
Goal		≥40,700[d/e/]									

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/ Total inriver run includes fish collected from the Klamath and Trinity rivers by the Yurok and Hoopa Valley tribes, respectively, to test for the presence of the parasite *Ichthyophthirius multifiliis* during the following years: 2014 - 282 fish; 2015 - 124 fish; 2016 - 113 fish.

c/ Preliminary.

d/ In December 2011, Amendment 16 to the Salmon Fishery Management Plan was approved, which replaced the 35,000 spawning escapement floor with an S_{MSY} management objective of 40,700 natural area adult spawners. The 35,000 spawner floor was in effect from 1989-2007 and in 2011. In 2008-2010, fisheries were managed for a natural area spawning escapement of 40,700 adults under requirements of a rebuilding plan.

e/ Annual escapement goals may be more or less than S_{MSY} in some years due to meeting S_{ACL} requirements and de minimis fishing provisions.

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

	Return to Facilities				
	Public Hatchery[a/]		Private	Estuary and Freshwater Harvest[b/]	
Year	Spring	Fall	All	Spring	Fall
			THOUSANDS OF CHINOOK		
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	29.0
2008	6.1	2.7	-	5.8	18.3
2009	7.2	4.2	-	9.2	26.1
2010	10.9	5.0	-	15.6	44.1
2011	7.8	4.0	-	16.1	63.0
2012	13.5	6.0	-	18.7	51.4
2013	13.1	7.2	-	16.3	83.3
2014	11.5	7.9	-	16.1	75.1
2015	10.7	9.6	-	NA	NA
2016[c/]	4.2	5.8	-	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.[a/]

	Fall Chinook Spawner Indices		South/local Migrating Spring Chinook Spawner Indices	
Year	North Migrating Peak Count Adults Per Mile	Rogue River (South/local migrating) Adult Carcass Counts	Rogue River Gold Ray Dam Counts[b/]	Umpqua River 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 [c/]	13	5
2005	118	[d/]	6	4
2006	76	[d/]	5	3
2007	42	[d/]	3	2
2008	40	[d/]	4	3
2009	61	[d/]	5	5
2010	87	[d/]	10	6
2011	109	[d/]	10	9
2012	146	[d/]	14	8
2013	189	[d/]	12	7
2014	157	[d/]	6	6
2015	247	[d/]	15	5
2016[e/]	118	[d/]	10	4
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/ Gold Ray Dam removed October, 2010. Natural estimates after 2010 derived using relationship of 2004-2010 spawning ground surveys to Gold Ray Dam passage. Estimate includes an unknown number of jacks.

c/ 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.

d/ Surveys were not conducted.

e/ Preliminary.

TABLE II-5. Performance of Chinook salmon stocks in relation to 2016 preseason conservation objectives (preliminary data). (Page 1 of 2)

System and Stock	2016 Conservation/Management Objective(s)	Achievement
Sacramento River Chinook		
Fall	Minimum escapement of 122,000 natural area and hatchery adults.	Preliminary estimate of 89,173 natural and hatchery adult fall Chinook is below 2016 management objective.
Winter (Endangered)	Age-3 impact rate for the area south of Point Arena, CA no greater than 19.9% (NMFS ESA consultation standard).	Preseason projection of 12.8%; no postseason estimate was available at time of printing.
Spring (Threatened)	Same objective as for winter Chinook.	See winter Chinook achievement.
California North Coast Chinook		
Klamath River Fall	Minimum escapement of 30,909 natural area adult spawners.	Preliminary estimate of 13,924 is below the 2016 management objective.
California Coastal (Threatened)	No greater than 16.0% ocean harvest rate on age-4 Klamath River fall Chinook.	Preseason projection of 8.4%; no postseason estimate was available at time of printing.
Oregon Coast Chinook		
North Migrating Stocks	150,000-200,000 natural adult spawners (equivalent to peak spawner index counts of 60-90 adults per mile).	118 natural adult spawners per mile, above the upper bound of the aggregate stock index range.
South/Local Migrating Stocks	34,992 natural adult passage estimate at Huntley Park in the lower Rogue River.	27,278 natural adult passage estimate at Huntley Park, below the conservation objective.
Columbia River Basin Fall Chinook		
LRW (Component of threatened lower Columbia River Chinook ESU)	MSY objective of 5,700 natural North Lewis River adult spawners.	Preliminary estimate of 17,070, well above the conservation objective.
LCR 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 41.0%.	Preseason projection of 38.2%. No postseason estimate was available.
LRH	12,600 adult hatchery spawners.	62,530 adult hatchery spawners, well above the goal.
SCH	7,000 adult hatchery spawners.	8,860 adult hatchery spawners, above the goal.
MCB	No FMP objective; target of 7,750 hatchery adults.	7,440 adult hatchery spawners, slightly below the target.
URB	40-45,000 natural and hatchery adults above McNary Dam, plus meet treaty Indian obligations. *U.S. v. Oregon* parties agreed to 60,000 in 2011.	250,000 natural and hatchery adults over McNary Dam, well over the MSY target in FMP.

TABLE II-5. Performance of Chinook salmon stocks in relation to 2016 preseason conservation objectives (preliminary data). (Page 2 of 2)

System and Stock	2016 Conservation/Management Objective(s)	Achievement
Columbia River Basin Fall Chinook (continued)		
Snake River Fall Chinook (Threatened; component of URB)	SRFI ≤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 0.409. Postseason estimate was not available.
Washington Coastal Chinook		
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 where available, goals were met.
Spring/Summer	Natural spawner escapement objectives as provided in state-tribal agreements; meet hatchery egg-take goals and meet treaty Indian obligations.	Preliminary estimate for Quillayute was below the objective. Estimates for other spring stocks were not available.
Puget Sound Chinook		
(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 were not available. Preseason predictions of adult equivalent exploitation rates, in Council fisheries only, and spawner objectives were:

	Exploitation Rate	Spawner Esc.	ISBM	Exploitation Rate	Spawner Esc.	ISBM
· Nooksack spring	7% SUS	-	≤60%	0.7%	-	NA
· Skagit summer/fall	50% Total	-	≤60%	0.3%	-	NA
· Skagit spring	38% Total	-	≤60%	1.2%	-	NA
· Stillaguamish summer/fall	15% Total	-	≤60%	1.1%	-	NA
· Snohomish summer/fall	15% Total	-	≤60%	2.0%	-	NA
· Lake Wash. summer/fall	20% SUS	-	≤60%	2.8%	-	NA
· White River spring	20% total	-	-	0.5%	-	-
· Green River summer/fall	12% pre-term SUS	1,800	≤60%	2.8%	NA	NA
· Puyallup summer/fall	50% Total		-	2.8%	-	-
· Nisqually summer/fall	50% Total	-	-	4.0%	-	-
· Skokomish summer/fall	50% total	-	-	2.7%	-	-
· Mid-Hood Canal fall	12% pre-term SUS	-	-	2.7%	-	-
· Dungeness spring	6% SUS	-	-	0.1%	-	-
· Elwha summer/fall	10% SUS	-	-	0.1%	-	-

TABLE II-6. Chinook stock status relative to overfished and overfishing criteria. A stock is overfished if the 3-year geometric mean spawning escapement is less than the minimum stock size threshold (MSST); a stock experiences overfishing if the total annual exploitation rate exceeds the maximum fishing mortality threshold (MFMT).

	Spawning Escapement															
Chinook Stock	2011	2012	2013	2014	2015	2016	3-yr Geo Mean	MSST	S_{MSY}	2011	2012	2013	2014	2015	2016	MFMT
Sacramento Fall	119,342	285,429	406,200	212,468	112,947	89,173	128,865	91,500	122,000	0.42	0.54	0.53	0.62	0.56	NA	0.78
Klamath River Fall	46,763	121,543	59,156	95,104	28,112	13,924	33,390	30,525	40,700	0.38	0.45	0.64	0.36	0.59	NA	0.71
Klamath River Spring	NA	NA	NA	NA	NA	NA	NA	Undef	Undef	NA	NA	NA	NA	NA	NA	Undef
Smith River Fall	NA	NA	NA	NA	NA	NA	NA	Undef	Undef	NA	NA	NA	NA	NA	NA	Undef
Southern Oregon	67,750	69,060	81,655	53,546	30,462	27,278	35,435	20,500	34,992	NA	NA	NA	NA	NA	NA	0.78
Central and Northern OR[a/]	109	146	189	157	247	118	166	30 fish/mile	150k-200k	0.58	0.64	0.46	0.43	NA	NA	0.78
Upper River Bright - Fall[a/]	93,510	94,925	305,445	233,934	323,276	145,361	222,350	19,182	39,625	0.59	0.49	0.52	0.53	NA	NA	0.86
Upper River - Summer[a/]	44,432	52,184	68,380	77,982	88,691	79,253	81,840	6,072	12,143	0.64	**0.83**	0.62	0.74	NA	NA	0.75
Willapa Bay - Fall[b/]	3,811	2,677	1,904	2,075	2,824	NA	2,235	1,696	3,393	0.60	**0.86**	0.76	0.47	NA	NA	0.78
Grays Harbor Fall[b/]	22,870	14,032	12,582	11,400	22,200	NA	14,712	5,694	11,388	0.60	**0.86**	0.76	0.47	NA	NA	0.78
Grays Harbor Spring	2,563	878	2,459	1,583	1,841	1,367	1,585	546	1,092	NA	NA	NA	NA	NA	NA	0.78
Queets - Fall[a/]	3,857	3,707	2,582	3,820	5,313	NA	3,742	1,250	2,500	0.60	0.86	0.76	0.47	NA	NA	0.87
Queets - Sp/Su	373	760	520	377	532	NA	471	350	700	NA	NA	NA	NA	NA	NA	0.78
Hoh - Fall[b/]	1,293	1,937	1,269	1,933	1,592	2,333	1,929	600	1,200	0.60	0.86	0.76	0.47	NA	NA	0.90
Hoh Sp/Su	827	915	750	744	1,070	1,144	969	450	900	NA	NA	NA	NA	NA	NA	0.78
Quillayute - Fall[b/]	3,963	3,518	4,017	2,782	3,098	3,508	3,115	1,500	3,000	0.60	0.86	0.76	0.47	NA	NA	0.87
Quillayute - Sp/Su	569	729	957	608	824	893	765	600	1,200	NA	NA	NA	NA	NA	NA	0.78
Hoko -Su/Fa[a/]	1,504	663	1,406	1,760	2,877	NA	1,924	425	850	0.20	0.33	0.25	0.42	NA	NA	0.78

a/ CWT based exploitation rates from PSC-CTC 2013 Exploitation Rate Analysis and Model Calibration.

b/ Queets River fall Chinook coded-wire-tag (CWT) exploitation rates used as a proxy. Exploitation rates in the terminal fisheries will differ from those calculated for Queets fall CWTs.

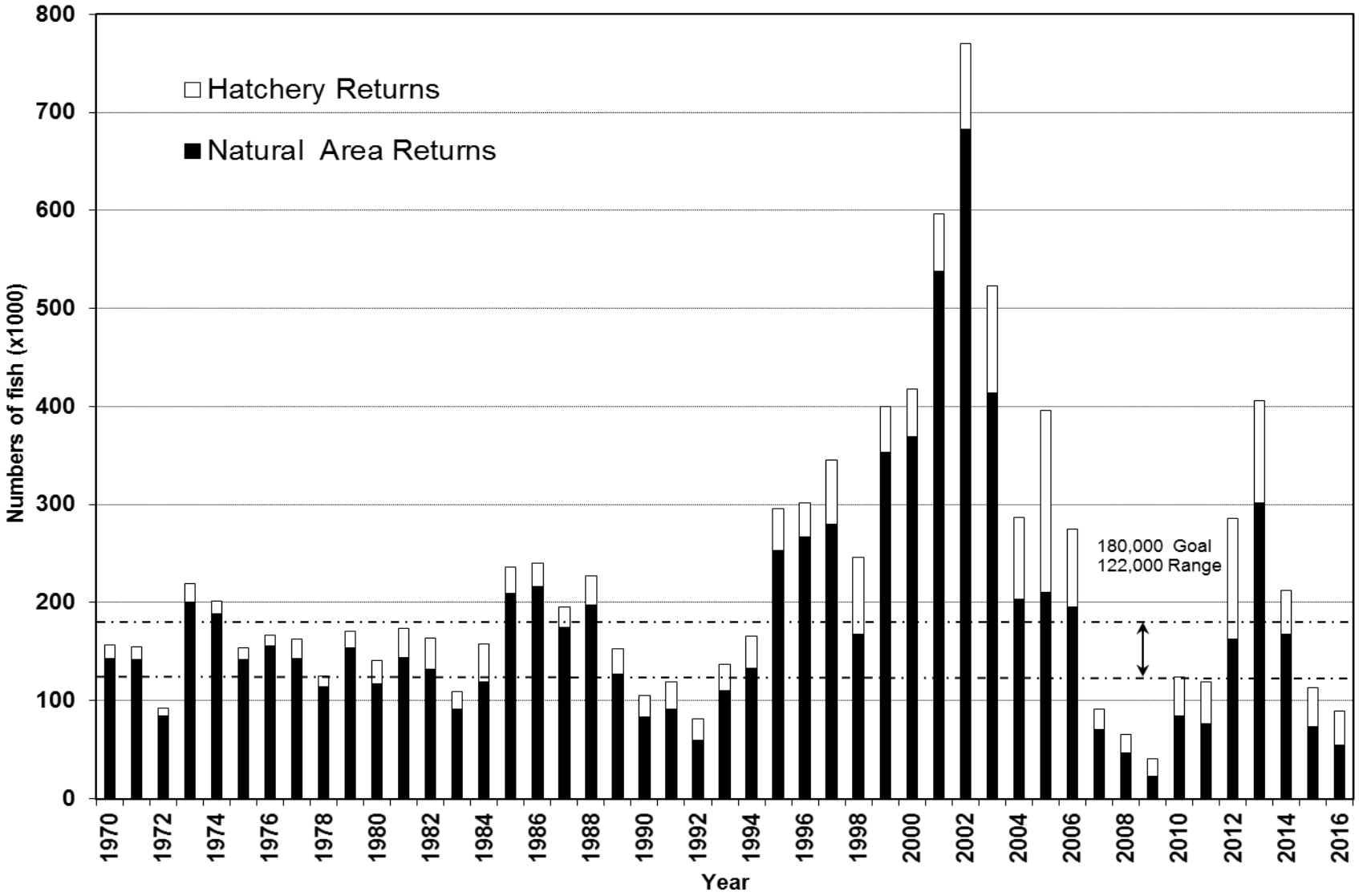

Figure II-1. Sacramento River adult fall Chinook spawning escapement, 1970-2016.

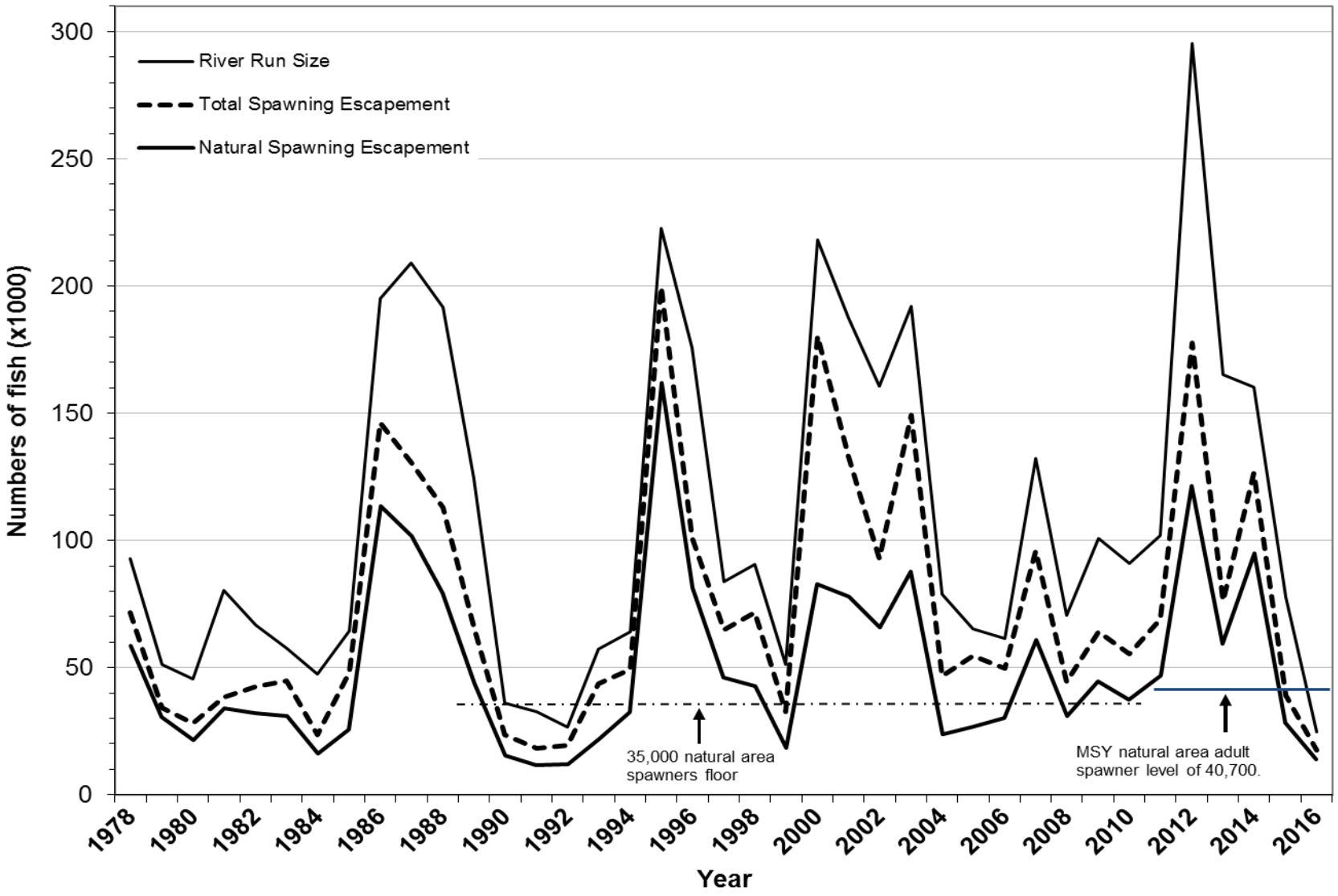

Figure II-2. Klamath River adult fall Chinook returns and spawning escapement, 1978-2016.

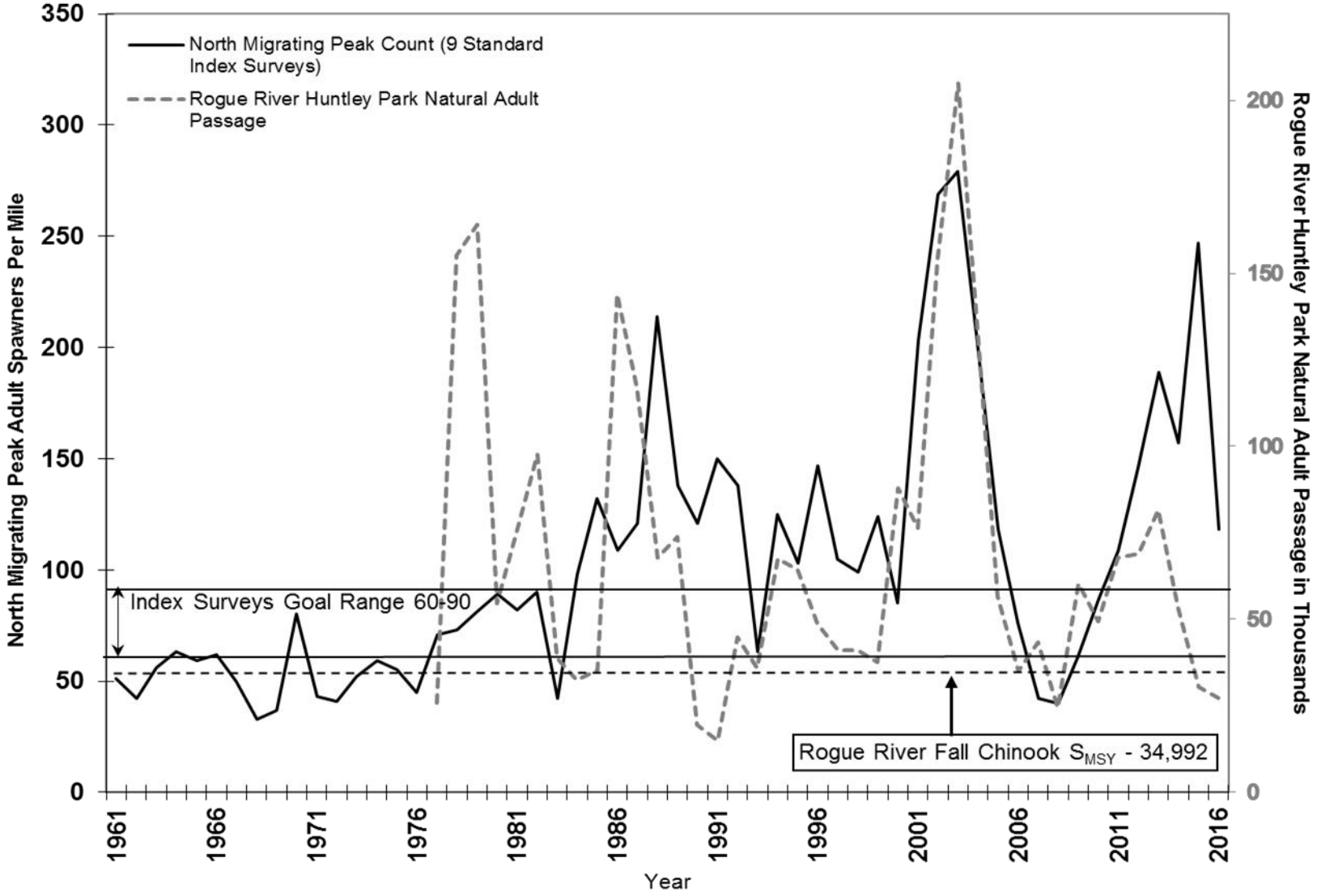

Figure II-3. Spawner indices for naturally produced Oregon coastal fall Chinook, 1961-2016.

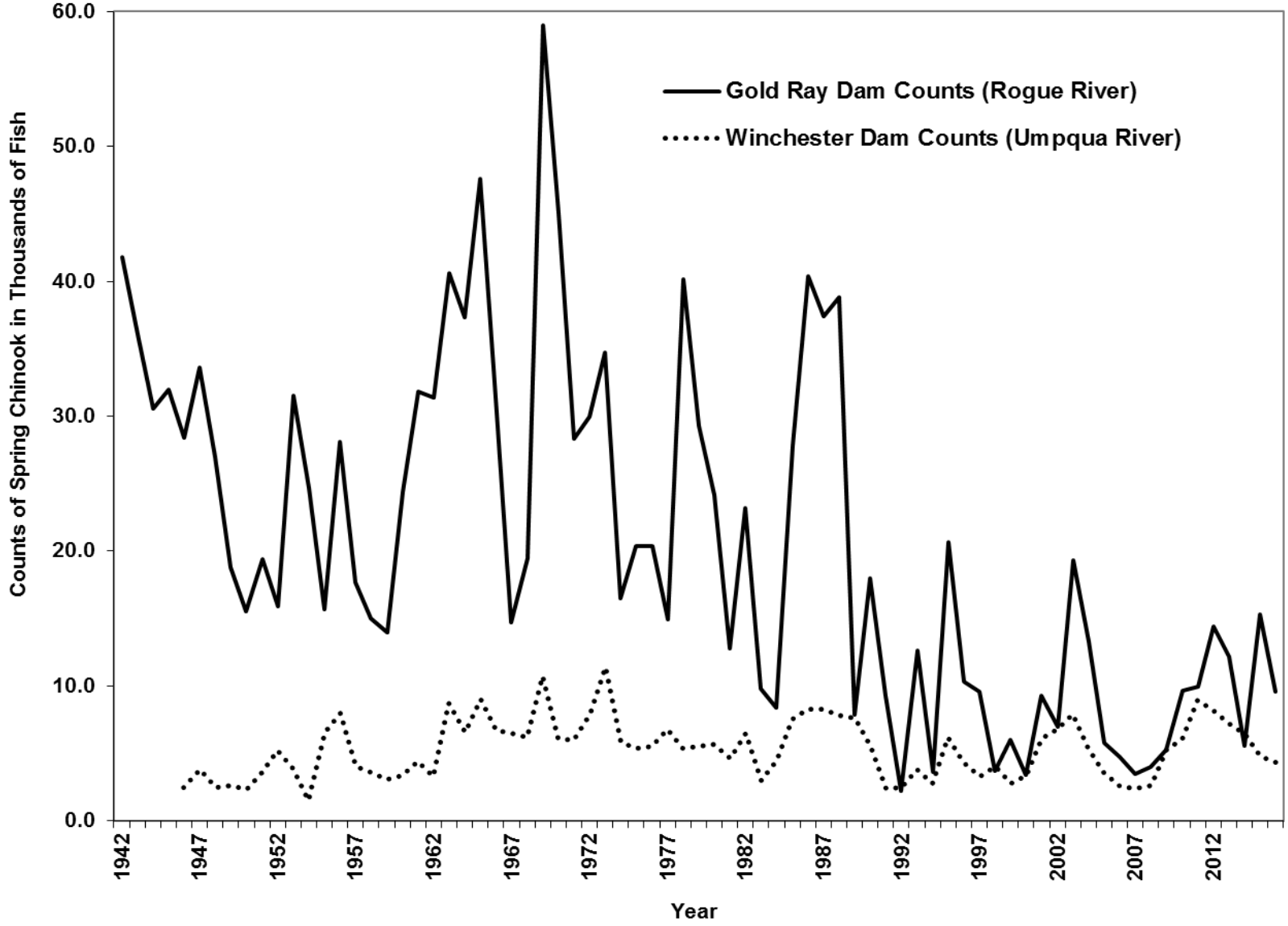

Figure II-4. Escapement indices for naturally produced Oregon coastal south/local migrating spring Chinook, 1942-2016.

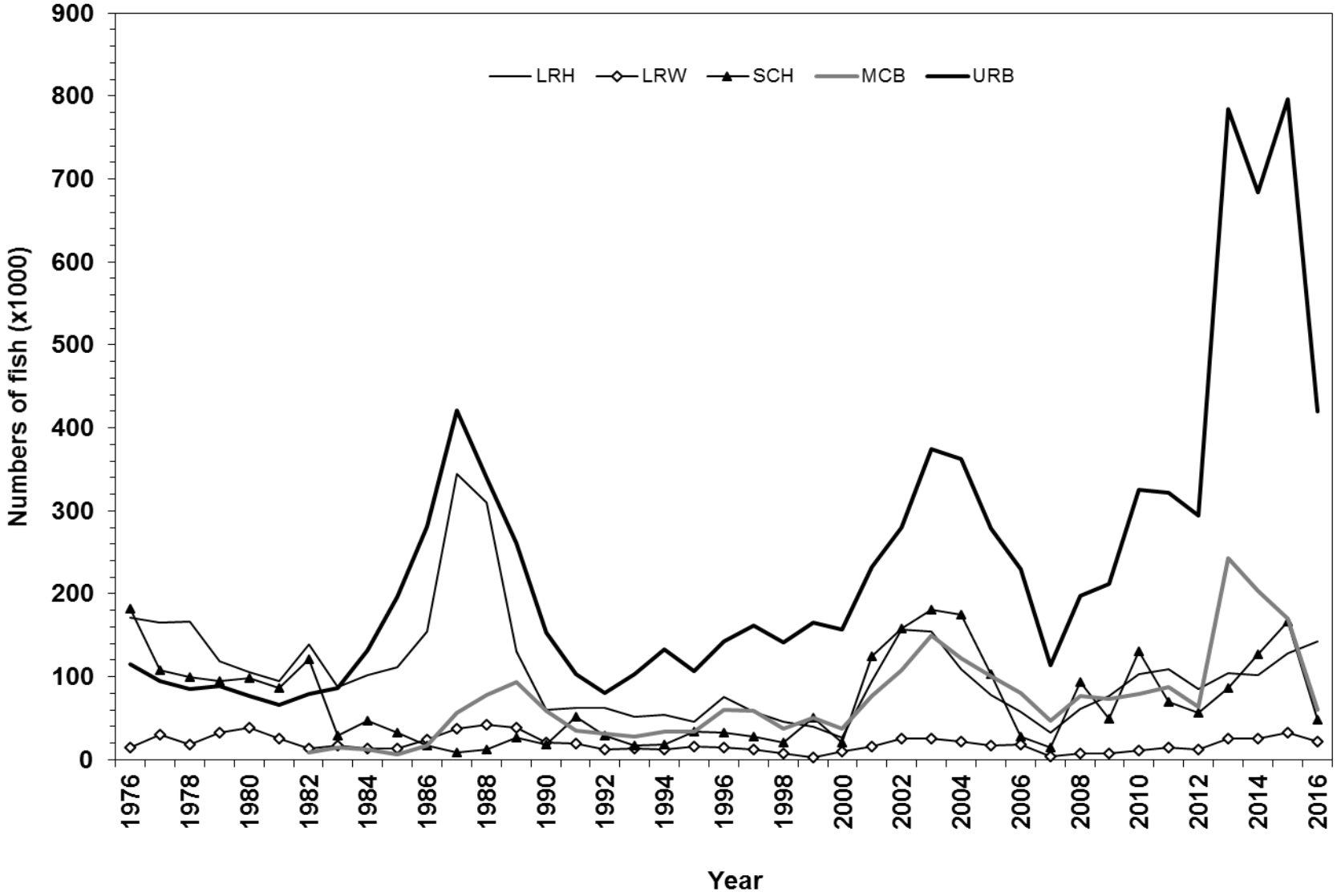

Figure II-5. Columbia River mouth adult returns of the five major fall Chinook stock groups, 1976-2016.

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CHAPTER III

COHO SALMON MANAGEMENT

OREGON PRODUCTION INDEX AREA COHO STOCKS

Oregon Production Index (OPI) area coho stocks include all Washington, Oregon, and California natural and hatchery stocks from streams south of Leadbetter Point, Washington, although stocks produced north of Leadbetter Point are also intercepted in the OPI area. The largest naturally produced coho stock is OCN coho, which includes coho produced from Oregon river and lake systems south of the Columbia River. OCN coho are managed as a stock aggregate with four identified components. Prior to 2000, NMFS listed three coho ESUs within the OPI area as threatened: CCC coho listed October 1996, SONCC coho listed May 1997, and OCN coho listed August 1998. In 2002, NMFS began an update of all its listing determinations and in January of 2006 concluded that the OCN ESU did not warrant listing under the ESA. That determination was overruled by a U.S. Court decision in 2007, and subsequently relisted by NMFS as threatened in February 2008. Lower Columbia River natural (LCN) coho were listed as endangered under the Oregon State ESA in 2002, and as threatened under the Federal ESA on June 28, 2005. The primary OPI hatchery stocks include a south migrating Columbia River (early) stock, a north migrating Columbia River (late) stock, public hatchery coho from the Oregon and northern California Coast, and formerly a small cooperative program along the southern Oregon Coast known as the Salmon Trout Enhancement Program (STEP), which was discontinued after the 2004 brood releases.

Management Objectives

In establishing ocean salmon fisheries that impact OPI area coho stocks, the Council was guided by the reasonable and prudent alternatives of NMFS 1999 Supplemental Biological Opinion and Incidental Take Statement for CCC and SONCC coho and the March 2016 NMFS ESA guidance letter for LCN and OCN coho, which required:

1. No directed coho fisheries or retention of coho in all commercial and recreational fisheries off California to protect endangered CCC coho.
2. Marine fishery impacts on endangered CCC and threatened SONCC coho must be no more than 13.0 percent as indicated by projected impacts on RK hatchery coho.
3. Fishery impacts on threatened LCN coho must not exceed a coastwide marine and mainstem Columbia River exploitation rate of 18.0 percent.
4. Fishery impacts on threatened OCN coho must not exceed a coastwide marine and freshwater exploitation rate of 20.0 percent.

Based on parent escapement levels and the marine survival, the total allowable OCN coho exploitation rate for 2016 fisheries was no greater than 20.0 percent under the Salmon FMP (Amendment 13) and no greater than 20.0 percent under the matrix developed by the OCN Coho Work Group during their review of Amendment 13. The work group recommendation was accepted by the Council as expert biological advice in November 2000. A modification to the marine survival index in the matrix was adopted by the Council in 2013.

The Council was also guided by a treaty Indian/non-Indian sharing agreement for Columbia upriver coho stocks, which required passage of 50 percent of the run destined for areas above Bonneville Dam.

Regulations to Achieve Objectives

Historically, OPI area coho stocks contributed primarily to ocean fisheries off Oregon and northern California and, to a lesser degree, Washington and B.C. The Council has prohibited retention of coho in all fisheries south of the Oregon/California border since 1996. For the adopted seasons the STT projected exploitation rates of 7.0 percent for RK coho in marine fisheries, 13.1 percent for OCN coho in marine and freshwater fisheries combined, and 7.2 percent for LCN coho in marine fisheries.

Total allowable harvest set preseason for the north of Cape Falcon recreational fisheries for coho in 2016 was 18,900, a substantial decrease from the 150,800 quota in 2015. For the non-Indian commercial and treaty Indian fisheries there was no coho retention allowed in 2016 compared to the 19,200 and 42,500 coho quotas, respectively, in 2015. Season and size limit details are presented in Tables I-1, I-2, and I-3.

Commercial Troll

Commercial troll fisheries have been closed to coho retention south of Cape Falcon since 1993 with the exception of limited fisheries in 2007, 2009 and 2014.

In the non-Indian commercial troll fisheries from Cape Falcon to the U.S./Canada border there was no coho retention allowed in 2016 (Table I-1).

Recreational

From 1994 through 1998, coho retention was prohibited in Oregon recreational fisheries south of Cape Falcon. Retention of coho has been prohibited off California since 1996 to protect ESA-listed CCC coho. Mark-selective coho directed ocean recreational fisheries have been implemented in the OPI area since 1998. Limited non-mark-selective recreational ocean coho fisheries have occurred in recent years; 2004 between Leadbetter Point and the Queets River and since 2011 between Cape Falcon and Humbug Mountain. In 2012, 2013 and 2015 non-mark-selective fisheries occurred between the Queets River and Cape Falcon, and in 2014, non-mark-selective fisheries occurred in all areas from the U.S.-Canada border to Humbug Mountain. Adequate abundance of marked coho in the OPI area has resulted in allowable harvests of marked coho in Oregon and Washington within constraints for OCN and LCN coho.

In 2016 the recreational coho fisheries north of Cape Falcon operated with a quota of 18,900 in the Columbia River subarea. There were no coho retention fisheries north of the Columbia River subarea (Table I-3). The recreational fishery between Cape Falcon and the Oregon/California border operated with a mark-selective quota of 26,000. A non-mark-selective fishery with a quota of 7,500 occurred in September between Cape Falcon and Humbug Mountain (Table I-3).

Inside Harvest

Coho retention in all California fisheries was prohibited.

The 2016 inside recreational harvest of coho in Oregon coastal basins, as in recent years, was very restricted and generally limited to areas where abundant naturally-produced or hatchery coho returns were expected. Estimates of the 2016 inriver recreational coho harvest for most areas were not available. Historical estimates of the recreational harvest of adult coho in Oregon coastal estuaries and rivers, derived from ODFW salmon and steelhead angler catch record cards, are reported in Table III-1.

Limited recreational fisheries for naturally-produced coho (non-mark-selective) were approved in two lake systems in 2016. The total catch estimate for these fisheries was 121 in Siltcoos Lake and 41 in Tahkenitch Lake.

The 2016 Columbia River non-Indian commercial net fishery harvested 31,400 adult coho. Select Area fisheries in both Oregon and Washington accounted for 30,300 of the total 2016 Columbia River commercial coho catch. The Columbia River treaty Indian mainstem commercial gillnet coho catch was approximately 5,000 fish, compared to the 2015 catch of 2,300 coho. In 2016, no non-treaty coho-directed fisheries were conducted due to the low coho return and other constraints. Columbia River commercial coho fisheries were both selective and non-mark-selective in 2016 dependent on gear type. Coho harvest information for Columbia River commercial and recreational fisheries are presented in Appendix B, Table B-21.

The Buoy 10 and mainstem recreational fisheries below Bonneville Dam harvested 9,200 adult coho compared to 36,900 adult coho in 2015. All Columbia River recreational fisheries in 2016 were mark-selective for coho. In 2016 Columbia River managers opened the Buoy 10 fishery August 1 through October 21 for marked coho, with a daily-bag-limit of two adult salmon, only one of which may be a Chinook. Only adipose and/or left ventral fin-clipped Chinook were allowed August 1, 7, 8, 14, 15, 21, 22, 28, 29 and September 15-30. All salmon angling closed October 22 through November 4. Barbless hooks were required in these fisheries. The upriver boundary for the fishery was at the Tongue Point, Oregon to Rocky Point, Washington line. The 2016 Buoy 10 effort totaled 94,950 angler trips (Table III-2). Historical Buoy 10 catch and effort data are provided in Appendix B, Table B-22. Recreational coho harvest estimates for Columbia River tributaries downstream of Bonneville Dam are included with mainstem harvest in Appendix B, Table B-21.

Escapement and Management Performance

The overall abundance estimate for OPI area stocks in 2016 was 326,700 compared to 336,300 in 2015 and to the recent ten-year average of 796,800 (Table III-3; Figure III-1). All Council area coho fisheries complied with quota limits. (Table I-6).

Central California Coast and Northern California Coho

For CCC coho, redd counts have been made for the Lagunitas Creek basin since 1995. In 2016, 126 redds were counted and are reported in Table B-7. However, the spawning season for this watershed may not be complete and the final redd count may change. Estimates were available for escapement to Klamath River Basin hatcheries, but not for coho spawning in natural areas. In 2016, a total of 480 adult coho returned to Trinity River Hatchery and 59 adult coho returned to Iron Gate Hatchery. These values compare to a combined goal of 2,000 adults.

Oregon Coast Natural Coho

The preliminary estimate of natural spawner escapement in 2016 to Oregon coastal river and lake systems from the Sixes River north (Oregon Coast ESU) was 75,900 adult coho. This compares to 57,100 adults in 2015. Historical spawner escapement estimates of naturally produced coho are reported in Table III-1.

Preliminary information indicates the total natural spawning population on the Oregon Coast was the third lowest since 2001. The total estimate of the natural spawning population in 2016 was 82,200, including estimates from the Rogue River, which is part of the SONCC ESU (Table III-4, Figure III-2).

Preliminary postseason estimates of combined marine and freshwater exploitation on OCN coho is 8.7 percent, which is lower than the preseason projection of 13.1 percent, and below the 20.0 percent maximum allowed under the OCN work group matrix.

Preliminary postseason estimates of marine exploitation on RK coho is 6.7 percent, which is lower than the preseason projection of 7.0 percent, and below the 13.0 percent maximum ESA consultation standard.

Oregon Coastal Hatchery Coho

The preliminary estimate of total coho returns to Oregon coastal public hatcheries was 8,800 adults (Table III-1).

Columbia River Coho

The 2016 ocean escapement of adult early and late Columbia River coho stocks was 196,300 fish, compared to 174,700 adults in 2015 (Appendix B, Table B-21).

Preliminary postseason estimates of marine exploitation on LCN coho was 7.6 percent, which is slightly higher than the preseason projected 7.2 percent but well within the 18 percent allowed.

WASHINGTON COASTAL COHO STOCKS

Washington coastal coho stocks include all natural and hatchery stocks originating in Washington coastal streams north of the Columbia River to the western Strait of Juan de Fuca (west of the Sekiu River). The stocks in this group most pertinent to ocean salmon fishery management were Willapa Bay (hatchery), Grays Harbor, Quinault (hatchery), Queets, Hoh, and Quillayute coho. Those stocks contribute primarily to ocean fisheries off Washington and B.C

Management Objectives

Preseason Management goals in 2016 for Grays Harbor and Olympic Peninsula coho stocks included achieving natural spawning escapement objectives and treaty Indian allocation requirements. The Council's preseason conservation objectives for stocks managed for natural production were based on maximum sustainable yield (MSY) spawner escapements established pursuant to the U.S. District Court order in *Hoh* v. *Baldrige*. The conservation objectives for the Queets, Hoh, and Quillayute rivers were developed as ranges intended to bracket estimates of MSY escapement. The range reflected the inherent uncertainty by using the high estimate of recruits-per-spawner and the low estimate of carrying capacity for the lower bound, and the low estimate of recruits-per-spawner and the high estimate of smolt carrying capacity for the upper end of the range. The ranges were further adjusted upward by 26 to 184 percent for risk aversion and habitat considerations. Annual targets for natural spawning escapement and total escapement were established by WDFW and treaty Indian tribes under the provisions of *U.S.* v. *Washington* and subsequent U.S. District Court orders. After an annual agreement was reached, ocean fishery escapement objectives were established for each river or region of origin. Agreements included provisions for treaty Indian allocation requirements and inside non-Indian fishery needs. No agreements on annual spawning targets for Washington coastal coho other than those in the FMP in place during the preseason process were made in 2016.

In December 2011, Amendment 16 to the FMP was approved, which established new conservation objectives and SDC for Washington coastal coho based on either S_{MSY} estimates derived from FRAM run reconstruction programs or existing conservation objectives.

Regulations to Achieve Objectives

Washington coastal coho stocks played a primary role in 2016 Council-area ocean fishery management, particularly north of Cape Falcon, due to extremely low run size predictions. Overall harvest quotas were limited to levels well below those of the late 1980s and early 1990s. All non-Indian ocean fisheries north of Cape Falcon prohibited retention of coho with the exception of the area between Leadbetter Point, WA and Cape Falcon, OR which included mark-selective coho retention. All ocean coho fisheries south of Cape Falcon were mark-selective except for a September recreational coho fishery. Treaty Indian ocean fisheries prohibited retention of coho in 2016. Season and size limit details are presented in Tables I-1, I-2, and I-3.

Willapa Bay Coho

Inside Harvest

Historical terminal run size, harvest, and escapement data for Willapa Bay coho are presented in Appendix B, Table B-24. The 2016 gillnet coho harvest in Willapa Bay totaled 19,304 fish. Based on the preseason forecast for a terminal run of 60,879 fish, the scheduled commercial fisheries were expected to harvest approximately 12,512 total coho. There were 31 12-hour Chinook and coho directed non-Indian gillnet fishery openings September 6 through October 14. Retention of both marked and unmarked coho was allowed. Unmarked Chinook retention was prohibited. Non-directed openings were scheduled November 1 through November 25. An in-season chum conservation concern predicated an adjustment to the commercial fishing schedule on November 4, 2016. As a result, the commercial season closed for eight, 12-hour fishing openers then was re-opened for the remainder of their scheduled fishing season in November.

From July 1, 2016 through July 31, 2016, Willapa Bay (Marine Area 2-1) was open for recreational fishing concurrent with the Ocean Marine Area 2 (ocean rules prohibiting coho retention applied). From August 1, 2016 through January 31, 2017, Willapa Bay was open to recreational fishing with a daily-bag-limit of 6 salmon, no more than four adults. Unmarked Chinook retention was prohibited. Barbless hooks were required when fishing for salmon. Anglers were allowed to fish with two poles if they had a Two-Pole Endorsement. Expected harvest in all recreational fisheries based on preseason forecast abundance was 6,820 hatchery and wild coho. Marine and freshwater recreational harvest estimates were unavailable for 2016, but for 2015, Marine Area 2-1 and freshwater recreational harvest estimates totaled 11,105 fish.

Freshwater recreational fisheries in the Willapa Bay watersheds varied in duration, but were generally open for salmon fishing as early as August 1, 2016 through January 31, 2017 with a daily-bag-limit of 6 salmon and no more than four adults. Unmarked Chinook retention was prohibited. Single-point barbless hooks were required in all areas except Naselle, South Fork Willapa, and Bear rivers, where only barbless hooks were required.

Escapement and Management Performance

Willapa Bay coho were managed primarily for natural production. Estimates of natural spawning escapement for 2016 were unavailable. The most recent but still preliminary natural escapement estimate available was 17,086 in 2015, which did not meet the FMP escapement objective of 17,200 natural spawners. Escapement to Willapa Bay hatcheries in 2015 was estimated at 21,386 coho, which met the WDFW escapement objective of 6,100 spawners.

The geometric mean of Willapa Bay coho natural spawning escapements in 2013, 2014, and 2015 is 29,915 which was above the MSST of 8,600; therefore, Willapa Bay coho should not be considered overfished. Estimates of Willapa Bay coho exploitation rates were not available for 2015 or 2016; however, fisheries in earlier years resulted in exploitation rates well below the MFMT (0.74); therefore, Willapa Bay coho should not be considered subject to overfishing (Table III-7).

Grays Harbor Coho

Inside Harvest

Historical terminal run size, harvest, and escapement data for Grays Harbor coho are presented in Appendix B, Table B-26. The 2015 terminal run size estimate for Grays Harbor coho, after execution of the ocean fishery, was 53,729 fish (28,719 natural and 25,010 hatchery). Treaty Indian gillnet and non-Treaty fisheries reported a harvest of 22,891 coho (natural, hatchery, and net-pen origin) during 2015. The Chehalis Tribe reported it's gillnet fishery harvest to be 610 coho in 2015. 2016 pre-terminal and Grays

Harbor terminal fisheries were conducted with regulations designed to restrict coho harvest impacts. Treaty Indian and non-Indian gillnet coho harvest for 2015 was reported as 14,694 compared to 2016 harvest of 3,186 under increased terminal fishery restrictions in 2016. Recreational harvest estimates for 2016 are not available at this time.

The Quinault Indian Nation operated two separately scheduled gillnet fisheries for Chinook, coho, and chum in the area of the Lower Humptulips and in the area of the Lower Chehalis, as described in Chapter II under the section labeled Grays Harbor Chinook. The pre-season expected coho fishery impacts were limited by the expected abundance and harvest of coho in the Lower Chehalis side of the fishery. The Chehalis area Treaty fishery harvested 1,276 coho, while the Humptulips area Treaty fishery catch was 787 coho. The combined Grays Harbor Treaty coho harvest was 2,063 approximately 57 percent of the expected harvest after accounting for the in-season net restrictions changes during later chum salmon entry and the pre-season terminal prediction.

The non-Indian gillnet fishery in Humptulips commercial Area 2C was scheduled to open for four 12-days in mid- to late October. Retention of all fall Chinook, coho, and chum was allowed. Total catch of coho in Area 2C was 28 fish, 28 percent of the expected harvest. The non-Indian gillnet fishery in the Chehalis River commercial Areas 2A and 2D was scheduled to open for three 12-hour days in late October. During these fisheries, all areas of 2D were open. During all fisheries live boxes were required, and wild Chinook could not be retained. Total catch for areas 2A and 2D is 204 coho, about 35 percent of the predicted harvest estimate.

Chehalis Tribe Chehalis River upper mainstem fisheries occurred in the fall of 2016 and harvested 891 coho.

Estimates of catch in recreational fisheries for 2016 were unavailable; however, fisheries were conducted in three general areas: Marine Area 2.2, the Chehalis River and its tributaries, and the Humptulips River.

A recreational fishery in the northern portion of Marine Area 2-2, Commercial Area 2C, was open from August 1 through September 24. During this time 2 adult salmon could be retained, wild coho must be released. From October 1 through November 30, the portion of Marine Area 2-2 east of a line from the mouth of Johns River to Brackenridge Bluff Tripod was open for the retention of 1 adult salmon per day. During this time wild Chinook must be released.

The Chehalis River and its tributaries were scheduled to open for coho fishing on the following dates and areas:

- Downstream of the high bridge on Weyerhaeuser 1000 line approximately 400 yards downstream from Roger Creek: September 16 through January 31, 2017 with a daily limit of 6 salmon, one adult may be retained, release wild Chinook and coho is required.

The Humptulips River recreational fishery was scheduled to open for coho fishing on the following dates and areas, with a bag limit of two adult salmon daily.

- From the mouth to the confluence of the East and West forks: September 1 through November 15: a daily limit of 6 salmon, up to 2 adults may be retained; release wild coho. From November 16, 2016 through January 31, 2017: a daily limit of 6 salmon, up to 2 adults may be retained, release Chinook and wild coho.

Escapement and Management Performance

Grays Harbor coho are managed for natural production with a spawning escapement goal of 35,400. The 2015 terminal run forecast for natural spawning coho was 127,595 adult fish and 37,663 hatchery-origin coho. A preliminary escapement estimate for 2015 is 21,278 natural spawning coho. An estimate for 2016 Grays Harbor coho was not available. The returns of hatchery-origin coho to Grays Harbor hatchery programs were sufficient to provide for 2016 coho production goals. For the last three returns, natural origin escapement (natural spawning or taken for broodstock or killed when sampled) was 44,694, 84,139, and 16,346 during 2013, 2014, and 2015 respectively. For 2016 escapement has not been determined, but 207 natural origin fish were taken for hatchery broodstock.

The geometric mean of Grays Harbor coho natural origin escapements in 2013, 2014, and 2015 which were respectively of 56,785, 104,836, and 21,278 is 50,222 which is above the MSST of 18,320; therefore, Grays Harbor coho should not be considered overfished. Estimates of Grays Harbor coho exploitation rates were not available for 2016; however, fisheries in earlier years resulted in exploitation rates well below the MFMT (0.65); therefore, Grays Harbor coho should not be considered subject to overfishing (Table III-7).

Quinault River Coho

Inside Harvest

Historical terminal run size, harvest, and escapement for Quinault River coho are presented in Appendix B, Table B-28. The treaty Indian gillnet fishery targeted hatchery Chinook and coho from early September through mid-November. A total of 37,187 coho were harvested by the gillnet fishery during the 2016 season.

Escapement and Management Performance

Quinault River coho were managed for hatchery production. Escapement estimates for Quinault River coho in 2016 were unavailable. The Quinault National Fish Hatchery egg take objectives for 2016 were achieved.

Queets River Coho

Inside Harvest

Historical terminal run size, harvest, and escapement for Queets River coho are presented in Appendix B, Table B-31. Queets River fisheries were managed according to preseason abundance estimates and planned Council ocean fisheries. The 2016 fishery was structured to target returning hatchery coho while limiting incidental impacts on natural coho and limiting total freshwater Chinook harvest to a maximum rate of 40 percent. The schedule and mesh size restrictions fished in 2016 are depicted in the discussion of the Chinook directed fishery. The total harvest of coho in the Treaty Indian gillnet fishery was 6,745 commercially-landed fish, which was more than the preseason modeled catch of 1,621. The gillnet harvest was comprised of a mix of early-timed hatchery fish and normal/late-timed natural fish and the harvest of both was substantially more than anticipated. A final estimate of the hatchery/natural mix in the catch is currently unavailable.

The recreational fishery within the Quinault Reservation was conducted with a restriction on the harvest of unmarked coho. Only coho with an adipose clip were permitted to be retained in the Queets and Salmon River fisheries on the Reservation.

Recreational fisheries outside of reservation lands were further restricted. The Clearwater River was closed to salmon fishing throughout the fall season. The Queets and Salmon Rivers outside the Quinault reservation were open only in September for salmon fishing to allow some harvest of early timed hatchery

coho. Anglers were required to release wild coho, and wild Chinook as well in waters within Olympic National Park.

Escapement and Management Performance

The 2015 natural escapement estimate was 2,028. The expected natural coho escapement for 2015 based on preseason modeling was 5,308, with a preseason escapement objective range of 5,800 to 14,500 natural coho. The pre-season expected natural coho escapement in 2016 was 2,977. Actual escapement is anticipated to be above the preseason expectation. The Quinault Indian Nation closed their fisheries as planned during weeks 41 and 42 as well as weeks 46 and 47 of the 2016 fishery and established large mesh restriction during weeks 40, 43, 44 and 45 due to the lower than expected return of wild coho. Off reservation non-treaty sport fisheries proceeded as planned pre-season, and described above.

The geometric mean of Queets River coho escapement in 2013, 2014, and 2015 was 4,357, which was above the MSST of 4,350; therefore, Queets River coho should not be considered overfished

Hoh River Coho

Inside Harvest

Historical terminal run size, catch, and escapement data for Hoh River coho are presented in Appendix B, Table B-34. The 2016 terminal run size of Hoh River natural coho was projected to be 1,924. The tribal fishery targeted 6.4 percent of the terminal run. The treaty Indian gillnet fishery occurred from the week of September 1 to the week of December 31 (which included Stat Weeks 49-52 of steelhead management), as described in Chapter II under the section labeled Hoh River Chinook. The treaty Indian gillnet fishery was closed during weeks 41 through 47 as a response to the low forecasted abundance. The preliminary tribal commercial fishery harvested total was 271 wild coho and 24 hatchery-origin coho, with 2 coho retained for ceremonial and subsistence purposes. The non-Indian recreational fishery was open September 1 October 9 with a daily-bag-limit of 6 salmon, only one of which could be an adult with no retention of coho. The non-Indian recreational fishery was closed October 10 through November 20 as a response to the low forecasted abundance. The non-Indian recreational fishery was opened November 21 through November 30 however, there was no legal retention of coho. A catch estimate for the 2016 recreational fishery of wild coho was not available.

Escapement and Management Performance

The preliminary 2016 spawning escapement estimate for coho in the Hoh River is 4,110. The escapement goal range established for this stock is 2,000 to 5,000. The geometric mean of Hoh River coho escapement in 2014, 2015, and 2016 was 3,229; therefore, Hoh River coho should not be considered overfished. Estimates of Hoh River coho exploitation rates were not available for 2015. The MFMT for Hoh River coho is 0.65. In 2012, 2013 and 2014, the Hoh River coho exploitation rates were 0.46, 0.70 and 0.43, respectively; therefore, in 2014 Hoh River coho was not subject to overfishing (Table III-7).

Quillayute River Coho

Inside Harvest

Historical terminal run size, catch, and escapement data for Quillayute River summer and fall coho are presented in Appendix B, Table B-37. The recreational and tribal fisheries for coho were established by preseason agreement between WDFW and the Quileute Tribe. A total of 2,450 summer coho were harvested in the Quileute Tribe's commercial, ceremonial, and subsistence fisheries (hatchery = 1,557, wild = 893). An estimate of the 2016 recreational, summer coho catch was 382 (169 natural).

Tribal harvest of fall coho in 2016 was 5,596 (hatchery = 3,651, wild = 1,945). Fall coho taken in the ceremonial and subsistence fishery is included in IGN catch. The fall recreational fishery in the Quillayute system was greatly reduced to protect wild, fall coho. The season ran from September 1-30 and November 16 to December 15 in the Quillayute and Sol Duc rivers and November 16-30 in the Dickie, Calawah and Bogachiel rivers. Wild coho retention was prohibited with a daily limit 1 hatchery coho. An estimate of the 2016 recreational fall coho catch was 180 (est. 16 natural from non-harvest mortality). The Quileute Tribe closed their fall fishery from October 3 through November 21 for stock conservation reasons.

Escapement and Management Performance

The summer coho run in the Quillayute is managed primarily for its hatchery component, which returns in August and September. The summer coho hatchery rack return was 2,116, well above the goal of 300. The 2016 wild summer coho escapement estimate was 663.

The preliminary 2016 escapement estimate for natural fall coho was 9,025. This was above the MSY spawner escapement objective of 6,300 for this stock. Sol Duc Hatchery rack return for fall coho was 16,332.

Estimates of Quillayute River coho exploitation rates were not available for 2015. The MFMT for Quillayute River Coho is 0.59. In 2012, 2013 and 2014, the Quillayute River coho exploitation rates were 0.53, 0.55 and 0.50, respectively; therefore, in 2014 Quillayute River coho was not subject to overfishing (Table III-7).

PUGET SOUND COHO STOCKS

Puget Sound coho salmon stocks include natural and hatchery stocks originating from U.S. tributaries in Puget Sound and the Strait of Juan de Fuca. The primary stocks in this group that are most pertinent to ocean salmon fishery management were Strait of Juan de Fuca, Hood Canal, Skagit, Stillaguamish, Snohomish, and South Puget Sound (hatchery) coho. Those stocks contribute primarily to ocean fisheries off Washington and B.C.

Management Objectives

The Council's previous conservation objectives were based on the Puget Sound Salmon Management Plan, which defined management objectives and long-term goals for these stocks as developed by representatives from Federal, state, and tribal agencies. Conservation objectives for specific stocks were based on either maximum sustainable production for stocks managed primarily for natural production or on hatchery escapement needs for stocks managed for artificial production. The original conservation objectives were developed by a State/Tribal Management Plan Development Team following the Boldt Decision with the goal for natural spawning stocks defined as "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 methodology used to develop the objectives was based on assessment of the quantity and quality of rearing habitat and the number of adult spawners required to fully seed the habitat. Some objectives were subsequently modified by the U.S. District Court Fisheries Advisory Board and later determinations of the WDFW/Tribal Technical Committee. However, annual natural management objectives may vary from the FMP conservation objectives if agreed to by WDFW and the treaty Indian tribes under the provisions of *U.S.* v. *Washington* and subsequent U.S. District Court orders. (see "Memorandum Adopting Salmon Management Plan"; *U.S.* v. *Washington*, 626 F. Supp. 1405 [1985]).

The PSC adopted a management plan for coho salmon originating in Washington and southern B.C. river systems in 2002. The plan was directed at the conservation of key management units, four from Southern B.C. (Interior Fraser, Lower Fraser, Strait of Georgia Mainland, Strait of Georgia Vancouver Island) and nine from Washington (Skagit, Stillaguamish, Snohomish, Hood Canal, Strait of Juan de Fuca, Quillayute,

Hoh, Queets, and Grays Harbor). Under the plan, the U.S. and Canada were required to constrain total fishery exploitation rates to levels associated with the categorical status and target exploitation rates of the key management units as determined by domestic managers. Ceilings on exploitation rates by intercepting fisheries were established through formulas specified in the plan. Categorical status was employed by the PST under the 2002 coho Agreement to indicate general ranges of allowable total exploitation rates for U.S. and Canadian coho management units in 2016. Three categories were employed: low (total exploitation rate <20 percent), moderate (total exploitation rate 20-40 percent), and abundant (total exploitation rate >40 percent).

In 2014, the Council adopted management objectives for Puget Sound coho as recommended by WDFW and tribal co-managers under provisions of *U.S.* v. *Washington*. The annual objectives were based on the Comprehensive coho Agreement categorical status and associated maximum exploitation rate limits. The Council formally adopted exploitation rate management objectives for Puget Sound coho in November 2009, which were generally consistent with PSC objectives, and replaced the longstanding FMP spawning escapement objectives in 2010. For 2016, the objectives were as follows:

- Strait of Juan de Fuca (East and West): Critical status 20 percent maximum exploitation rate
- Hood Canal: Low status 45 percent maximum exploitation rate
- Skagit: Critical status 20 percent maximum exploitation rate
- Stillaguamish: Critical status 20 percent maximum exploitation rate
- Snohomish: Critical status 20 percent maximum exploitation rate

Regulations to Achieve Objectives

Puget Sound coho stocks did not play a primary role in 2016 ocean fishery management considerations, since management of impacts to Washington coastal natural coho, and LCN coho were more constraining. Inside fisheries, primarily in Puget Sound, were constrained to meet objectives for Puget Sound coho. The mark-selective regulations in ocean and Puget Sound recreational fisheries served to increase harvest of marked hatchery fish while minimizing impacts on natural Washington Coast coho, Puget Sound coho, LCN coho, OCN coho, and Interior Fraser coho. Season and size limit details are presented in Tables I-1, I-2, and I-3.

Inside Harvest

Inside harvest of Puget Sound coho was managed on the basis of the six regional management units. Harvest of coho for each management unit is regulated according to the natural spawning escapement or hatchery program escapement goal for that unit. Commercial net and troll harvest (treaty Indian and non-Indian) for all coho stocks combined is presented in Appendix B, Table B-39. The 2016 total Puget Sound commercial catch of coho was 216,074 fish, compared to a catch of 34,227 coho in 2015. Non-Indian harvest was 14,486 coho, compared to 4,777 coho in 2015. Treaty Indian net and troll fisheries harvested 201,588 coho, compared to 29,450 coho in 2015.

Historical coho catches in the Puget Sound recreational fishery beginning in 1971 are listed in Appendix B, Table B-40. Catch estimates for the 2016 Puget Sound recreational fishery were unavailable.

Escapement and Management Performance

Puget Sound FMP conservation objectives were updated to reflect exploitation rate management objectives adopted by the Council in 2009. No 2016 postseason estimates were available for SUS harvest impacts on Puget Sound coho stocks; therefore, the 2016 preseason exploitation rate objectives could not be evaluated, although none of the Puget Sound coho management units have exceeded their annual exploitation rate limits in recent years. Preliminary 2016 escapement information was not available for natural Puget Sound coho.

The geometric mean of Strait of Juan de Fuca coho escapement (combined Western and Eastern; the current stock designation) in 2013, 2014, and 2015 was 7,008, which was above the MSST of 7,000 identified in FMP Amendment 16 but below the S_{MSY} estimate of 11,000; therefore, Strait of Juan de Fuca coho should not be considered overfished. Estimates of Strait of Juan de Fuca coho exploitation rates were not available for 2015 or 2016; however, fisheries in earlier years resulted in exploitation rates well below the MFMT (0.60); therefore, Strait of Juan de Fuca coho should not be considered subject to overfishing (Table III-7).

The geometric mean of Hood Canal coho escapement in the three most recent available years, 2012, 2013, and 2014 was 27,207, which was above the MSST of 10,750; therefore, Hood Canal coho should not be considered overfished. Estimates of Hood Canal coho exploitation rates were not available for 2015 or 2016; however, fisheries in 2010, 2012, and 2014 resulted in exploitation rates above the MFMT (0.65); therefore, Hood Canal coho were subject to overfishing in those years(Table III-7).

The geometric mean of Skagit coho escapement in 2013, 2014, and 2015 was 24,957, which was above the MSST of 14,875; therefore, Skagit coho should not be considered overfished. Estimates of Skagit coho exploitation rates were not available for 2015 or 2016; however, fisheries in earlier years resulted in exploitation rates well below the MFMT (0.60); therefore, Skagit coho should not be considered subject to overfishing (Table III-7).

The geometric mean of Stillaguamish coho escapement in 2013, 2014, and 2015 was 17,710, which was above the MSST of 6,100; therefore, Stillaguamish coho should not be considered overfished. Estimates of Stillaguamish coho exploitation rates were not available for 2015 or 2016; however, fisheries in earlier years resulted in exploitation rates well below the MFMT (0.50); therefore, Stillaguamish coho should not be considered subject to overfishing (Table III-7).

The geometric mean of Snohomish coho escapement in 2013, 2014, and 2015 was 42,083, which was above the MSST of 31,000; therefore, Snohomish coho should not be considered overfished. Estimates of Snohomish coho exploitation rates were not available for 2015 or 2016; however, fisheries in earlier years resulted in exploitation rates well below the MFMT (0.60); therefore, Snohomish coho should not be considered subject to overfishing (Table III-7).

BRITISH COLUMBIA COHO STOCKS

Management Objectives

B.C. coho stocks were managed under the PSC management plan as described in the previous section on Puget Sound coho.

Regulations to Achieve Objectives

In the 2016 management process, Interior Fraser coho were designated to be in the "low" status category, which required the total exploitation rate in SUS fisheries not to exceed 10.0 percent. This requirement was not a constraint for Council area and inside fisheries. The preseason expectation was that the total SUS fishery exploitation rate on Interior Fraser coho would not exceed 10.0 percent (0.8 percent in Council area fisheries). The mark-selective regulations in ocean and Puget Sound recreational fisheries served to increase harvest of marked hatchery fish while minimizing impacts on natural Interior Fraser coho

Inside Harvest

Harvest of coho in inside waters affecting B.C. coho stocks occurred in Puget Sound fisheries, which were described in the previous section of this chapter.

Escapement and Management Performance

Postseason estimates of SUS inside harvest impacts on coho stocks subject to the PSC coho management plan were unavailable.

COASTWIDE GOAL ASSESSMENT SUMMARY

Preliminary assessment indicates that ESA consultation standards and FMP Conservation objectives for Council managed coho stocks in effect during the preseason planning process of 2016 were met for Rogue/Klamath, OCN and LCN coho stocks (Table III-6). Despite preseason forecast abundances below spawning escapement objectives, Quillayute fall coho and Hoh coho met their FMP conservation objectives. Information to assess compliance with FMP conservation objectives and ESA consultation standards in 2016 was unavailable for most other Washington coastal, and Puget Sound coho stocks.

Stock Status Determinations

The Council adopted SDC for overfishing, overfished, not overfished/rebuilding, and rebuilt under FMP Amendment 16. These criteria, approved and implemented in December 2011, were:

- Overfishing occurs when a single year exploitation rate exceeds the MFMT (F_{MSY});
- Overfished status occurs when a 3-year geometric mean spawning escapement is less than the MSST;
- Not overfished/rebuilding status occurs when the most recent a 3-year geometric mean spawning escapement is greater than the MSST but less than S_{MSY};
- A stock is rebuilt when the most recent a 3-year geometric mean spawning escapement exceeds S_{MSY}.

All criteria rely on the most recent estimates available, which in some cases may be a year or more in the past because of incomplete broods or data availability. The above criteria for rebuilt status are the default criteria provided in the FMP; however, alternative criteria may be developed through a rebuilding plan if warranted by stock specific circumstances. All relevant stocks were evaluated relative to these new SDC as required by the FMP. Stock specific reference points and recent year estimates for relevant stocks are presented in Table III-7. All relevant coho stocks were not overfished. Exploitation rate estimates for these stocks are not available for 2016. The most recent year where exploitation rates are available is 2014 and no stocks were subject to overfishing.

TABLE III-1. Estimated returns to Oregon coastal streams and lakes in thousands of adult coho.

	Returns to Hatcheries			Winchester Dam Count[c/]	Number of OCN Spawners[a/]			Inside Harvest Impacts[d/]	Ocean Escapement to Oregon Coast[a/]
Year	Private	Public	STEP[b/]	(North Umpqua)	Lakes	Rivers	Total		
1970-75	-	22.8	-	0.4	14.9	40.3	55.2	20.5	98.8
1976	-	38.7	-	0.3	1.5	39.2	40.7	19.6	99.3
1977	4.2	6.5	-	0.4	5.8	13.7	19.5	13.5	44.1
1978	12.3	5.6	-	0.5	1.6	18.2	19.8	4.5	42.7
1979	49.2	22.2	-	0.4	6.6	38.4	45.0	1.5	118.3
1980	38.7	21.9	-	0.2	4.7	23.5	28.2	6.3	95.3
1981	117.8	21.2	-	0.1	2.5	25.5	28.0	9.9	177.0
1982	184.7	14.8	-	2.7	7.9	68.0	75.9	14.7	292.8
1983	133.9	9.5	-	1.2	3.4	18.9	22.3	6.8	173.7
1984	115.4	28.6	-	3.2	14.8	52.6	67.4	17.4	232.0
1985	332.0	15.8	-	4.0	7.6	65.3	72.9	15.7	440.3
1986	453.7	35.8	2.5	9.6	11.8	57.2	69.0	30.3	600.8
1987	119.3	12.3	0.2	2.1	4.2	25.3	29.5	7.7	171.1
1988	116.1	33.7	1.2	1.2	5.8	45.7	51.5	13.3	217.0
1989	46.9	37.3	1.2	3.0	4.8	40.6	45.4	15.1	148.9
1990	35.6	15.5	1.6	1.9	4.4	16.8	21.1	9.5	85.2
1991	35.1	39.6	4.9	3.9	7.1	33.8	40.9	31.5	155.8
1992	-	23.3	0.6	4.4	2.0	44.7	46.6	18.7	93.7
1993	-	20.2	2.0	2.3	10.1	49.2	59.2	13.3	97.1
1994	-	23.4	1.8	2.0	5.7	41.7	47.4	2.4	77.0
1995	-	25.2	0.4	2.7	11.1	50.1	61.2	3.6	93.1
1996	-	23.4	1.0	5.1	13.4	69.2	82.7	4.0	116.2
1997	-	17.7	0.2	1.8	8.6	15.2	23.8	4.3	47.8
1998	-	15.3	0.2	4.6	11.1	21.5	32.6	5.2	57.9
1999	-	13.3	0.4	3.3	12.5	34.7	47.2	2.8	67.1
2000	-	15.0	0.5	9.7	12.7	61.0	73.8	4.4	103.3
2001	-	37.4	1.4	16.0	19.6	143.1	162.7	10.1	227.7
2002	-	30.9	2.6	7.4	22.0	236.4	258.4	8.0	307.3
2003	-	15.9	3.6	10.7	16.1	213.3	229.4	6.8	266.4
2004	-	13.2	0.8	7.3	18.6	154.1	172.8	6.2	200.3
2005	-	10.0	0.3	9.0	14.7	139.9	154.6	6.1	180.0
2006	-	9.8	0.1	7.1	24.1	104.7	128.8	2.5	148.4
2007	-	3.6	0.0	2.7	9.0	57.3	66.3	1.3	73.9
2008	-	7.0	0.0	0.2	23.6	156.1	179.7	3.0	189.8
2009	-	6.1	0.0	0.7	17.3	245.4	262.7	7.3	276.8
2010	-	7.9	0.0	1.7	38.7	244.7	283.4	5.6	298.6
2011	-	4.6	0.0	0.3	20.3	336.0	356.2	12.7	373.8
2012	-	2.2	0.0	0.7	18.9	80.2	99.2	8.1	110.1
2013	-	6.5	0.0	0.6	13.7	110.8	124.4	12.0	143.5
2014	-	16.0	0.0	0.4	22.0	337.6	359.6	23.4	399.4
2015	-	4.7	0.0	0.4	4.7	52.4	57.1	4.2	66.4
2016[e/]	-	8.8	0.0	0.3	8.0	67.9	75.9	1.8	86.8

a/ Does not include estimates for the Rogue River (SONCC ESU). Spawner escapements to rivers prior to 1990 were estimated by a nonrandom standard index of streams north of the Rogue River. A total coastwide spawner escapement methodology based on stratified random sampling (SRS) was initiated in 1990 and used through 1997 and was implemented concurrently with the standard index methodology. The SRS methodology indicated that actual escapements were less than estimated by the standard rivers index. The spawner index data for years prior to 1990 have been recalibrated in this table to be comparable with the SRS estimates. Since 1998 a random site selection procedure based on the EPA's Environmental Monitoring and Assessment Program (EMAP) has been used.

b/ Oregon coastal Salmon Trout Enhancement Program (STEP) production from hatchery smolt rearing sites only.

c/ Natural and hatchery fish prior to 1990, marked fish only thereafter.

d/ Freshwater sport catch from ODFW salmon/steelhead angler catch record card information and represents only those coho greater than 24 inches total length through 1993, and those coho with a total length greater than 20 inches from 1994 on. Includes estimated mortality from hook-and-release..

e/ Preliminary.

TABLE III-2. Estimated weekly effort (in angler trips) and catches of Chinook and coho in the 2016 Buoy 10 recreational fisheries (all data are preliminary).[a/]

Week Number	Ending Date of Period	Angler Trips	Catch[b/]		Catch Per Trip
			Chinook	Coho	
32	Aug.-7	7,481	668	41	0.09
33	Aug.-14	19,378	3,521	212	0.19
34	Aug.-21	24,788	4,073	864	0.20
35	Aug.-28	22,671	7,047	2,673	0.43
36	Sept.-4	11,962	1,683	3,343	0.42
37	Sept.-11	5,951	737	1,577	0.39
38	Sept.-18	1,330	28	219	0.19
39	Sept.-25	752	7	126	0.18
40	Oct.-2	372	0	53	0.14
41-43	Oct.-23	265	16	74	0.34
Total		94,950	17,780	9,182	0.28

a/ Includes boat-based and shore-based fisheries from the upstream boundary at the Tongue Point/Rocky Point line (2000), downstream to the Buoy 10 line including Clatsop Spit, the South Jetty of the Columbia River, and the North Jetty of the Columbia River after the ocean closed. Youngs Bay bubble closure in effect August 1 through September 15. Fishery was open August 1 through October 21 for marked coho, with the daily-bag-limit of two adult salmon, only one of which may be a Chinook. Only adipose and/or left ventral fin-clipped Chinook were allowed August 1, 7, 8, 14, 15, 21, 22, 28, 29 and September 15-30. All salmon angling closed October 22 through November 4.
b/ Includes adults and jacks as determined by CWT analysis.

TABLE III-3. Oregon production index (OPI) area coho harvest impacts, spawning, abundance, and exploitation rate estimates in thousands of fish.[a/]

			Oregon and California Coastal Returns					
Year or	Ocean Fisheries[b/]		Hatcheries and Freshwater Harvest[c/]	OCN Spawners[d/]	Private Hatcheries	Columbia River Returns	Abundance[e/]	Ocean Exploitation Rate Based on OPI Abundance[f/]
Avg.	Troll	Sport						
1970-1975	1,629.6	558.4	45.8	55.2	-	460.4	2,749.3	0.80
1976-1980	1,253.6	555.0	31.2	31.1	26.1	263.3	2,154.2	0.85
1981-1985	451.2	274.0	37.2	56.0	176.8	305.3	1,328.6	0.63
1986	638.9	320.6	79.3	70.0	453.7	1578.1	2,558.9	0.46
1987	468.2	296.2	45.1	30.1	119.3	324.2	915.5	0.96
1988	844.7	297.2	61.1	56.8	116.1	686.1	1,663.7	0.74
1989	645.1	425.5	61.1	46.4	46.9	728.7	2,062.1	0.53
1990	275.9	357.1	28.7	24.2	35.6	208.0	810.9	0.82
1991	448.4	469.9	77.8	41.3	35.1	981.5	1,925.2	0.49
1992	67.4	256.5	51.0	48.9	-	225.4	629.6	0.51
1993	13.1	140.8	38.6	59.6	-	117.9	315.9	0.49
1994	2.7	3.0	28.2	51.8	-	173.4	267.5	0.02
1995	5.4	43.5	37.5	64.6	-	77.4	204.1	0.24
1996	7.0	31.8	45.7	87.5	-	117.1	260.3	0.15
1997	5.5	22.4	26.9	31.6	-	156.4	230.5	0.12
1998	3.5	12.8	29.4	34.9	-	175.9	270.8	0.06
1999	3.6	36.5	22.6	48.6	-	289.1	432.0	0.09
2000	25.2	74.6	33.2	84.8	-	558.3	762.4	0.13
2001	38.1	216.8	75.8	174.7	-	1128.3	1,673.2	0.15
2002	15.0	118.7	54.0	266.9	-	535.8	972.2	0.14
2003	28.8	252.4	45.1	236.2	-	713.2	1,266.9	0.22
2004	26.2	159.3	38.1	197.3	-	463.5	904.5	0.21
2005	10.5	58.2	42.8	164.6	-	354.7	629.9	0.11
2006	4.5	47.5	29.6	132.7	-	409.7	674.1	0.08
2007	26.2	128.5	10.9	71.4	-	349.0	631.3	0.25
2008	0.6	26.4	15.9	180.1	-	520.8	769.8	0.04
2009	27.7	201.2	16.6	265.3	-	760.2	1,341.3	0.17
2010	5.8	48.8	19.5	287.1	-	471.3	848.4	0.06
2011	4.2	54.7	20.0	360.8	-	376.5	836.4	0.07
2012	4.7	45.5	18.5	104.6	-	143.9	311.3	0.16
2013	8.4	48.3	26.5	135.6	-	258.3	494.1	0.11
2014	35.6	197.4	42.2	362.0	-	1029.0	1,724.8	0.14
2015	11.7	84.4	11.9	61.2	-	174.7	336.3	0.29
2016	0.0	31.7	11.4	82.2	-	196.3	326.7	0.10

a/ The OPI area includes ocean and inside harvest impacts and escapement to streams and lakes south of Leadbetter Pt., Washington.

b/ Incl. est. nonretention mort.: troll: release mort.(1982-present) and drop-off mort.(all yrs.); sport --release mort.(1994-present) and drop-off mort.(all yrs.).

c/ Includes STEP smolt releases through the 2007 return year, after which the program was terminated.

d/ Includes Rogue River.

e/ FRAM post season runs used after 1985 and includes OPI origin stock catches in all fisheries.

f/ Private hatchery stocks are excluded in calculating the OPI area stock aggregate ocean exploitation rate index.

g/ Preliminary.

TABLE III-4. Oregon Coast Natural (OCN) adult coho salmon spawner escapement.

	Adjusted SRS Adult Coho Spawner Population Estimates in Thousands of Spawners by Stock Component[a/]					Adult Coho Spawners Per Spawner Habitat Mile				
Year	Northern[b/]	North Central[c/]	South Central[d/]	Southern[e/]	Coastwide	Northern[b/]	North Central[c/]	South Central[d/]	Southern[e/]	Coastwide Average
1990	2.2	5.6	13.5	1.2	22.5	2	5	8	3	6
1991	9.3	6.7	21.6	0.5	38.1	10	6	13	1	9
1992	2.4	15.4	24.4	2.0	44.2	3	13	15	5	11
1993	4.5	7.8	43.1	0.8f[/]	55.7	5	7	27	1[f/]	14
1994	3.5	9.8	30.9	4.3	48.5	4	8	19	11	12
1995	3.9	13.6	36.5	3.4	57.3	4	12	22	8	14
1996	3.3	18.1	52.6	5.2	79.3	4	16	32	13	19
1997	2.1	2.8	18.4	8.2	31.6	2	2	11	20	8
1998	2.6	3.3	26.1	2.3	34.3	3	3	16	6	8
1999	8.9	11.8	29.2	1.4	51.2	10	10	18	3	13
2000	17.9	14.3	37.9	11.0	81.1	20	12	23	27	20
2001	33.5	25.2	113.9	12.0	184.6	37	22	70	29	45
2002	52.5	104.0	104.1	8.5	269.0	58	89	64	21	66
2003	59.6	68.9	100.1	6.8	235.4	66	59	62	17	57
2004	28.8	42.1	101.9	24.5	197.3	32	36	63	60	48
2005	16.5	51.4	86.7	10.0	164.6	18	44	53	24	40
2006	24.1	21.2	83.5	3.9	132.7	27	18	51	10	32
2007	17.5	12.3	36.5	5.1	71.4	19	11	22	13	17
2008	25.6	68.1	86.0	0.4	180.1	28	59	53	1	44
2009	48.1	86.4	128.2	2.6	265.3	54	74	79	6	65
2010	55.0	56.5	171.9	3.7	287.1	61	49	106	9	70
2011	45.9	119.1	191.3	4.5	360.8	51	102	118	11	88
2012	7.5	33.8	57.8	5.5	104.6	8	29	36	13	26
2013	11.0	39.7	73.7	11.2	135.6	12	34	45	27	33
2014	67.4	121.9	170.4	2.4	362.0	75	105	105	6	88
2015	6.7	22.7	27.7	4.1	61.2	7	19	17	10	15
2016[g/]	18.3	26.4	31.2	6.3	82.2	20	23	19	15	20

a/ A spawner escapement methodology study based on SRS had been in effect from 1990 to 1997 in which coho salmon population estimates have been made for Oregon coastal river systems from the Sixes River and north. Since 1998 a random site selection procedure based on the EPA's Environmental Monitoring and Assessment Program (EMAP) has been used. Spawner population estimates include an adjustment for observation error.

b/ Estimate based on 899 miles of spawner habitat within Nehalem, Tillamook, and Nestucca Rivers and other direct ocean tributaries from Necanicum River through Neskowin Creek.

c/ Estimate based on 1,163 miles of spawner habitat within Siletz, Yaquina, Alsea, and Siuslaw Rivers and other direct ocean tributaries from the Salmon through Siuslaw Rivers.

d/ Estimate based on 1,622 miles of spawner habitat within Umpqua, Coos, and Coquille Rivers. Also includes spawners using tributaries to Siltcoos, Tahkenitch, and Tenmile Lakes.

e/ Estimate based on a mark-recapture methodology and 410 miles of spawner habitat within the Rogue River.

f/ Unreliable estimate.

g/ Preliminary.

TABLE III-5. Oregon Coastal Natural and Lower Columbia Natural adult coho salmon cons. objective and fishery impacts.

	OCN Fishery Impact (Total Marine and Freshwater Exploitation Rate)			LCN Fishery Impact (Total Marine and Freshwater Exploitation Rate)		
Year	Conservation Objective[a/]	Preseason Projection	Postseason Estimate[b/]	Conservation Objective[c/]	Preseason Projection	Postseason Estimate[b/]
1990	-	-	-	-	-	-
1991	-	0.460	0.639	-	-	-
1992	-	0.420	0.626	-	-	-
1993	-	0.260	0.396	-	-	-
1994	≤0.20	0.111	0.064	-	-	-
1995	≤0.20	0.118	0.106	-	-	-
1996	≤0.20	0.125	0.062	-	-	-
1997	≤0.20	0.110	0.091	-	-	-
1998	≤0.13	0.119	0.076	-	-	-
1999	≤0.15	0.087	0.073	-	-	-
2000	≤0.15	0.082	0.042	-	-	-
2001	≤0.08	0.074	0.035	-	-	-
2002	≤0.15	0.123	0.049	-	-	-
2003	≤0.15	0.144	0.080	-	-	-
2004	≤0.15	0.147	0.077	-	-	-
2005	≤0.15	0.111	0.044	≤0.15	0.10[d/]	0.179
2006	≤0.15	0.096	0.076	≤0.15	0.10[d/]	0.146
2007	≤0.20	0.113	0.118	≤0.20	0.13[d/]	0.208
2008	≤0.08	0.069	0.019	≤0.08	0.08	0.073
2009	≤0.15	0.130	0.067	≤0.20	0.20	0.187
2010	≤0.15	0.112	0.045	≤0.15	0.15	0.107
2011	≤0.15	0.132	0.059	≤0.15	0.15	0.111
2012	≤0.15	0.150	0.183	≤0.15	0.15	0.140
2013	≤0.30	0.231	0.149	≤0.15	0.15	0.143
2014	≤0.30	0.253	0.141	≤0.225	0.225	0.164
2015	≤0.15	0.149	0.198	≤0.23	0.23	0.244
2016[e/]	≤0.20	0.131	0.087	≤0.18	0.13	0.094

a/ Prior to 1994, the conservation objective was expressed in terms of the total escapement of OCN spawners in index numbers rather than as an exploitation rate. The index escapement objectives from 1981 through 1993 are provided in Table III-2 of the Review of 1998 Ocean Salmon Fisheries and Table 1 of Amendment 11. From 1994 through 1997, Amendment 11 specified that at low stock sizes, only incidental harvest of OCN coho could occur and that impacts could not exceed 20%. Beginning in 1998, the OCN conservation objective has been as specified in Amendment 13 which is also the basis for the NMFS jeopardy standards under the Endangered Species Act listing.

b/ From the coho FRAM.

c/ In 2005, the NMFS conservation objective and was in terms of marine area fisheries. In 2006, the NMFS conservation objective was in terms of Council area and mainstem Columbia River fisheries; thereafter in terms of all marine area and mainstem Columbia.

d/ The preseason projection was in terms of a marine exploitation rate.

e/ Preliminary.

TABLE III-6. Performance of coho salmon stocks in relation to 2016 preseason conservation objectives (preliminary data). (Page 1 of 2)

System and Stock	2016 FMP Conservation/Management Objectives	Achievement
OPI Area Coho (Columbia River and coastal stocks south of Leadbetter Point)	Natural spawner escapement objectives as provided below; meet hatchery egg-take goals; meet treaty Indian obligations.	Hatchery egg-take goals achieved at nearly all facilities. No information available on catch allocation.
Northern California (Threatened) and CCC (Endangered)	No directed coho fisheries or retention of coho south of the OR/CA border. Marine exploitation rate ≤13.0% as indicated by R/K hatchery stocks.	No coho retention south of the California/Oregon border. Preliminary postseason estimate of 6.2%.
OCN	Combined marine and freshwater exploitation rate ≤20.0%.	Preliminary postseason estimate of 8.7%.
LCN-Columbia River Natural (Threatened)	Combined marine and mainstem Columbia River exploitation rate ≤18.0%.	Preliminary postseason estimate of 9.4% exploitation rate in marine and mainstem Columbia River fisheries.
Washington Coast Coho	Natural spawner escapement objectives as provided below and in state/tribal agreements; meet hatchery egg-take goals; meet treaty Indian obligations.	Hatchery egg-take goals achieved. No information available on catch allocation.
Willapa	17,200 natural adult spawners.	Escapement estimate was unavailable; preseason projection was 37,400 ocean escapement.
Grays Harbor	31,000 comanager adult spawner agreement.	Escapement estimate was unavailable; preseason projection was 34,500 ocean escapement.
Queets	2,900 comanager adult spawner agreement.	Escapement estimate was unavailable; preseason projection was 3,200 ocean escapement.
Hoh	1,800 comanager adult spawner agreement.	Preliminary postseason escapement estimate was 4,110.
Quillayute Fall	4,000 comanager adult spawner agreement.	Preliminary postseason escapement estimates was 9,025.

TABLE III-6. Performance of coho salmon stocks in relation to 2016 preseason conservation objectives (preliminary data).
Page (2 of 2)

System and Stock	2016 FMP Conservation/Management Objectives	Achievement
Puget Sound Coho	Stepped exploitation rate objectives; meet hatchery egg-take goals; meet treaty Indian obligations and inside non-Indian fishery needs for six management units.	Data not available for 2016 natural spawner escapements. Hatchery egg-take goals will be met.
Strait of Juan de Fuca	≤20% total exploitation rate.	Preseason expectation of an 0.8% Council area exploitation rate; postseason estimate unavailable.
Hood Canal	≤45% total exploitation rate.	Preseason expectation of a 0.2% Council area exploitation rate; postseason estimate unavailable.
Skagit	≤20% total exploitation rate.	Preseason expectation of a 0.6% Council area exploitation rate; postseason estimate unavailable.
Stillaguamish	≤20% total exploitation rate.	Preseason expectation of a 0.6% Council area exploitation rate; postseason estimate unavailable.
Snohomish	≤20% total exploitation rate.	Preseason expectation of a 0.8% Council area exploitation rate; postseason estimate unavailable.

TABLE III-7. Coho stock status relative to overfished and overfishing criteria. A stock is overfished if the 3-year geometric mean spawning escapement is less than the minimum stock size threshold (MSST); a stock experiences overfishing if the total annual exploitation rate exceeds the maximum fishing mortality threshold (MFMT).

	Spawning Escapement									Total Exploitation Rate						
Coho Stock	2011	2012	2013	2014	2015	2016	3-yr Geo Mean	MSST	S_{MSY}	2011	2012	2013	2014	2015	2016	MFMT
Willapa Bay	31,737	20,412	26,303	59,569	17,086	NA	29,915	8,600	17,200	0.46	0.50	0.23	0.50	NA	NA	0.74
Grays Harbor	64,403	66,836	56,785	104,836	21,278	NA	50,222	18,320	24,426	0.42	0.44	0.44	0.46	NA	NA	0.65
Queets	8,588	4,285	5,684	7,174	2,028	NA	4,357	4,350	5,800	0.36	0.30	0.39	0.44	NA	NA	0.65
Hoh	4,072	2,899	4,565	1,794	4,110	0 to 5,000	3,229	1,890	2,520	0.39	0.46	**0.70**	0.43	NA	NA	0.65
Quillayute Fall	8,070	5,846	7,063	7,410	3,079	9,025	5,905	4,725	6,300	0.42	0.53	0.55	0.50	NA	NA	0.59
Juan de Fuca	13,288	13,096	8,461	11,002	3,698	NA	7,008	7,000	11,000	0.09	0.12	0.13	0.17	NA	NA	0.60
Hood Canal	25,733	46,802	16,064	26,787	NA	NA	27,207	10,750	14,350	0.52	**0.70**	0.58	**0.66**	NA	NA	0.65
Skagit	49,162	109,763	88,246	27,170	6,483	NA	24,957	14,875	25,000	0.37	0.31	0.44	0.50	NA	NA	0.60
Stillaguamish	49,991	45,156	60,387	35,763	2,572	NA	17,710	6,100	10,000	0.21	0.29	0.33	0.40	NA	NA	0.50
Snohomish	111,374	130,637	125,870	46,244	12,804	NA	42,083	31,000	50,000	0.21	0.31	0.39	0.43	NA	NA	0.60

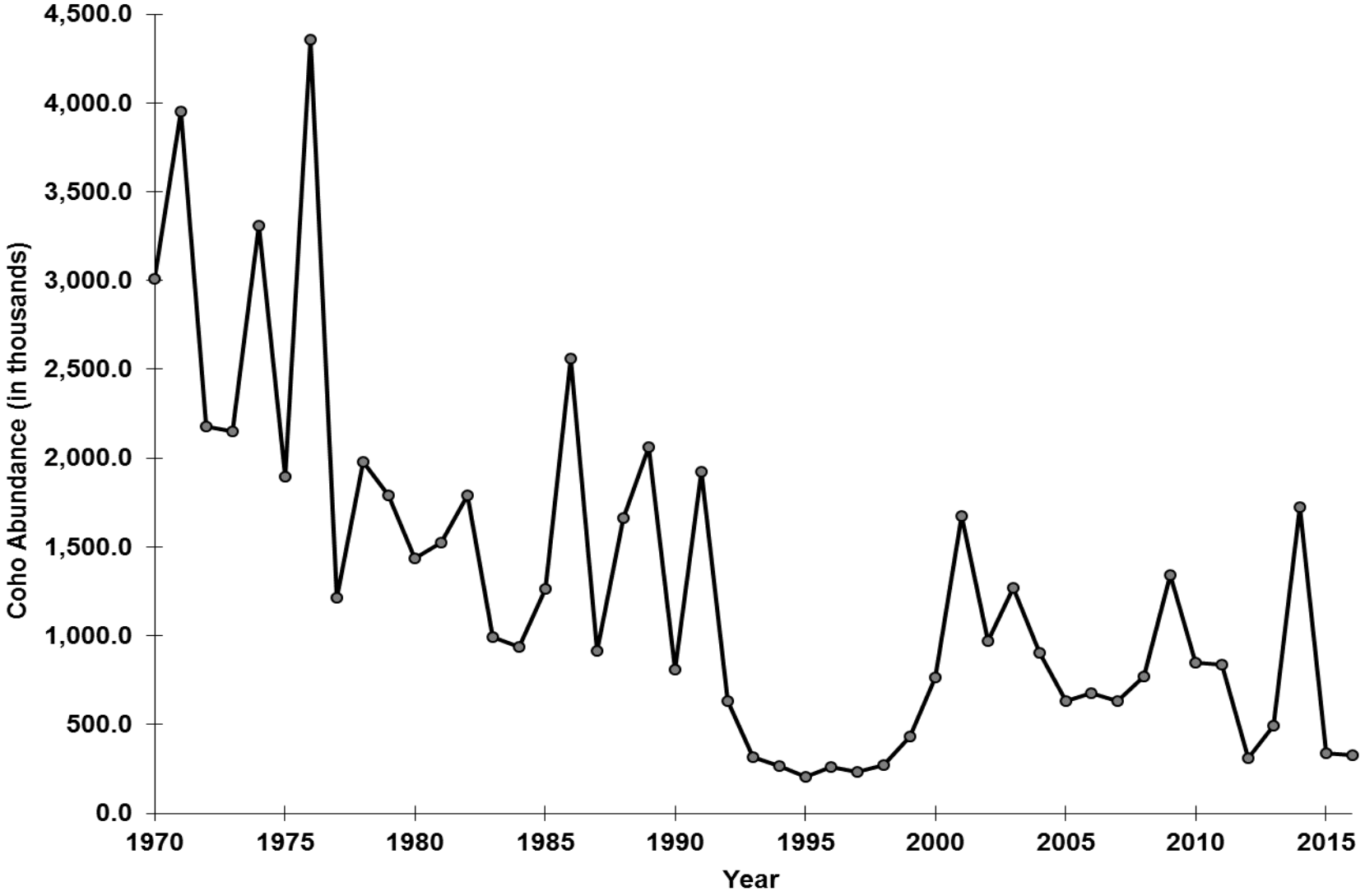

Figure III-1. Oregon Production Index (OPI) area coho abundance estimates by stratified random surveys (SRS) accounting methods, 1970-2016.

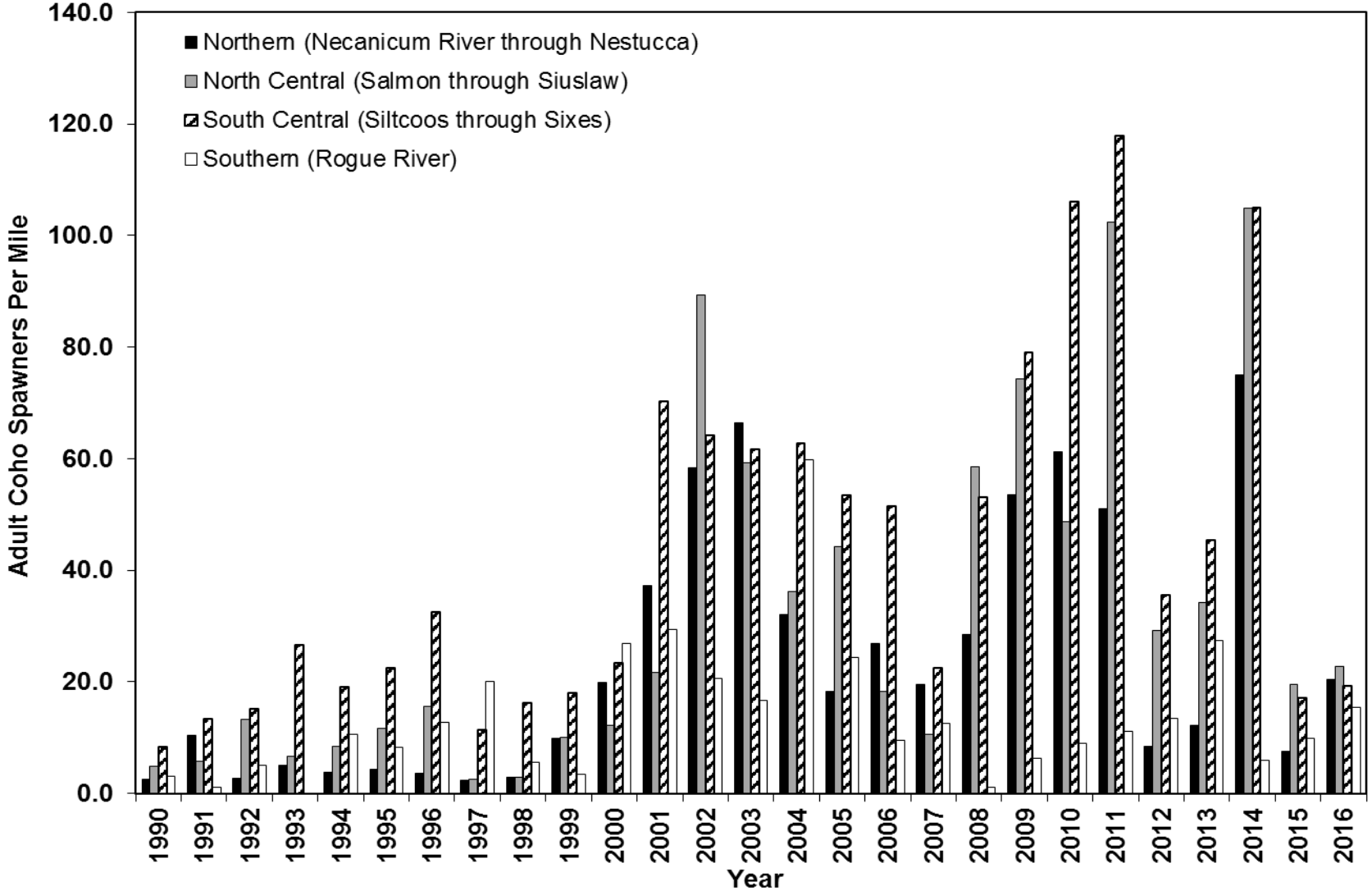

Figure III-2. Oregon coastal natural (OCN) adult coho spawners per habitat mile by coastal region based on SRS accounting methods, 1990-2016.

CHAPTER IV

SOCIOECONOMIC ASSESSMENT OF THE 2016 OCEAN SALMON FISHERIES

SUMMARY: Total 2016 exvessel value of the Council-managed non-Indian troll commercial salmon fishery was $11.2 million. This was 42 percent below last year's number of $19.4 million and 64 percent below the inflation-adjusted total of $30.7 million harvested in 2014. The exvessel value of the coastwide commercial fishery in 2016 was 52 percent below the 2011-2015 inflation-adjusted average of $23.4 million, and 81 percent below the 1979 through 1990 inflation-adjusted average of $59.4 million. The coastwide average exvessel price for Chinook in 2016 was $8.38 per pound, 30 percent above last year's inflation-adjusted average of $6.44 and the highest coastwide average price on record. For the first time since 1997 and 1998, there were no coho landed in the ocean commercial troll fishery in 2016.

The preliminary number of vessel-based ocean salmon recreational angler trips taken on the West Coast in 2016 was 156,200, a decrease of 35 percent from last year, 56 percent below the number taken in 2014, and 74 percent below the 1979 through 1990 average of 599,700 angler-trips.

Total West Coast income impacts associated with recreational and commercial ocean salmon fisheries for all three states combined in 2016 were estimated at $48.6 million, 38 percent below last year's inflation-adjusted total of $78.2 million, 58 percent below the inflation-adjusted total of $115.0 million in 2014, and the lowest level since 2010.[1]

ALLOCATION OF THE SALMON RESOURCE

Salmon management by the Council involves numerous allocation issues including:

- Determining the amount of salmon available for ocean harvest after considering expected abundances, harvests by inside fisheries, and spawning escapement goals.
- Allocating harvest among broad management areas and among port areas within the management areas.
- Allocating harvest between Indian and non-Indian harvesters.
- Allocating the non-Indian portion between commercial and recreational harvesters.

The amount of salmon available for harvest in Council management areas depends, in part, on harvest in Canada and Alaska. Allocation of harvest between the West Coast, Canada, and Alaska is determined within the constraints of the PST.

In general, the recreational fishery has tended to have a somewhat more stable harvest level than the commercial fishery (in both absolute and relative terms) (Figures IV-1 and IV-2). The majority of the annual variation in available ocean harvest is usually taken up in the commercial fishery. However, both commercial and recreational fisheries have suffered substantial declines relative to harvest levels of the 1980s, the effects of which are amplified within specific geographic areas.

Decisions on allowable harvests for a particular stock often have implicit allocation effects on the geographic distribution of salmon harvest. Seasons may be more restrictive along a particular area of the

[1]A recent changeover in methodology from FEAM-based to IO-PAC-based income impact multipliers means that comparisons of recent year's income impacts with historical values for years prior to 2010 are not meaningful. Consequently any comparisons of income impacts in this document are confined to describing trends appearing over 2010-current year, during which period the IO-PAC-based models and multipliers were applied. See Appendix E of the *Review of 2014 Ocean Salmon Fisheries* for a more detailed explanation of the change in income impact modeling methodology.

coast to protect a depressed stock that is encountered at a relatively higher rate in that area. The geographic distribution of harvest opportunity along the coast involves balancing the often conflicting objectives of maximizing ocean harvest and distributing the responsibility for resource conservation. A brief outline of the regulatory objectives that shaped the 2016 season is provided in Chapter I, and an assessment of success in meeting the objectives is provided in Chapters II and III.

COMMERCIAL SALMON FISHERIES

West Coast Non-Indian Commercial Ocean Fishery

In-season Price Trends

The coastwide average exvessel price for troll caught Chinook in 2016 was $8.38. There were no coho landed in the 2016 ocean commercial troll fishery. Monthly average exvessel price data provide information on price trends over the season (Table IV-1). California Chinook prices were at their highest in May and June, averaging $9.43 and $9.49 per pound, respectively. Oregon weighted average Chinook prices were highest in April and May at $10.77 and $9.45 per pound, respectively. In Washington, weighted average Chinook prices were highest in May at $9.14 per pound. Average Chinook exvessel prices in California were at their lowest in September, while average Chinook exvessel prices in Oregon and Washington were at their lowest in July. Over the entire season, exvessel Chinook prices in California, Oregon and Washington averaged $8.63, $8.23 and $8.00 per pound, respectively.

Annual Trends (Seasons, Value, Prices, and Pounds)

Average Chinook and coho troll exvessel price and value by state and species, compiled from fish receiving tickets and expressed both in nominal terms and inflation-adjusted 2016 dollars, are presented in Tables IV-2, IV-3, and IV-4. Data on pink salmon are shown in Table IV-5. The gross domestic product implicit price deflator, developed by the Bureau of Economic Analysis, was used to adjust nominal dollar values for inflation (Appendix D, Table D-22). Landing weights by state and port for Chinook and coho are presented in Tables IV-6, IV-7 and IV-8. These tables and the following discussion focus on the non-Indian commercial fishery in Council management areas and associated state territorial ocean-area waters.

Total 2016 coastwide exvessel value of the Council-managed non-Indian, commercial, troll salmon fishery was $11.2 million, 42 percent below last year's number of $19.4 million, 64 percent below the inflation-adjusted level in 2014 of $30.7 million, and 52 percent below the 2011-2015 inflation-adjusted average of $23.4 million (Figure IV-4). Coastwide exvessel value in 2016 was more than eight times its all-time low level of $1.4 million recorded in 2008 but the lowest level since 2011 (including pinks, adjusted for inflation). 100 percent of total coastwide exvessel value in 2016 was from Chinook landings. There were no coho landed in the ocean commercial troll fishery for the first time since 1997 and 1998.

In 2016 California achieved $5.3 million in commercial troll exvessel landings value of Chinook, including Chinook taken as personal use with the average price per pound applied, which was 37 percent below the prior year's level of $8.5 million, and 59 percent below the level of two years ago ($12.8 million) (all values adjusted for inflation). The 2016 total landings revenues in California were 83 percent below the 1979-1990 inflation-adjusted average of $31.3 million (which include coho landings during that period) and the lowest recorded since $1.4 million in 2010.

The 2016 exvessel value of the Oregon commercial troll harvest of $4.3 million, 43 percent below year's level of $7.4 million, 72 percent below the recent high level recorded in 2014 ($15.1 million), and 43 percent below the 2011-2015 average of $7.5 million (all values adjusted for inflation). Oregon's 2016 commercial troll harvest value was 77 percent below the 1979-1990 average of $18.8 million and the lowest recorded since $2.6 million in 2011.

The 2016 exvessel value of Washington's non-Indian troll harvest of $1.6 million was 54 percent below last year's inflation-adjusted value of $3.5 million, and 41 percent below the 2011-2015 five-year average value of $2.7 million. The 2016 value was 81 percent below the 1979-1990 inflation-adjusted average of $8.5 million and the lowest recorded since $1.3 million in 2009.

The 2016 average West Coast ocean harvest Chinook price of $8.38 per pound was 30 percent above last year's inflation-adjusted value of $6.44 per pound, and the highest value in inflation-adjusted terms on record since at least 1979. Adjusted for inflation, the coastwide average Chinook price over the last eleven years (2006-2016) was $6.44 per pound, a period which includes the second-highest inflation-adjusted average price of $7.82 recorded in 2008. Part of the reason exvessel prices have been relatively high in recent years may be due to relatively restricted fishing opportunities and low harvests (see Chapter I and Appendix C for details).

In terms of numbers of fish, the 2016 coastwide, non-Indian commercial troll harvest of 114,700 Chinook was 58 percent below last year's level of 270,100 (Figure IV-1), the lowest number since 99,620 were harvested in 2010, and 82 percent below the 1976-2015 long-term average of 627,900 fish. The 2016 coastwide average weight per Chinook (11.6 pounds) was five percent above last year's average (11.1 pounds), nine percent below the average in 2014 (12.8 pounds), and four percent below the previous five-year (2011-2015) average of 12.2 pounds per fish (Appendix D Tables D-1, D-2, and D-3).

The coastwide non-Indian commercial fishery landed no coho in 2016 for the first time since 1997 and 1998.

West Coast port areas with the highest commercial Chinook landings shares (by weight) in 2016 were Newport (25 percent), San Francisco (23 percent), Fort Bragg (12 percent), Monterey (10 percent) and Westport and Coos Bay (9 percent each). In 2015 the leading ports were Fort Bragg (21 percent), Newport and Coos Bay (14 percent), Westport (13 percent), and San Francisco (12 percent). In 2014 the leading ports were Fort Bragg (20 percent), Coos Bay (19 percent), and San Francisco and Newport (18 percent each). In 2016, the ports north of Cape Falcon accounted for about 17 percent of aggregate coastwide Chinook harvest by weight. By comparison, ports north of Cape Falcon accounted for 25 percent of Chinook landings in 2015, 12 percent in 2014, 9 percent in 2013, and 14 percent in 2012. Between 2000 and 2007, ports north of Cape Falcon accounted for an average of about 9 percent of coastwide Chinook landings by weight.

Compared with last year, commercial Chinook harvest by weight in 2016 was down by 48 percent in California, 56 percent in Oregon, and 68 percent in Washington. In 2016 there was essentially no ocean commercial troll coho harvest for the first time since 1997 and 1998. Commercial harvest of coho in California has been prohibited since 1992.

Ocean Commercial Salmon Harvesters

Based on Pacific Coast Fisheries Information Network (PacFIN) data, a total of 773 vessels participated in the West Coast commercial salmon fishery in 2016. This is 27 percent fewer than participated in 2015 (1,063), 31 percent fewer than the number participating in 2014 (1,126), and 29 percent fewer vessels than participated in 2013 (1,085). Note that these coastwide vessel counts are less than totals derived by summing values in the three state-level tables (Tables D-4, D-5, and D-6) due to an uncertain degree of completeness at the time data were extracted for this report and because certain vessels may be counted more than once if they landed in more than one state.

In 2016, 437 commercial vessels made salmon landings in California, the fewest since 215 vessels in 2010. No vessels landed salmon in California in 2008 or 2009 (Table D-4). In Oregon, the active fleet decreased to 316 vessels in 2016 from 487 vessels the prior year. This was the fewest recorded since 304 vessels participated in 2011. The number of active vessels in Oregon in 2014 (493) was highest since 565 vessels participated in 2005 (Table D-5). The number of active vessels in Washington decreased by 15 from 122 vessels last year to 107 vessels in 2016 (Table D-6). This was the fewest number of vessels landing salmon in Washington since 105 vessels in 2012. Coastwide the number of state limited entry salmon permits issued in 2016 decreased by 60 from the previous year to 2,195. Landings were made on only 39 percent of all permits in 2016, the lowest ratio since 37 percent in 2011. Note: Years 2008 (9 percent) and 2009 (13 percent) are the two lowest vessel participation years on record (1982-2016). From 1982 to 1993 an average of 5,193 of 7,942 total permits (65 percent) harvested on an annual basis. Harvest opportunity began declining substantially after that time, and some permits were subsequently purchased in a buyback program.

In 2016, coastwide average inflation-adjusted exvessel value of salmon landings per vessel decreased 20 percent compared to 2015, to approximately $13,000 per vessel. Compared to 2015, average 2016 exvessel revenue per vessel was down 16 percent in California, 12 percent in Oregon, and 48 percent in Washington. Note that some caution needs to be exercised in interpreting average exvessel revenue per vessel. The averages may be influenced as much by disproportionate changes in the number of particularly small or large harvesters participating from one year to the next as by any real change in the average revenues of vessels that have consistently participated in the fishery.

Additional historical information on landings by vessel size, percentages of the fleet responsible for the majority of harvest, and harvest by residence of participants in each state's fisheries is included in Appendix D.

West Coast Treaty Indian Commercial Ocean Fishery

Treaty Indian commercial fisheries off Washington operate under regulations established by the Council. While some of the treaty Indian harvest is for ceremonial and subsistence purposes, the vast majority of the catch is sold commercially. Commercial treaty Indian fisheries provide food to consumers and generate income in local and state economies through expenditures related to harvesting, processing, and marketing of the catch. In 2016 the treaty Indian ocean troll fishery harvested 23,200 Chinook (276,400 pounds) and 12 coho (< 100 pounds), compared with 61,800 Chinook (747,500 pounds) and 4,000 coho (19,800 pounds) in 2015, and 65,100 Chinook (655,200 pounds) and 56,000 coho (313,900 pounds) in 2014. The preliminary exvessel value of Chinook and coho landed in the treaty Indian ocean troll fishery was $0.9 million in 2016, compared with inflation-adjusted values of $2.4 million in 2015 and $3.6 million in 2014 (numbers of fish are from Table A-15; weights and revenue values are based on January 24, 2017 PacFIN data).

Columbia River Commercial Fishery

Harvest in the ocean salmon fisheries impacts the in-river fisheries by affecting the number of fish available for harvest in inside treaty Indian and non-Indian fisheries. Table IV-9 shows the exvessel value of treaty Indian and non-Indian commercial harvest of Chinook, coho and chum salmon in the Columbia River. All prices and values in the table and the following discussion are reported in inflation-adjusted dollars. Exvessel prices for in-river commercial salmon catch vary considerably with species (Chinook, coho or chum), race (e.g., spring versus fall Chinook), and stock (e.g., tules versus brights). Spring Chinook generally bring the highest prices, and tule fall Chinook and chum the lowest prices

Total exvessel value of combined treaty Indian and non-Indian commercial salmon harvested in the Columbia River in 2016 was $12.7 million. This was 18 percent below the 2015 level of $15.5 million,

and 17 percent below the 2014 level of $15.3 million (adjusted for inflation). Of these amounts, the total inflation-adjusted exvessel value of non-Indian commercial salmon harvested in the Columbia River was $5.4 million in 2016, $5.2 million in 2015 and $6.4 million in 2014 (Table IV-9).

Total 2016 exvessel value of treaty Indian salmon harvested in the Columbia River and sold on fish tickets was $7.3 million. This is 29 percent below the inflation-adjusted level of $10.3 million in 2015, and 18 percent below the inflation-adjusted level of $8.9 million in 2014. Note that these values include only sales made to licensed fish buyers. Treaty Indian fishers' direct sales to the public are accounted for in harvest monitoring reports (Table B-20), but estimates of the pounds and value of such sales are not included in Table IV-9.

Puget Sound and Washington Coastal Inside Fisheries

Information on 2016 Puget Sound and Washington coastal inside fisheries below is preliminary. In previous years, substantial revisions to these numbers have occurred after publication of this review. Based on PacFIN data (as of January 24, 2017), the exvessel value of all salmon species taken in the commercial non-Indian fisheries in Puget Sound and Washington coastal inside fisheries (excluding the Columbia River) in 2016 was $4.4 million. This was 11 percent greater than last year's inflation-adjusted value of $3.9 million, but 46 percent below the $8.0 million harvest value in 2014. Of the total Puget Sound and Washington coastal inside fisheries non-Indian commercial landings in 2016, $0.9 million were Chinook and coho, compared with $0.3 million in 2015 (the lowest value going back to 1981) and $1.4 million in 2014. The 1981 through 2015 inflation-adjusted average annual exvessel value from Puget Sound and Washington coastal inside non-Indian commercial fisheries salmon landings was $16.1 million, of which approximately $3.9 million on average were landings of Chinook and coho. It is interesting to note that all years with recorded values higher than those averages were prior to 1994.

The preliminary 2016 exvessel value reported to PacFIN (as of January 24, 2017) for all salmon species taken in Puget Sound and Washington coastal inside commercial treaty Indian fisheries (excluding the Columbia River) was $2.4 million, of which $1.7 million were Chinook and coho. These are lowest values recorded for these fisheries going back to 1981. The (revised) inflation-adjusted value for the 2015 commercial treaty Indian harvest in Puget Sound and Washington coastal inside fisheries was $7.6 million for all salmon species, of which $3.2 million were Chinook and coho. The inflation-adjusted exvessel value of the 2014 commercial treaty Indian harvest in Puget Sound and Washington coastal inside fisheries was $15.6 million for all salmon species, of which $5.6 million were Chinook and coho. From 1981 through 2015 the inflation-adjusted average annual exvessel value of commercial treaty Indian fisheries in Puget Sound and Washington coastal inside areas was $21.0 million, of which on average $8.0 million were Chinook and coho.

Klamath River Fisheries

Commercial sales in the Yurok and Hoopa Valley Reservation Indian fall gillnet fisheries in the Klamath River occurred in 1987-1989, 1996, 1999-2004, and 2007-2015. Average commercial catch of fall Chinook over those years was approximately 22,200 fish, most of which were taken in the estuary. Commercial sales in the Indian spring Chinook gillnet fisheries occurred in 1989, 1996, 2000-2004, and 2007-2013 resulted in an average of about 1,100 fish sold per year. The 1989 total harvest of 27,700 fall Chinook reportedly had an average weight of 15.4 pounds per fish and sold for $852,000 ($1.3 million adjusted to 2015 dollars). In 1996, 3,129 spring Chinook and 40,147 fall Chinook were harvested, with an average weight per fish landed of 13.5 pounds and value at first sale of an estimated $525,000 ($694,000 adjusted to 2015 dollars). Records are not available for the weight and value of harvests for years after 1996 as each Indian fisher now markets their fish independently. The fishery has occurred in most recent years with the exception of 2005. 2006 and 2016. In 2015 approximately 17,100 commercial fall Chinook were harvested, 44 percent more than in 2014 but 67 percent below the 52,100 fish harvested in 2013. The 82,900 fall

Chinook harvested in 2012 of was more than double the previously highest total of 40,147 taken in 1996. No spring Chinook commercial harvest occurred in 2014 or 2015. By comparison 971 spring Chinook were harvested in 2013, 856 in 2012, and 33 in 2011 (Appendix B, Table B-5).

CEREMONIAL AND SUBSISTENCE SALMON FISHERIES

In addition to the commercial Indian fisheries discussed above, fish are taken in Indian fisheries each year for ceremonial and subsistence purposes. Estimates of the amount of salmon used for ceremonial and subsistence purposes are documented in Appendix B. Discussion of the importance of ceremonial and subsistence fish to Indian communities is presented in Appendix B to Amendment 14 of the salmon FMP.

RECREATIONAL SALMON FISHERIES

Ocean

The preliminary number of vessel-based ocean salmon recreational angler trips taken on the West Coast in 2016 was 156,200, a decrease of 35 percent over 2015, 56 percent below the 2014 level, and 74 percent below the 1979-1990 annual average of 599,700. Compared with last year, preliminary estimates of the number of trips taken in 2016 decreased by 15 percent in California, by 41 percent in Oregon, and by 48 percent in Washington. (Note that Washington effort estimates shown in Tables IV-10 and IV-13 may differ from those in Tables I-4 and (Appendix A) Table A-17 because the former exclude bank fishers on the Columbia River north jetty.)

Recreational ocean area salmon fishing takes place primarily in two modes: (1) anglers fishing from privately owned pleasure craft, and (2) anglers employing the services of charter vessels. In general, success rates on charter vessels tend to be higher than success rates on private vessels. Small amounts of shore-based effort directed toward ocean area salmon also occur from jetties and piers. The coastwide proportion of angler trips taken on charter vessels in 2016 (30 percent) was 5 percent below last year (32 percent), but 9 percent higher than in 2014 (27 percent). Underlying this coastwide trend were a decrease of 4 percent compared with last year in the proportion of charter trips in California, a decrease of 47 percent in the proportion of charter trips in Oregon, and a decrease of 14 percent in the proportion of charter trips in Washington. Figure IV-5 and Tables IV-10, IV-11, IV-12, and IV-13 display recreational effort and catch statistics by port area and mode for each state.

California

The number of ocean recreational salmon trips in California in 2016 (69,700) continued a downward trend over the prior four years. The 2016 total was 15 percent below 2015 (81,800), 42 percent lower than in 2014 (120,300), and 53 percent lower than in 2013 (147,300) and 2012 (148,000). The number of salmon trips in 2016 was 12 percent lower than the prior year in Crescent City, 1 percent higher in Eureka, 19 percent lower in Fort Bragg, 5 percent lower in San Francisco, and 49 percent lower in Monterey. A total of 37,700 Chinook were caught in California on the total of 69,700 trips, for an average success rate of 0.54 fish per trip. The charter industry's share of California recreational salmon trips in 2016 was 44 percent, 4 percent below last year's share, and the second highest proportion recorded since 45 percent in 2004 (Table IV-10, Table IV-11 and Figure IV-5).

Oregon

The 38,900 ocean recreational salmon trips in Oregon in 2016 were down by 41 percent compared with 66,000 angler trips in 2015, and by 68 percent compared with 121,500 angler trips in 2014 (Tables IV-10 and IV-12). Total trips in 2016 were 50 percent below the most recent five-year average (2011-2015) of 78,000. Compared with last year, effort was lower in all port areas: Astoria was down by 50 percent, Tillamook by 29 percent, Newport by 55 percent, Coos Bay by 24 percent, and Brookings by 53 percent. The charter industry's share of Oregon recreational salmon trips in 2016 was approximately 6 percent, 47

percent lower than in 2015, 42 percent below the recent five-year (2011-2015) average share of 11 percent and the lowest charter trip share since 2008 (Table IV-10, Table IV-12 and Figure IV-5).

From 1984 to 1993, on average coho accounted for 87 percent of the annual Oregon recreational ocean salmon catch. From 1994 through 1998 the lack of opportunity to retain coho south of Cape Falcon generally resulted in much lower angler success rates. With the opportunity to retain coho in mark-selective fisheries south of Cape Falcon beginning in 1999, salmon retention rates increased. From 2002 through 2015, retention rates ranged between 0.44 and 1.08 salmon per angler-day. The 2016 Oregon salmon retention rate of 0.32 fell well below this range, and was 44 percent below last year's value of 0.57. In 2016, coho contributed 67 percent of the total Oregon recreational ocean salmon catch, below the prior two year's shares of 75 percent and 84 percent recorded in 2015 and 2014, respectively.

Washington

In 2016, 47,700 ocean angler trips were taken on vessels on the Washington coast, a decrease of 48 percent from the 91,900 trips taken in 2015, and 44 percent below the recent five-year (2011-2015) average of 85,600. About 29 percent of Washington angler trips in 2016 were taken on charter vessels, down 14 percent from 2015, and 10 percent below the recent five-year average charter trip share of 32 percent (Table IV-10, Table IV-13 and Figure IV-5).

The angler success rate in Washington (in terms of retained fish per angler-trip) was 0.69 in 2016, down 40 percent from last year, and 36 percent below the recent five-year (2011-2015) average success rate of 1.07. Note that these figures do not include angler effort that occurs from the ocean side of the Columbia River jetty, or in the state managed Area 4B add-on fishery (when open).

In order to increase angler participation in non-salmon recreational fishing (e.g., bottomfish) and to extend the length of the salmon season, partial-week closures were instituted in the recreational fishery north of Cape Falcon beginning in 1985. The extent to which partial week closures have been used has varied, starting 1996. Beginning in 1996, Sunday through Thursday salmon openings were generally used in the two southern areas (Westport and Columbia River), and seven-day per week seasons were common in the two northern areas (Neah Bay and La Push). Then starting in 1999, seven-day per week openings began to be used in the later part of the summer in the Columbia River area and, initially to a lesser extent, Westport. In the same year, partial week openings were instituted for much of the season in both northern areas. Seven-day per week openings were increasingly used in the Westport and Columbia River areas; and beginning in 2011, seven-day openings became common for all areas. The most recent season with partial week openings was summer 2013 in the Westport area. In 2016 there were 58,000 bottomfish trips north of Cape Falcon, 25 percent more than in 2015, and continuing an overall upward trend exhibited since the 2009 low point of 37,200 (Table IV-14). Compared with 2015, bottomfish effort increased in all three areas: Columbia River–Buoy 10, Westport, La Push and Neah Bay–Area 4B regions.

Buoy 10 and Area 4B Add-On Fisheries

Salmon anglers fishing from private and charter boats from Oregon and Washington ports made a total of 88,700 trips in the Buoy 10 fishery in 2016. This effort level is approximately 13 percent below the 101,700 trips made in 2015, and 14 percent below the 103,500 trips recorded in 2014, but approximately 17 percent above the recent five-year (2011-2015) average of 76,100 trips. The success/retention rate for anglers fishing from boats in the Buoy 10 fishery was 0.29 in 2016, 58 percent lower than the 0.68 salmon per angler day success rate in 2015 and the lowest average success rate recorded in the Buoy 10 fishery since 2010 (Table IV-15).

There was no Area 4B add-on fishery in 2016. In 2000, approximately 3,400 trips were made in the late-season Area 4B add-on fishery. Since then there have been no late season Area 4B add-on fisheries, with the exception of 2008, when there were an estimated 782 private trips and no charter trips (Table IV-15).

There were numerous other inside recreational salmon fishing opportunities in Puget Sound and coastal streams and estuaries that are not enumerated in this chapter of the Review. See Appendix B for estimates of harvest in some of those other fisheries.

SALMON FISHERY INCOME IMPACTS AND COMMUNITY DEPENDENCE

Coastal community income impacts provide information on the effects of fluctuations in salmon harvest on local economies and small businesses. Income impacts are based on commercial landings and recreational fishing days (angler-trips), and were estimated using the IO-PAC fisheries economic impact model. Prior to the 2014 salmon review document income impacts were estimated using the Fisheries Economic Assessment Model (FEAM). The change in methodology means that recent year income impacts estimated using IO-PAC are not comparable with historical values for years prior to 2010 that were estimated using FEAM. Consequently any comparisons of income impacts in this document are confined to describing trends appearing over 2010-2016, during which period the IO-PAC-based models and multipliers were applied. Appendix E to the *Review of 2014 Ocean Salmon Fisheries* contains a more detailed explanation of the change in income modeling methodology, including comparisons of IO-PAC with FEAM-based estimates for recent years.

Estimated state and local community income impacts of commercial and recreational ocean salmon fisheries and selected state-managed fisheries are shown in Tables IV-16 through IV-20. Income impacts are most relevant to those dependent on an income stream from the fishery, including individuals, businesses, and state and local governments. These impacts represent estimates of total personal income associated with harvesting and processing activities in the commercial salmon fisheries and trip-related expenditures made by recreational salmon anglers, expressed at the local community (county) and state levels.[2] The impacts included here are personal income earned by those directly participating in the fishery (e.g. vessel owners, crew members, processing workers, and recreational charter operators), income indirectly associated with the fishery that is earned by those providing inputs to harvesting, processing and recreational operations (e.g. fuel, gear, packaging, bait, and ice suppliers), and income earned by those who benefit when direct and indirect income is re-spent in the community (e.g. grocery store owners, car mechanics, and health professionals). This last category is sometimes called induced income

When commercial or recreational production from the fishery is reduced or absent, the net impact on local communities will depend on the economic base of the community and how people respond to the reduced fishery. For example, if a recreational fisher unable to make a coastal salmon trip instead travels inland to fish at a mountain lake, then the impact associated with the lost salmon trip would be a net loss to the members of the coastal community. On the other hand, if the recreational fisher instead took part in another form of recreational activity in the same coastal community, then there may be little or no net loss to the community as a whole, however at least some of those involved in the salmon fishery would experience an income reduction as if the recreational fisher's money had been spent elsewhere (or not at all). Similarly,

[2] Because *income impact* refers to income "associated with" a given level of economic activity, the term *impact* in this context should not be confused with the term *impact* as frequently employed in policy analyses such as those required by the National Environmental Policy Act. Such policy analyses refer to impact as the effect (the difference) which results from taking an action (as compared to not taking the action). Income impacts are one of a number of different but related measures of total economic activity (e.g. income impacts, gross receipts, total jobs, etc.).

for those involved in the commercial fishery, whether or not a reduction in income impacts associated with reduced salmon harvest represents a net loss to the community depends on to what degree there are opportunities to take up some other economic activity to compensate for the loss of commercial salmon harvesting and processing.

Income impacts are presented at the local and state levels (and could also be provided at the national level). In moving from focus on a local-level economy to a larger state or national economy, an indicated change in income impacts increasingly represents a disruption due to redistribution of activity within the economy, and probably decreasingly represents a net loss to the economy under consideration.

Income impacts are estimated based on several data components, including: reported commercial landings and exvessel prices by port or area, an inventory of local harvesters and processors, estimates of expenditures by harvester and processors, data on the expenditure patterns of recreational anglers, and local and state-level total income impact coefficients generated by IMPLAN® models constructed for each port or area. Commercial ocean harvests that are landed outside of coastal areas (e.g., ocean troll caught salmon landed in Puget Sound ports) are not included in these estimates of coastal community impacts, but are included in the overall state-level impacts.

The income impacts presented below are estimates of annual trends and are intended to indicate the possible redirection of economic activity between non-fishing and fishing-dependent sectors. As such they represent likely upper bounds on the local community and state-level income impacts generated by West Coast salmon fisheries. All income impact estimates reported in this Review are in terms of inflation-adjusted 2016 dollars.

West Coast Ocean Fishery Commercial and Recreational Income Impacts

Total state level income impacts associated with recreational and non-Indian commercial ocean salmon fisheries for all three states combined in 2016 were $48.6 million, 38 percent below last year's inflation-adjusted level of $78.2 million, and the second lowest estimated over the 2010-2016 period (Tables IV-16, IV-17 and IV-18). West Coast income impacts associated with the 2016 non-Indian commercial ocean fishery were $17.7 million, 42 percent below the estimate for last year ($30.5 million), and 64 percent below 2014's inflation-adjusted level of $49.1 million.[3] Income impacts generated by the three states' combined 2016 ocean recreational fisheries were estimated at $30.8 million, 35 percent below last year's level of $47.7 million, and 53 percent below 2014's inflation-adjusted level of $65.9 million. Note that these coastwide values may mask effects in individual communities. Tables IV-16, IV-17 and IV-18 provide greater detail on the income impacts estimated for individual port areas in the three West Coast states.

Selected Inside Fisheries

Columbia River Commercial Fisheries

Historically the non-Indian and treaty Indian Columbia River commercial fisheries have generated a substantial amount of income for Oregon and Washington communities on the Columbia River. In 2016, income impacts associated with the Columbia River commercial catch (combined non-Indian and treaty Indian) were estimated at $18.4 million, 18 percent below the annual estimates for 2015 and 2014 of $22.5 million and $22.4 million, respectively; and 0.4 percent above the recent 5 year average for the 2011-2015 period (Table IV-19).

[3] Income impact estimates for the commercial fishery do not include postseason settlement payments fishers may have received from buyers. In certain years postseason settlements have been particularly significant in the California fishery.

Buoy 10 and Area 4B Add-On

Estimated local community income impacts associated with the 2016 Buoy 10 recreational salmon fishery were $6.8 million, 12 percent below the annual estimates for the 2015 and 2014 fisheries of $7.7 million, but 19 percent above the recent 5 year average of $5.7 million for the 2011-2015 period. There was no late-season Area 4B add-on fishery in 2016. The most recent Area 4B add-on fishery, which occurred in 2008, was the first since 2000. Inflation-adjusted local community income impacts associated with the 2008 area 4B add-on fishery were estimated to be $33,100 (Table IV-20).

TABLE IV-1. Average monthly exvessel troll salmon price in dollars per dressed pound for California, Oregon, and Washington in 2016.

Species/Grade	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Season
CALIFORNIA											
Chinook[a/]	-	-	9.43	9.49	-	8.08	7.70	9.21	-	-	8.63
Coho	-	-	-	-	-	-	-	-	-	-	-
OREGON											
Chinook											
Large (>11 Pounds)	-	10.88	9.48	8.99	6.66	7.52	7.36	8.28	7.98	-	8.16
Medium (7-11 Pounds)	-	10.88	9.07	8.43	6.31	7.05	6.83	8.06	8.00	-	8.20
Small (<7 Pounds)	-	10.75	8.68	8.13	7.03	6.25	6.58	8.50	-	-	8.54
Ungraded Chinook	-	10.66	9.66	9.52	6.65	7.48	7.65	8.29	10.00	-	8.30
Weighted Average	-	10.77	9.45	9.09	6.61	7.44	7.49	8.27	8.74	-	8.23
Mixed Coho	-	-	-	-	-	-	-	-	-	-	-
WASHINGTON[b/]											
Chinook											
Large (>11 Pounds)	-	-	9.34	8.63	6.08	7.26	-	-	-	-	8.00
Medium (8-11 Pounds)	-	-	8.95	8.19	5.55	7.12	-	-	-	-	7.87
Small (<8 Pounds)	-	-	7.15	7.29	5.47	5.48	-	-	-	-	6.84
Ungraded Chinook	-	-	-	-	-	-	-	-	-	-	-
Weighted Average	-	-	9.14	8.53	6.03	7.21	-	-	-	-	8.00
Mixed Coho	-	-	-	-	-	-	-	-	-	-	-

a/ Chinook salmon typically sold in two size categories. Prices paid in these categories are not extracted from dealer ticket information.

b/ Non-Indian data only.

TABLE IV-2. Troll Chinook and coho landed in California, estimates of exvessel value, and average price (dollars per dressed pound) in nominal and real (inflation adjusted, 2016) dollars.[a/]

	Chinook				Coho				Total[b/]	
Year or Avg	Nominal Value ($*1,000)	Real Value ($*1,000)	Nominal Price Per Pound ($)	Real Price Per Pound ($)	Nominal Value ($*1,000)	Real Value ($*1,000)	Nominal Price Per Pound ($)	Real Price Per Pound ($)	Nominal Value ($*1,000)	Real Value ($*1,000)
1979	17,356	44,203	2.53	6.44	2,303	5,865	2.19	5.58	19,659	50,069
1980	12,741	29,738	2.27	5.30	408	952	1.36	3.17	13,149	30,690
1981-1985	10,945	21,618	2.42	4.72	554	1,106	1.94	4.14	11,499	22,725
1986-1990	21,151	35,363	2.56	4.24	490	806	1.36	2.74	21,641	36,169
1991-1995	7,335	10,416	2.28	3.27	143	213	1.25	2.42	7,478	10,629
1996	5,984	8,027	1.44	1.93	-	-	-	-	5,984	8,027
1997	7,288	9,606	1.38	1.82	-	-	-	-	7,288	9,606
1998	3,060	3,988	1.66	2.16	-	-	-	-	3,060	3,988
1999	7,429	9,543	1.93	2.48	-	-	-	-	7,429	9,543
2000	10,304	12,955	2.01	2.53	-	-	-	-	10,304	12,955
2001	4,773	6,352	1.98	2.63	-	-	-	-	4,773	6,352
2002	7,776	10,191	1.55	2.04	-	-	-	-	7,776	10,191
2003	12,181	15,652	1.91	2.45	-	-	-	-	12,181	15,652
2004	17,895	22,379	2.87	3.59	-	-	-	-	17,895	22,379
2005	12,913	15,646	2.97	3.60	-	-	-	-	12,913	15,646
2006	5,350	6,289	5.13	6.03	-	-	-	-	5,350	6,289
2007	7,902	9,048	5.18	5.93	-	-	-	-	7,902	9,048
2008	-	-	-	-	-	-	-	-	-	-
2009	-	-	-	-	-	-	-	-	-	-
2010	1,246	1,372	5.47	6.02	-	-	-	-	1,246	1,372
2011	5,133	5,537	5.18	5.59	-	-	-	-	5,133	5,537
2012	13,521	14,323	5.34	5.66	-	-	-	-	13,521	14,323
2013	23,632	24,636	6.23	6.49	-	-	-	-	23,632	24,636
2014	12,521	12,824	5.56	5.69	-	-	-	-	12,521	12,824
2015	8,347	8,457	7.03	7.12	-	-	-	-	8,347	8,457
2016[c/]	5,298	5,298	8.63	8.63	-	-	-	-	5,298	5,298

a/ These exvessel values do not include the postseason settlement payments some fishers may have received from buyers, and therefore may underestimate the true payments received by fishers for their landings. Beginning circa 1999, these postseason settlements are believed to have grown for the California fishery. For 2002, the exvessel value reported here is believed to be under-reported by roughly 5 percent to 10 percent.

b/ Does not include pink salmon landings, if any.

c/ Preliminary.

TABLE IV-3. Troll Chinook and coho landed in Oregon, estimates of exvessel value, and average price (dollars per dressed pound) in nominal and real (inflation adjusted, 2016) dollars.

	Chinook				Coho				Total[a/]	
Year or Avg.	Nominal Value ($*1,000)	Real Value ($*1,000)	Nominal Price Per Pound ($)	Real Price Per Pound ($)	Nominal Value ($*1,000)	Real Value ($*1,000)	Nominal Price Per Pound ($)	Real Price Per Pound ($)	Nominal Value ($*1,000)	Real Value ($*1,000)
1971-1975	2,036	7,659	0.89	3.41	3,658	14,095	0.64	2.42	5,694	21,754
1976-1980	5,290	14,416	2.17	5.89	6,389	17,944	1.51	4.10	11,679	32,360
1981-1985	3,582	7,038	2.46	4.80	2,248	4,608	1.45	2.84	5,830	11,646
1986-1990	9,381	15,659	2.47	4.09	3,203	5,359	1.54	2.56	12,584	21,018
1991-1995	1,971	2,805	2.24	3.21	326	485	0.64	0.93	2,297	3,289
1996	3,007	4,034	1.56	2.09	-	-	-	-	3,007	4,034
1997	2,469	3,254	1.60	2.11	-	-	-	-	2,469	3,254
1998	2,297	2,994	1.64	2.14	-	-	-	-	2,297	2,994
1999	1,400	1,798	1.94	2.49	1	1	1.03	1.32	1,401	1,800
2000	2,988	3,757	2.02	2.54	75	94	1.06	1.33	3,063	3,851
2001	4,680	6,228	1.61	2.14	41	55	0.79	1.05	4,721	6,283
2002	5,383	7,055	1.54	2.02	8	11	0.75	0.98	5,391	7,066
2003	7,186	9,234	1.97	2.53	36	47	0.85	1.09	7,222	9,280
2004	9,832	12,296	3.45	4.31	86	108	1.24	1.55	9,919	12,405
2005	8,466	10,257	3.17	3.84	37	45	1.87	2.27	8,503	10,302
2006	2,663	3,130	5.48	6.44	38	45	2.90	3.41	2,701	3,175
2007	2,630	3,011	5.66	6.48	193	221	1.90	2.18	2,822	3,231
2008	484	543	7.31	8.21	10	12	2.82	3.17	494	555
2009	77	86	5.06	5.64	267	298	2.04	2.27	345	384
2010	2,775	3,056	5.49	6.04	16	17	2.23	2.46	2,791	3,073
2011	2,396	2,585	5.96	6.43	5	6	2.01	2.17	2,401	2,591
2012	4,263	4,516	5.75	6.09	8	9	2.20	2.33	4,271	4,525
2013	7,604	7,927	5.88	6.13	7	7	2.56	2.67	7,611	7,934
2014	14,692	15,047	5.71	5.85	67	69	2.00	2.05	14,760	15,116
2015	7,313	7,410	6.15	6.23	21	21	1.88	1.90	7,334	7,431
2016[b/]	4,267	4,267	8.23	8.23	-	-	-	-	4,267	4,267

a/ Does not include pink salmon landings.

b/ Preliminary.

TABLE IV-4. Non-Indian troll Chinook and coho landed in Washington, estimates of exvessel value, and average price (dollars per dressed pound) in nominal and real (inflation adjusted, 2016) dollars.[a/]

	Chinook				Coho				Total[b/]	
Year or Avg.	Nominal Value ($*1,000)	Real Value ($*1,000)	Nominal Price Per Pound ($)	Real Price Per Pound ($)	Nominal Value ($*1,000)	Real Value ($*1,000)	Nominal Price Per Pound ($)	Real Price Per Pound ($)	Nominal Value ($*1,000)	Real Value ($*1,000)
1971-1975	2,714	10,341	0.89	3.41	3,060	11,687	0.66	2.53	5,775	22,028
1976-1980	5,313	14,785	2.39	6.45	6,086	16,896	1.67	4.52	11,399	31,682
1981-1985	1,954	3,951	2.46	4.80	1,272	2,582	1.32	2.58	3,225	6,534
1986-1990[c/]	1,310	2,181	2.61	4.34	360	590	1.62	2.69	1,670	2,771
1991-1995[d/]	550	802	2.17	3.11	120	175	0.86	1.24	670	977
1996	d/	d/	d/	d/	59	79	0.86	1.15	d/	d/
1997	125	165	1.55	2.04	-	-	-	-	125	165
1998	123	160	1.51	1.97	-	-	-	-	123	160
1999	377	484	1.90	2.44	19	24	0.88	1.13	396	509
2000	224	282	1.71	2.15	34	43	1.09	1.37	258	325
2001	349	464	1.44	1.92	34	45	0.69	0.92	383	510
2002	756	991	1.11	1.45	2	2	1.58	2.07	758	993
2003	951	1,222	1.15	1.48	40	52	0.74	0.95	991	1,274
2004	1,079	1,350	2.14	2.68	106	132	1.16	1.45	1,185	1,482
2005	1,273	1,543	2.70	3.27	16	20	1.65	2.00	1,290	1,562
2006	1,029	1,209	4.64	5.45	16	19	1.69	1.99	1,045	1,228
2007	905	1,036	4.90	5.61	48	55	1.46	1.67	953	1,091
2008	673	756	6.73	7.56	36	40	2.49	2.80	709	796
2009	893	995	5.76	6.42	276	307	2.02	2.25	1,169	1,303
2010	3,083	3,395	5.61	6.18	32	35	2.14	2.36	3,115	3,430
2011	1,652	1,782	5.12	5.52	35	38	2.10	2.27	1,687	1,820
2012	2,323	2,461	5.34	5.66	35	37	1.99	2.11	2,358	2,498
2013	2,771	2,888	6.16	6.42	67	70	2.15	2.24	2,838	2,958
2014	2,549	2,610	5.50	5.63	160	164	1.83	1.87	2,709	2,774
2015	3,423	3,468	5.48	5.55	26	26	1.67	1.69	3,448	3,494
2016	1,606	1,606	8.00	8.00	-	-	-	-	1,606	1,606

a/ All values in this table are based on preliminary information available at the start of each year's salmon review.

b/ Does not include pink salmon landings.

c/ There was no legal coho fishery in 1988. The value used in this average for 1988 is for landings of fish caught south of Cape Falcon and seizures of illegal fish.

d/ In 1994-1996 Chinook were caught off Oregon and landed in Washington. Value information was not provided to preserve confidentiality.

TABLE IV-5. Non-Indian troll pink salmon landed in Oregon and Washington, estimates of exvessel value, and average price (dollars per dressed pound) in nominal and real (inflation adjusted, 2016) dollars.

	Oregon				Washington				Total	
Year or Avg.[a/]	Nominal Value ($*1,000)	Real Value ($*1,000)	Nominal Price Per Pound ($)	Real Price Per Pound ($)	Nominal Value ($*1,000)	Real Value ($*1,000)	Nominal Price Per Pound ($)	Real Price Per Pound ($)	Nominal Value ($*1,000)	Real Value ($*1,000)
1976-1980	167	476	0.75	2.03	1,200	3,225	0.54	1.48	1,367	3,701
1981-1985	129	257	0.74	1.45	287	580	0.41	0.81	416	837
1986-1990	41	70	0.77	1.28	57	92	0.66	1.10	98	162
1991-1995	1	2	0.88	1.25	38	55	0.64	0.91	39	57
1997	b/	b/	0.56	0.74	b/	b/	0.20	0.26	b/	b/
1999	b/	b/	0.67	0.86	b/	b/	0.38	0.49	b/	b/
2001	1	1	0.58	0.77	b/	b/	0.22	0.29	1	1
2003	b/	b/	0.85	1.09	b/	b/	0.30	0.39	b/	b/
2005	b/	b/	1.25	1.51	b/	b/	0.52	0.63	b/	b/
2007	b/	b/	1.11	1.27	b/	b/	0.33	0.38	b/	b/
2009	b/	b/	0.51	0.57	b/	b/	0.33	0.37	b/	b/
2011	b/	b/	1.31	1.41	1	1	0.83	0.90	1	1
2013	b/	b/	1.35	1.41	b/	b/	0.61	0.64	b/	b/
2015	b/	b/	1.60	1.62	b/	b/	0.77	0.78	b/	b/

a/ Odd year averages.

b/ Less than $500.

TABLE IV-6. Pounds of salmon landed by the commercial troll ocean fishery for major California port areas.[a/b/]

Year or Avg.	Crescent City	Eureka	Fort Bragg	San Francisco	Monterey	State Total
CHINOOK (thousands of dressed pounds)						
1976-1980	393	1,403	1,449	1,733	889	5,867
1981-1985	350	428	1,128	1,806	742	4,454
1986-1990	155	405	2,299	3,648	1,592	8,097
1991-1995	2	25	183	1,893	1,326	3,429
1996-2000	2	35	146	2,155	1,699	4,037
2001	3	61	192	1,735	418	2,409
2002	54	108	872	3,060	912	5,008
2003	38	7	3,096	2,753	498	6,392
2004	308	65	1,292	3,712	853	6,230
2005	25	77	889	2,258	1,098	4,347
2006	-	-	273	684	87	1,043
2007	34	81	357	888	165	1,525
2008	-	-	-	-	-	-
2009	-	-	-	-	-	-
2010	-	4	186	16	20	228
2011	8	53	622	215	94	992
2012	5	78	611	1,189	648	2,530
2013	24	200	1,427	1,776	367	3,793
2014	27	110	1,038	970	108	2,253
2015	6	48	617	363	154	1,188
2016[c/]	d/	6	165	311	131	614
COHO (thousands of dressed pounds)						
1976-1980	360	391	277	109	48	1,184
1981-1985	89	104	89	54	9	345
1986-1990	22	43	136	53	9	262
1991-1995	d/	4	11	56	23	94
1996-2000	-	-	-	-	-	-
2001	-	-	-	-	-	-
2002	-	-	-	-	-	-
2003	-	-	-	-	-	-
2004	-	-	-	-	-	-
2005	-	-	-	-	-	-
2006	-	-	-	-	-	-
2007	-	-	-	-	-	-
2008	-	-	-	-	-	-
2009	-	-	-	-	-	-
2010	-	-	-	-	-	-
2011	-	-	-	-	-	-
2012	-	-	-	-	-	-
2013	-	-	-	-	-	-
2014	-	-	-	-	-	-
2015	-	-	-	-	-	-
2016	-	-	-	-	-	-

a/ The major port areas listed may include smaller ports as follows: Crescent City includes only Crescent City; Eureka includes Trinidad and Humboldt Bay; Fort Bragg includes Shelter Cove, Noyo Harbor, and Mendocino; San Francisco includes Bodega Bay, Sausalito, Berkeley, and Half Moon Bay; Monterey includes Santa Cruz, Moss Landing, Morro Bay, Avila, and all ports south of Pt. Conception.

b/ Prior to 2005 landings were based on catch area, not port of landing.

c/ Preliminary.

d/ Less than 500 pounds.

TABLE IV-7. Pounds of salmon landed by the commercial troll ocean fishery for major Oregon port areas.[a/]

Year or Avg.	Astoria	Tillamook	Newport	Coos Bay	Brookings	State Total
CHINOOK (thousands of dressed pounds)						
1976-1980	171	118	530	908	700	2,427
1981-1985	92	45	271	638	386	1,432
1986-1990	52	264	829	2,118	468	3,731
1991-1995	7	86	580	235	31	940
1996-2000	25	70	790	435	92	1,414
2001	73	223	1,673	776	152	2,897
2002	330	275	1,442	1,223	218	3,488
2003	265	245	1,634	1,353	142	3,639
2004	134	113	1,121	1,214	267	2,850
2005	130	214	1,034	1,054	239	2,671
2006	99	67	218	56	45	486
2007	22	37	76	232	98	464
2008	39	19	-	-	8	66
2009	7	4	-	-	5	15
2010	116	40	185	122	43	506
2011	30	14	68	231	59	402
2012	84	64	275	221	97	741
2013	34	76	232	783	166	1,291
2014	172	149	927	1,025	298	2,571
2015	115	89	429	429	127	1,189
2016[b/]	24	17	338	116	24	519
COHO (thousands of dressed pounds)						
1976-1980	385	660	1,190	1,661	357	4,252
1981-1985	133	293	451	550	111	1,537
1986-1990	73	473	693	648	69	1,957
1991-1995	17	93	110	104	1	325
1996-2000	14	-	-	-	-	14
2001	50	c/	2	-	-	52
2002	6	5	-	-	-	11
2003	32	11	-	-	-	43
2004	47	22	-	-	-	70
2005	9	11	-	-	-	20
2006	8	5	-	-	-	13
2007	37	34	13	14	3	101
2008	3	1	-	-	-	4
2009	48	43	35	5	c/	131
2010	6	1	-	-	-	7
2011	2	1	-	-	-	3
2012	3	1	-	-	-	4
2013	2	-	-	-	-	2
2014	33	18	9	7	1	67
2015	10	1	-	-	-	11
2016	-	-	-	-	-	-

a/ The major port areas listed include smaller ports as follows: Astoria also includes Gearhart/Seaside and Cannon Beach; Tillamook also includes Garibaldi, Netarts, Pacific City, and Nehalem Bay; Newport also includes Depoe Bay, Siletz Bay, Salmon River, and Waldport; Coos Bay also includes Florence, Winchester Bay, Charleston, and Bandon; Brookings also includes Port Orford and Gold Beach.

b/ Preliminary.

c/ Less than 500 pounds.

TABLE IV-8. Pounds of salmon landed by the non-Indian commercial troll ocean fishery for major Washington port areas.[a/b/]

Year or Avg.	Neah Bay	La Push	Westport	Ilwaco	Coastal Community Total	Puget Sound	State Total[c/]
CHINOOK (thousands of dressed pounds)							
1976-1980	288	421	919	261	1,889	426	2,315
1981-1985	88	32	370	74	564	124	689
1986-1990	71	17	234	48	371	122	493
1991-1995[d/]	137	29	123	9	204	30	234
1996-2000[d/]	49	1	37	3	80	22	102
2001	97	-	138	6	241	-	241
2002	262	33	322	61	678	-	678
2003	470	67	243	29	810	12	821
2004	250	74	158	15	497	7	504
2005	170	100	181	20	471	e/	471
2006	86	64	40	26	216	5	222
2007	38	31	105	8	182	2	184
2008	20	17	49	13	99	1	100
2009	31	25	92	3	153	2	155
2010	48	62	402	10	522	-	522
2011	113	44	155	11	322	-	322
2012	172	92	147	23	435	-	435
2013	85	83	275	7	450	e/	450
2014	77	93	182	112	463	e/	463
2015	61	133	383	43	621	4	625
2016	28	32	118	19	197	3	201
COHO (thousands of dressed pounds)							
1976-1980	600	786	1,066	678	3,130	496	3,626
1981-1985	133	63	277	142	616	128	744
1986-1990	70	19	97	53	239	19	259
1991-1995	52	14	49	13	102	12	111
1996-2000	10	e/	8	3	22	2	24
2001	2	-	39	9	49	-	49
2002	-	-	e/	1	1	-	1
2003	11	12	21	8	52	2	54
2004	12	20	53	4	89	1	91
2005	2	1	3	5	10	-	10
2006	3	3	3	1	10	e/	10
2007	3	3	9	17	33	-	33
2008	2	3	8	1	14	e/	14
2009	29	34	54	14	131	5	136
2010	1	2	12	1	15	-	15
2011	6	2	9	e/	17	-	17
2012	7	5	6	1	18	-	18
2013	5	8	18	1	31	e/	31
2014	7	22	47	12	87	-	87
2015	e/	1	10	4	15	e/	15
2016	e/	-	-	-	-	e/	e/

a/ All values in this table are based on preliminary information available at the start of each year's salmon review.

b/ The major port areas listed may include smaller ports as follows: Neah Bay includes only Neah Bay; La Push also includes Kalaloch; Westport also includes Aberdeen, Bay City, Copalis Beach, Hoquiam, Moclips, Taholah, Bay Center, Grayland Beach, Raymond, South Bend, and Tokeland; Ilwaco also includes Long Beach, Nahcotta, Naselle, and all Columbia River Ports; Puget Sound includes all Puget Sound ports east of Neah Bay.

c/ State total includes landings where port of landing is not specified.

d/ There was no ocean commercial fishery for Chinook north of Cape Falcon in 1994-1996; however, Chinook were caught off Oregon and landed in Washington.

e/ Less than 500 pounds.

TABLE IV-9. Landings, exvessel values and average prices (inflation adjusted, 2016 dollars) of inriver commercial harvest of Columbia River salmon.[a/] (Page 1 of 2)

Year or Avg.	Non-Indian Gillnet[b/] Chinook Spring	Non-Indian Gillnet[b/] Chinook Fall Brights[d/]	Non-Indian Gillnet[b/] Chinook Fall Tules	Non-Indian Gillnet[b/] Coho	Non-Indian Gillnet[b/] Chum	Non-Indian Gillnet[b/] TOTAL	Treaty Indian[c/] - All Gears Chinook Spring	Treaty Indian[c/] - All Gears Chinook Fall Brights[d/]	Treaty Indian[c/] - All Gears Chinook Fall Tules	Treaty Indian[c/] - All Gears Coho	Treaty Indian[c/] - All Gears Chum	Treaty Indian[c/] - All Gears TOTAL	Columbia River Total By State
Oregon													
Average Price Per Landed Pound[e/] (dollars)													
1987-2003	4.30	1.47	0.40	1.28	0.55		4.47	1.39	0.36	0.97	-		
2004	4.65	1.71	0.28	1.13	0.31		2.31	1.41	0.13	0.74	-		
2005	4.13	1.96	0.32	1.30	0.38		-	1.26	0.21	1.13	-		
2006	5.50	2.52	0.33	1.54	0.31		3.53	1.80	0.31	1.47	-		
2007	6.17	3.24	0.06	1.85	0.86		4.29	2.99	0.03	1.23	-		
2008	6.94	2.81	0.64	1.47	0.73		5.21	2.88	0.51	1.30	1.01		
2009	5.02	2.30	0.60	1.35	0.58		3.80	1.56	0.40	1.03	-		
2010	5.43	2.33	0.66	1.53	0.74		4.64	2.22	0.69	2.08	-		
2011	5.48	2.46	0.63	1.78	0.83		3.85	2.55	0.77	1.65	-		
2012	6.17	2.34	0.57	1.71	0.52		5.85	2.71	0.78	1.96	-		
2013	6.72	2.62	0.59	1.92	0.52		5.41	2.15	0.67	1.40	-		
2014	5.51	1.87	0.58	1.20	0.51		5.15	1.76	0.58	0.93	-		
2015	5.85	2.45	0.51	1.54	0.30		4.24	2.52	0.47	1.48	-		
2016[g/]	7.09	3.21	0.63	1.84	-		6.00	2.90	0.60	1.55	-		
Exvessel Value (thousands of dollars)													
1987-2003	522	1,751	103	1,129	2	3,506	7	717	18	6	-	747	4,253
2004	1,284	701	62	850	f/	2,896	185	673	37	21	-	917	3,813
2005	381	536	41	1,023	f/	1,981	-	252	14	1	-	266	2,248
2006	722	749	21	737	f/	2,229	f/	371	3	17	-	392	2,621
2007	875	404	2	352	f/	1,633	73	414	1	17	-	504	2,137
2008	802	1,158	72	753	f/	2,785	362	1,053	65	57	f/	1,537	4,322
2009	487	1,002	101	1,141	f/	2,731	159	628	40	27	-	853	3,584
2010	2,078	992	169	857	1	4,097	650	504	97	36	-	1,287	5,384
2011	1,259	1,561	147	781	f/	3,747	198	645	33	33	-	908	4,655
2012	1,119	953	116	158	f/	2,346	78	370	5	12	-	466	2,812
2013	965	2,213	110	512	f/	3,800	93	1,080	24	7	-	1,204	5,004
2014	643	1,660	144	1,700	f/	4,147	286	909	14	35	-	1,244	5,391
2015	1,261	1,473	95	262	f/	3,091	432	996	30	2	-	1,461	4,551
2016[g/]	1,248	1,322	60	388	-	3,019	141	844	2	8	-	995	4,013
Pounds (thousands)													
1987-2003	116	749	156	785	2	1,807	3	337	62	5	-	407	2,213
2004	276	409	224	755	f/	1,664	80	476	299	29	-	884	2,548
2005	92	273	132	789	f/	1,286	-	200	67	1	-	267	1,554
2006	131	298	65	478	f/	971	f/	206	11	12	-	229	1,200
2007	142	135	f/	189	f/	466	17	138	25	14	-	194	660
2008	116	413	112	512	f/	1,152	70	366	129	44	f/	609	1,761
2009	97	436	168	846	f/	1,547	42	403	100	26	-	571	2,118
2010	382	426	257	560	1	1,626	140	226	140	17	-	524	2,150
2011	230	635	234	439	f/	1,537	51	253	43	20	-	367	1,905
2012	181	407	204	92	f/	885	13	137	7	6	-	163	1,048
2013	144	846	186	267	f/	1,442	17	503	35	5	-	560	2,002
2014	117	886	247	1,419	f/	2,669	55	516	24	38	-	634	3,302
2015	216	600	186	170	f/	1,171	102	395	64	1	-	563	1,734
2016[g/]	176	412	3	211	f/	803	24	291	64	5	-	383	1,186

TABLE IV-9. Landings, exvessel values and average prices (inflation adjusted, 2016 dollars) of inriver commercial harvest of Columbia River salmon.[a/] (Page 2 of 2)

	Non-Indian Gillnet[b/]						Treaty Indian[c/] - All Gears						
	Chinook						Chinook						Columbia
		Fall						Fall					River Total
Year or Avg.	Spring	Brights[d/]	Tules	Coho	Chum	TOTAL	Spring	Brights[d/]	Tules	Coho	Chum	TOTAL	By State
Washington[g/h/i/]													
Average Price Per Landed Pound[e/] (dollars)													
1987-2003	5.28	1.36		1.28	0.48	-	3.78	0.96		0.90	-		
2004	4.91	1.61		1.18	0.31	-	1.96	0.68		0.28	-		
2005	4.34	1.68		1.25	0.97	-	2.05	0.62		0.36	-		
2006	4.31	2.27		1.56	-	-	2.76	1.65		0.66	0.59		
2007	7.68	2.92		1.44	1.11	-	5.10	1.56		0.92	1.03		
2008	7.54	2.86		1.41	1.09	-	5.00	1.53		0.90	1.01		
2009	5.90	1.98		1.26	0.66	-	3.35	1.04		0.64	-		
2010	5.51	2.15		1.44	0.66	-	4.15	1.26		0.97	-		
2011	4.84	2.06		1.63	0.63	-	3.79	1.96		1.54	3.38		
2012	6.64	2.16		1.73	0.46	-	5.03	1.83		1.33	-		
2013	6.39	2.23		1.91	-	-	4.76	1.97		1.22	-		
2014	5.49	1.66		1.16	0.47	-	4.82	1.48		1.00	1.11		
2015	5.61	2.04		1.65	-	-	4.04	1.88		1.31	-		
2016	7.44	2.90		1.87	-	-	5.38	2.40		1.39	-		
Exvessel Value (thousands of dollars)													
1987-2003	247	677		469	1	1,379	62	1,103		16	-	1,177	2,557
2004	340	546		435	f/	1,320	206	544		12	-	762	2,082
2005	267	396		238	f/	901	137	867		12	-	1,016	1,918
2006	376	494		324	-	1,193	498	1,489		30	f/	2,016	3,210
2007	145	264		286	f/	695	f/	1,420		59	f/	1,480	2,175
2008	353	571		310	f/	1,235	1,089	1,791		165	f/	3,045	4,280
2009	350	599		330	f/	1,280	687	912		28	-	1,627	2,907
2010	597	563		357	2	1,518	2,182	1,910		25	-	4,117	5,635
2011	380	805		257	1	1,443	1,798	3,134		251	1	5,183	6,626
2012	349	770		66	f/	1,185	977	1,805		38	-	2,820	4,005
2013	203	1,409		227	-	1,839	912	4,430		113	-	5,455	7,294
2014	253	1,402		609	f/	2,263	2,027	5,250		370	2	7,650	9,913
2015	511	1,506		81	-	2,098	2,687	6,135		27	-	8,850	10,948
2016	418	1,827		110	-	2,355	1,886	4,325		86	-	6,298	8,653
Pounds (thousands)													
1987-2003	46	333		369	1	747	37	914		18	-	966	1,713
2004	69	338		370	f/	777	105	806		43	-	954	1,731
2005	62	235		191	f/	487	67	1,404		34	-	1,504	1,992
2006	87	218		207	-	512	180	905		45	f/	1,130	1,642
2007	18	91		154	f/	263	f/	638		66	f/	705	968
2008	47	199		219	f/	466	218	1,172		184	f/	1,574	2,040
2009	59	302		262	1	624	205	880		44	-	1,129	1,753
2010	108	262		247	2	620	526	1,521		25	-	2,072	2,693
2011	78	391		158	1	628	475	1,596		163	f/	2,234	2,862
2012	53	355		38	f/	446	194	980		28	-	1,202	1,648
2013	32	630		119	-	781	191	2,244		93	-	2,528	3,309
2014	46	846		524	f/	1,416	421	3,540		369	2	4,332	5,748
2015	91	738		49	-	878	666	3,254		21	-	3,940	4,818
2016	56	629		59	-	744	350	1,803		62	-	2,216	2,960

a/ Excluding pink, sockeye, and steelhead.

b/ Mainstem below Bonneville and select areas (Youngs Bay, Tongue Point, Blind Slough, and Deep River).

c/ Treaty Indian landings and values do not include direct sales to consumers.

d/ For Washington, this column includes fall brights, tules, and jacks. Price changes may reflect a change in the mix of brights, tules, and jacks rather than annual price changes.

e/ Gillnet exvessel salmon prices are recorded in round weight and therefore are not strictly comparable to exvessel troll prices.

f/ Less than $500 or 500 pounds.

g/ Preliminary. (All Washington values in this table are based on preliminary information available when each year's Salmon Review is drafted.)

h/ Washington prices for years prior to 2000 are based on a combination of Washington and Oregon value information.

i/ Treaty Indian values are primarily mainstem Columbia set gillnet but also include Klickitat dipnet, Drano Lake (Little White Salmon River mouth), and Priest Rapids Pool fisheries.

TABLE IV-10. California, Oregon, and Washington ocean recreational salmon effort in thousands of angler trips and catch in thousands of fish by boat type. (Page 1 of 2)

	Angler Trips		Chinook Catch[a/]		Coho Catch[a/]	
Year or Avg.	Charter	Private	Charter	Private	Charter	Private
			CALIFORNIA			
1981-1985	68.9	78.1	74.6	34.4	1.5	18.3
1986-1990	95.9	144.8	100.1	66.3	5.3	35.1
1991-1995	81.7	131.8	85.9	83.0	3.8	18.7
1996-2000	82.2	112.5	77.5	80.3	b/	0.4
2001	69.9	95.2	43.2	55.6	0.1	1.2
2002	86.6	123.4	85.1	96.9	b/	0.8
2003	59.4	75.3	48.3	46.4	0.1	0.6
2004	97.7	121.0	124.7	96.5	b/	1.4
2005	69.1	103.0	61.3	81.9	b/	0.7
2006	44.9	81.6	35.3	61.0	b/	1.6
2007	31.4	74.5	12.4	35.4	b/	0.7
2008	0.1	0.3	0.0	b/	-	-
2009	0.6	4.7	0.1	0.6	-	b/
2010	13.6	35.0	4.7	10.1	-	0.2
2011	29.5	62.2	18.7	31.1	b/	0.3
2012	52.7	95.3	44.2	79.7	b/	0.1
2013	55.0	92.3	49.2	66.9	b/	0.3
2014	48.3	72.0	33.8	41.1	-	0.5
2015	37.7	44.1	23.4	14.1	b/	b/
2016[c/]	30.8	38.9	22.5	15.1	-	0.1
			OREGON[d/e/]			
1979	73.7	187.7	5.4	13.3	59.8	101.8
1980	79.0	218.9	5.1	11.9	98.3	207.5
1981-1985	45.7	187.9	6.2	26.9	48.0	117.6
1986-1990	56.5	184.6	7.0	28.8	71.6	148.4
1991-1995	18.0	81.8	1.3	8.0	27.1	76.2
1996-2000	5.3	40.3	1.5	9.7	3.4	9.1
2001	18.2	102.3	6.4	20.8	19.3	75.0
2002	15.7	91.9	7.9	39.5	9.0	27.5
2003	23.4	121.1	8.8	31.8	23.7	90.0
2004	21.1	124.6	14.6	41.8	13.1	58.8
2005	9.9	66.1	4.5	23.4	3.1	10.6
2006	8.0	54.4	1.5	10.1	3.6	12.0
2007	11.4	76.9	0.6	6.4	10.6	50.1
2008	1.9	28.5	0.2	1.4	1.0	11.1
2009	12.6	71.9	0.2	1.3	14.2	75.4
2010	5.0	48.3	0.6	4.4	2.8	15.5
2011	5.9	42.8	0.6	4.6	3.5	15.3
2012	6.6	60.7	1.5	17.3	3.0	13.1
2013	7.4	78.9	1.8	28.6	3.5	11.1
2014	14.5	107.0	1.3	17.2	19.0	80.5
2015	7.8	58.2	0.8	8.7	5.3	23.0
2016[c/]	2.4	36.4	0.3	3.8	1.2	7.2

TABLE IV-10. California, Oregon, and Washington ocean recreational salmon effort in thousands of angler trips and catch in thousands of fish by boat type. (Page 2 of 2)

	Angler Trips		Chinook Catch[a/]		Coho Catch[a/]	
Year or Avg.	Charter	Private	Charter	Private	Charter	Private
			WASHINGTON[f/g/]			
1979	220.8	89.8	61.1	15.7	227.9	62.4
1980	193.9	86.2	41.1	12.5	288.4	73.1
1981-1985	102.0	69.7	42.6	13.8	113.3	69.2
1986-1990	53.5	59.4	16.0	10.0	78.0	77.6
1991-1995	28.0	45.1	4.5	4.2	41.5	54.8
1991-1995	13.6	20.6	2.7	2.2	17.4	20.8
2001	41.2	72.4	11.9	10.8	66.2	98.2
2002	37.0	57.4	30.9	27.0	30.4	43.7
2003	44.5	75.5	16.0	18.1	53.4	84.9
2004	36.5	73.1	10.3	14.6	37.6	75.1
2005	31.7	58.9	15.9	20.4	19.2	32.6
2006	24.5	39.1	4.0	6.7	16.2	19.9
2007	26.7	45.9	3.1	5.9	33.7	50.1
2008	14.2	22.2	6.0	8.6	8.3	10.5
2009	29.4	69.5	3.1	9.2	47.9	90.0
2010	26.5	54.4	15.4	21.5	14.1	22.2
2011	22.2	49.2	9.8	19.3	15.1	24.4
2012	24.5	50.5	11.8	21.8	11.8	19.3
2013	24.7	52.3	9.2	19.6	17.9	27.9
2014	34.6	78.1	12.1	27.7	46.0	73.3
2015	30.6	61.3	12.0	26.9	27.6	39.5
2016[c/]	13.7	34.0	4.5	12.3	5.8	10.1

a/ Catch numbers may include some illegal harvest.

b/ Fewer than 50 fish.

c/ Preliminary.

d/ Salmon data from surveyed ports only. These generally include Astoria, Garibaldi, Depoe Bay, Newport, Winchester Bay, Coos Bay, and Brookings. Since 1981, Pacific City and Florence have also been included. Gold Beach data are included from 1981-1987. Astoria was not included in 1994.

e/ Numbers do not include angling from the Columbia River jetty.

f/ Numbers do not include angling from the Columbia River jetty or from the late-season state waters Area 4B fishery.

g/ Values for 1982-1985 include some inriver Columbia River fishing after closure of the ocean fishery.

TABLE IV-11. Estimates of California recreational ocean salmon angler trips (thousands) by port area and boat type.

Year or Avg.	Crescent City	Eureka	Fort Bragg	San Francisco	Monterey	State Total
			CHARTER TRIPS			
1976-1980	1.5	1.2	2.4	63.5	4.0	72.7
1981-1985	0.7	1.3	1.8	62.1	3.0	68.9
1986-1990	1.0	3.5	4.0	74.3	13.1	95.9
1991-1995	0.4	0.8	2.8	55.7	22.0	81.7
1996-2000	a/	0.7	4.2	55.2	22.1	82.1
2001-2005	a/	1.4	9.6	49.2	16.3	76.5
2006	0.0	0.7	6.9	29.2	8.0	44.9
2007	0.0	1.6	5.4	20.9	3.5	31.4
2008	-	-	0.1	-	-	0.1
2009	0.0	0.6	-	-	-	0.6
2010	0.0	0.3	1.8	8.0	3.6	13.6
2011	0.0	1.5	4.4	17.5	6.0	29.5
2012	0.2	3.6	4.2	33.7	11.0	52.7
2013	a/	4.1	5.5	40.4	4.9	55.0
2014	0.1	3.2	5.4	34.0	5.5	48.3
2015	a/	1.9	3.4	30.1	2.2	37.7
2016[b/]	a/	1.6	2.3	25.8	1.1	30.8
			PRIVATE TRIPS			
1976-1980	18.4	22.7	9.3	34.4	6.0	90.8
1981-1985	22.4	21.8	7.8	16.8	9.3	78.1
1986-1990	38.6	34.4	11.4	24.3	36.1	144.8
1991-1995	13.9	14.0	17.6	37.1	49.3	131.9
1996-2000	6.8	10.9	15.0	38.8	40.9	112.5
2001-2005	4.1	15.5	18.6	34.3	31.1	103.6
2006	1.5	14.2	14.1	32.1	19.7	81.6
2007	2.1	16.8	11.7	22.2	21.7	74.5
2008	-	-	0.3	-	-	0.3
2009	1.1	3.6	-	-	-	4.7
2010	0.2	3.7	4.8	11.4	15.0	35.0
2011	0.8	12.7	9.9	16.9	21.9	62.2
2012	7.7	20.0	10.6	23.8	33.3	95.3
2013	7.0	18.6	11.7	29.2	25.7	92.3
2014	4.3	13.0	12.1	20.7	22.0	72.0
2015	0.6	6.4	8.4	15.8	13.0	44.1
2016[b/]	0.6	6.8	7.3	17.6	6.7	38.9
			TOTAL TRIPS			
1976-1980	20.0	23.9	11.7	97.9	10.0	163.5
1981-1985	23.1	23.1	9.6	78.9	12.2	147.0
1986-1990	39.6	37.9	15.4	98.6	49.2	240.7
1991-1995	14.3	14.8	20.4	92.8	71.2	213.6
1996-2000	6.8	11.7	19.1	94.0	63.0	194.6
2001-2005	4.1	16.9	28.2	83.5	47.4	180.1
2006	1.5	15.0	21.0	61.4	27.7	126.5
2007	2.1	18.4	17.1	43.1	25.2	105.9
2008	-	-	0.4	-	-	0.4
2009	1.1	4.3	-	-	-	5.4
2010	0.2	4.0	6.6	19.4	18.5	48.7
2011	0.8	14.2	14.4	34.4	28.0	91.7
2012	7.8	23.6	14.8	57.5	44.3	148.0
2013	7.0	22.8	17.3	69.5	30.7	147.3
2014	4.4	16.2	17.5	54.7	27.5	120.3
2015	0.6	8.3	11.8	45.9	15.2	81.8
2016[b/]	0.6	8.4	9.6	43.4	7.8	69.7

a/ Fewer than 50 angler trips.

b/ Preliminary.

TABLE IV-12. Estimates of Oregon recreational ocean salmon angler trips (thousands) by port area and boat type. (Page 1 of 2)

Year or Avg.	Astoria	Tillamook	Newport	Coos Bay	Brookings	State Total
			CHARTER TRIPS			
1979	18.5	2.8	26.7	22.7	3.0	73.7
1980	26.3	3.7	26.7	19.6	2.8	79.1
1981-1985	10.3	3.0	17.2	11.9	3.3	45.7
1986-1990	7.1	5.3	27.5	13.0	3.6	56.5
1991-1995[a/]	4.3	1.6	7.9	3.5	0.7	18.0
1996-2000	1.3	0.4	2.4	0.6	0.6	5.3
2001	4.3	1.4	8.8	3.0	0.7	18.2
2002	3.1	1.6	7.1	3.5	0.3	15.7
2003	3.9	2.0	13.0	4.0	0.5	23.4
2004	3.0	2.5	11.1	3.8	0.6	21.1
2005	2.3	1.0	3.7	2.6	0.3	9.9
2006	2.1	0.6	3.0	2.0	0.3	8.0
2007	2.6	1.1	5.6	1.9	0.2	11.4
2008	0.7	0.1	0.9	0.1	0.1	1.9
2009	2.7	1.3	8.1	0.3	0.2	12.6
2010	1.8	0.4	2.8	0.1	0.1	5.0
2011	1.6	0.5	3.6	0.1	0.1	5.9
2012	1.7	0.4	3.7	0.5	0.2	6.6
2013	1.7	0.6	4.2	0.3	0.6	7.4
2014	2.6	1.0	10.2	0.3	0.4	14.5
2015	2.0	0.6	5.1	c/	0.1	7.8
2016[b/]	0.4	0.1	1.9	-	c/	2.4
			PRIVATE TRIPS			
1979	24.3	16.3	45.4	52.9	48.8	187.7
1980	20.1	29.3	56.6	65.2	47.7	218.9
1981-1985	15.6	27.1	40.4	51.8	53.0	187.9
1986-1990	10.6	23.7	47.1	48.4	54.8	184.5
1991-1995[a/]	8.5	12.0	17.0	22.4	22.0	82.0
1996-2000	4.1	7.7	3.0	7.6	17.8	40.3
2001	19.0	15.1	14.8	28.1	25.4	102.4
2002	9.0	22.8	10.9	29.9	19.4	91.9
2003	15.4	26.0	26.5	38.9	14.3	121.1
2004	15.6	26.8	27.9	36.7	17.7	124.6
2005	11.0	11.1	9.7	22.1	12.3	66.1
2006	6.2	15.3	7.4	15.2	10.4	54.4
2007	9.8	20.0	15.2	21.0	10.9	76.9
2008	2.9	9.0	4.6	7.3	4.7	28.5
2009	9.5	21.1	21.5	14.1	5.8	71.9
2010	8.5	13.1	12.2	8.6	5.9	48.3
2011	5.8	12.3	8.3	10.2	6.2	42.8
2012	3.1	12.0	11.1	16.0	18.6	60.7
2013	4.4	13.5	11.1	29.5	19.5	78.1
2014	9.7	24.2	27.0	29.5	16.7	107.0
2015	6.6	14.9	13.1	14.7	8.9	58.2
2016[b/]	4.0	10.9	6.3	11.2	4.2	36.4

TABLE IV-12. Estimates of Oregon recreational ocean salmon angler trips (thousands) by port area and boat type. (Page 2 of 2)

Year or Avg.	Astoria	Tillamook	Newport	Coos Bay	Brookings	State Total
			TOTAL TRIPS			
1979	42.8	19.1	72.1	75.6	51.8	261.4
1980	46.4	33.0	83.3	84.8	50.5	298.0
1981-1985	26.0	30.0	57.5	63.7	56.3	233.5
1986-1990	17.7	29.0	74.6	61.4	58.4	241.0
1991-1995[a/]	12.8	13.6	24.9	26.0	22.7	100.0
1996-2000	5.4	8.1	5.3	8.3	18.4	45.6
2001	23.3	16.5	23.6	31.1	26.1	120.6
2002	12.1	24.4	18.1	33.4	19.7	107.6
2003	19.3	28.0	39.6	42.9	14.8	144.5
2004	18.6	29.3	39.0	40.5	18.3	145.7
2005	13.3	12.1	13.4	24.6	12.6	76.0
2006	8.2	15.9	10.4	17.2	10.6	62.3
2007	12.4	21.0	20.8	23.0	11.1	88.3
2008	3.7	9.1	5.4	7.4	4.8	30.4
2009	12.3	22.4	29.6	14.4	5.9	84.5
2010	10.3	13.5	15.0	8.6	6.0	53.3
2011	7.4	12.8	12.0	10.3	6.3	48.8
2012	4.8	12.4	14.8	16.5	18.8	67.3
2013	6.1	14.1	15.3	29.8	20.1	85.5
2014	12.3	25.2	37.2	29.8	17.1	121.5
2015	8.6	15.5	18.2	14.7	9.0	66.0
2016[b/]	4.3	11.0	8.2	11.2	4.2	38.9

a/ The fishery north of Cape Falcon was closed in 1994, and it is assumed that no trips were taken out of Astoria into the south of Cape Falcon area. No samplers were stationed in Astoria.

b/ Preliminary.

c/ Less than 50 trips.

TABLE IV-13. Estimates of Washington recreational ocean salmon angler trips (thousands) by port area and boat type.
(Page 1 of 2)

Year or Avg.	Neah Bay[a/]	La Push	Westport	Ilwaco[b/]	State Total
			CHARTER TRIPS		
1984[c/]	0.3	-	11.6	18.0	29.9
1985[c/]	2.0	-	42.2	20.7	64.9
1986-1990	2.0	-	35.7	15.9	53.5
1991-1995	0.7	0.1	19.4	7.9	28.0
1996-2000	0.3	0.1	9.7	3.6	13.6
2001	1.4	0.3	25.6	13.9	41.2
2002	1.5	0.4	24.5	10.6	37.0
2003	2.0	0.9	27.3	14.3	44.5
2004	1.9	0.6	22.5	11.4	36.5
2005	1.2	0.6	20.5	9.4	31.7
2006	0.5	0.5	15.4	8.0	24.5
2007	0.6	0.4	15.7	10.1	26.7
2008	0.3	0.2	9.9	3.7	14.2
2009	0.5	0.7	18.5	9.7	29.4
2010	0.4	0.6	18.4	7.0	26.5
2011	0.5	0.7	14.1	6.9	22.2
2012	0.8	0.7	16.2	6.9	24.5
2013	0.9	0.7	15.9	7.1	24.7
2014	1.1	1.1	22.7	9.7	34.6
2015	1.0	0.8	20.2	8.6	30.6
2016[d/]	0.6	0.3	7.5	5.3	13.7
			PRIVATE TRIPS		
1984[c/]	8.3	0.2	2.3	36.0	46.8
1985[c/]	15.2	1.5	13.7	19.4	49.8
1986-1990	16.9	2.5	16.6	23.4	59.4
1991-1995	16.4	2.8	18.5	25.4	63.1
1996-2000	8.8	1.6	12.7	12.8	35.8
2001	16.6	3.1	24.1	28.7	72.4
2002	12.2	3.0	16.9	25.3	57.4
2003	18.4	3.5	20.7	32.9	75.5
2004	24.2	3.9	15.7	29.3	73.1
2005	17.2	4.4	14.7	22.6	58.9
2006	12.9	3.6	9.1	13.5	39.1
2007	12.8	2.9	10.2	20.0	45.9
2008	5.3	1.9	8.8	6.3	22.2
2009	16.0	4.4	19.3	29.8	69.5
2010	11.1	3.2	20.0	20.1	54.4
2011	10.6	3.6	19.4	15.7	49.2
2012	12.7	3.3	21.1	13.4	50.5
2013	14.4	3.6	20.0	14.4	52.3
2014	15.4	3.9	31.2	27.6	78.1
2015	13.8	2.7	25.2	19.6	61.3
2016[d/]	7.7	0.8	10.4	15.1	34.0

TABLE IV-13. Estimates of Washington recreational ocean salmon angler trips (thousands) by port area and boat type.
(Page 2 of 2)

Year or Avg.	Neah Bay[a/]	La Push	Westport	Ilwaco[b/]	State Total
			TOTAL TRIPS		
1984[c/]	8.6	0.2	13.9	54.0	76.7
1985[c/]	17.2	1.5	55.9	40.1	114.7
1986-1990	18.9	2.5	52.3	39.3	113.0
1991-1995	17.1	2.9	37.9	33.3	91.1
1996-2000	9.1	1.6	22.4	16.4	49.4
2001	17.9	3.4	49.7	42.5	113.6
2002	13.7	3.4	41.4	35.9	94.4
2003	20.4	4.4	48.0	47.1	120.0
2004	26.1	4.6	38.2	40.6	109.5
2005	18.5	4.9	35.2	32.1	90.6
2006	13.4	4.1	24.5	21.5	63.6
2007	13.4	3.3	25.9	30.1	72.7
2008	5.6	2.1	18.7	10.0	36.4
2009	16.5	5.1	37.8	39.5	98.9
2010	11.5	3.8	38.4	27.0	80.8
2011	11.1	4.2	33.5	22.5	71.4
2012	13.4	3.9	37.3	20.3	75.0
2013	15.4	4.3	35.9	21.5	77.0
2014	16.5	5.1	53.9	37.2	112.7
2015	14.8	3.5	45.5	28.2	91.9
2016[d/]	8.3	1.1	17.8	20.5	47.7

a/ Does not include effort from the late-season state water Area 4B fishery, when open.

b/ Does not include effort from the Columbia River Jetty.

c/ Values for 1984 and 1985 include some Columbia River fishing after closure of the ocean fishery.

d/ Preliminary.

TABLE IV-14. Oregon and Washington recreational salmon, bottomfish, and sturgeon angler trips (thousands) by ocean port area and boat type for the area north of Cape Falcon. (Page 1 of 3)

	Columbia River and Buoy 10					Westport			La Push			Neah Bay and Area 4B Add-On		
Year	Charter	Private	Subtotal	Jetty	Total	Charter	Private	Total	Charter	Private	Total	Charter	Private	Total
SALMON EFFORT														
1984	NA	NA	-	NA	54.0	11.6	2.3	13.9	0.0	0.2	0.2	0.3	8.3	8.6
1985	NA	NA	-	NA	90.3	42.2	13.7	55.9	0.0	1.5	1.5	2.0	15.2	17.2
1986	NA	NA	-	NA	144.3	36.6	14.8	51.4	0.0	1.7	1.7	2.4	17.4	19.8
1987	39.5	130.0	169.5	12.4	181.9	34.1	9.8	43.9	0.0	2.0	2.0	1.9	17.8	19.7
1988	34.5	154.4	188.9	16.9	205.8	23.5	13.9	37.4	0.0	2.8	2.8	2.0	14.8	16.8
1989	40.4	169.2	209.6	22.9	232.5	40.8	18.7	59.5	0.0	1.6	1.6	2.8	25.5	28.3
1990	32.8	128.7	161.5	5.7	167.2	43.4	25.9	69.3	0.0	4.2	4.2	3.0	30.8	33.8
1991	37.9	172.7	210.6	35.5	246.1	28.6	24.2	52.8	0.2	3.3	3.5	1.9	23.5	25.4
1992	22.3	116.6	138.9	28.4	167.3	28.1	25.6	53.7	0.2	2.3	2.5	1.1	18.6	19.7
1993	20.2	103.3	123.5	24.6	148.1	27.4	23.5	50.9	0.1	2.8	2.9	1.6	25.7	27.3
1994	0.5	6.3	6.8	3.6	10.4	-	-	-	-	-	-	-	-	-
1995	9.0	43.4	52.4	8.5	60.9	12.7	9.0	21.7	0.1	1.4	1.5	0.3	9.2	9.5
1996	7.3	26.8	34.1	7.5	41.6	10.3	5.2	15.5	a/	1.3	1.3	0.3	10.6	10.9
1997	8.4	53.0	61.3	7.4	68.7	10.0	7.3	17.3	0.1	0.9	0.9	0.2	4.6	4.8
1998	3.2	30.7	33.9	3.6	37.5	4.5	3.5	8.0	0.0	0.6	0.6	0.1	6.3	6.4
1999	8.7	63.9	72.6	6.2	78.8	11.5	7.6	19.1	0.1	2.9	2.9	0.5	7.6	8.1
2000	9.8	82.2	92.0	7.0	99.0	12.2	7.7	19.8	0.1	1.8	2.0	1.1	10.3	11.4
2001	22.5	165.0	187.5	17.0	204.5	25.6	24.1	49.7	0.3	3.1	3.4	1.4	16.8	18.1
2002	15.2	115.1	130.3	2.8	133.1	44.5	16.9	41.4	0.4	3.0	3.4	1.5	12.2	13.7
2003	19.3	133.3	152.7	7.2	159.8	27.3	20.7	48.0	0.9	3.5	4.4	2.0	18.4	20.4
2004	15.8	113.3	129.2	3.2	132.3	22.5	15.7	38.2	0.6	3.9	4.6	1.9	24.2	26.1
2005	12.0	88.5	100.5	b/	100.5	20.5	14.7	35.2	0.6	4.4	4.9	1.2	17.2	18.5
2006	10.4	59.8	70.2	1.7	71.9	15.4	9.1	24.5	0.5	3.6	4.1	0.5	12.9	13.4
2007	13.6	64.2	77.8	b/	77.8	15.7	10.2	25.9	0.4	2.9	3.3	0.6	12.8	13.4
2008	5.5	40.7	46.1	0.4	46.5	9.9	8.8	18.7	0.2	1.9	2.1	0.3	6.1	6.4
2009	13.1	109.9	122.9	2.6	125.5	18.5	19.3	37.8	0.7	4.4	5.1	0.5	16.0	16.5
2010	8.9	79.9	88.9	0.1	89.0	18.4	20.0	38.4	0.6	3.2	3.8	0.4	11.1	11.5
2011	10.5	76.2	86.7	2.2	88.9	14.1	19.4	33.5	0.7	3.6	4.2	0.5	10.6	11.1
2012	9.5	79.3	88.8	2.7	91.5	16.2	21.1	37.3	0.7	3.3	3.9	0.8	12.7	13.4
2013	10.2	82.3	92.5	4.8	97.2	15.9	20.0	35.9	0.7	3.6	4.3	0.9	14.4	15.4
2014	12.8	140.3	153.1	10.9	164.0	22.5	31.2	53.8	1.1	3.9	5.1	1.1	15.4	16.5
2015	11.1	127.4	138.5	5.2	143.8	20.2	25.2	45.5	0.8	2.7	3.5	1.0	13.8	14.8
2016[c/]	6.0	107.5	113.5	3.8	117.3	7.5	10.4	17.8	0.3	0.8	1.1	0.6	7.7	8.3

TABLE IV-14. Oregon and Washington recreational salmon, bottomfish, and sturgeon angler trips (thousands) by ocean port area and boat type for the area north of Cape Falcon. (Page 2 of 3)

	Columbia River and Buoy 10					Westport			La Push			Neah Bay and Area 4B Add-On		
Year	Charter	Private	Subtotal	Jetty	Total	Charter	Private	Total	Charter	Private	Total	Charter	Private	Total
						BOTTOMFISH EFFORT[d/]								
1984	2.1	0.1	2.2	-	-	12.4	0.5	12.9	0.0	0.0	0.0	1.8	12.3	14.1
1985	1.9	0.2	2.1	-	-	15.3	1.0	16.3	0.0	0.1	0.1	3.0	10.6	13.6
1986	1.7	0.2	1.9	-	-	19.6	0.8	20.4	0.0	0.2	0.2	3.5	11.4	14.9
1987	1.7	0.3	2.0	0.5	2.5	21.1	1.2	22.3	0.0	0.5	0.5	5.6	16.0	21.6
1988	2.1	0.2	2.3	0.8	3.1	24.4	1.1	25.5	0.0	0.7	0.7	5.7	14.8	20.5
1989	1.2	0.6	1.8	1.5	3.3	19.3	1.0	20.3	0.0	0.6	0.6	6.8	16.3	23.1
1990	1.4	0.3	1.7	2.4	4.1	21.8	0.8	22.6	0.0	0.8	0.8	6.4	18.1	24.5
1991	1.3	0.4	1.7	1.8	3.5	23.5	1.1	24.6	0.0	0.9	0.9	5.9	18.2	24.1
1992	1.4	0.5	1.9	2.3	4.1	20.5	2.2	22.7	0.0	1.5	1.5	4.8	19.1	23.9
1993	2.2	0.6	2.8	2.6	5.4	21.5	1.8	23.0	0.1	1.1	1.2	5.1	19.2	24.3
1994	2.7	0.7	3.3	2.7	6.0	26.0	1.7	27.7	0.2	1.9	2.1	4.1	15.0	19.1
1995	1.3	0.9	2.3	2.2	4.4	21.1	1.6	22.7	a/	1.6	1.6	4.1	19.2	23.3
1996[e/f/]	1.2	0.5	1.7	1.7	3.4	21.4	1.2	22.6	0.0	1.6	1.6	4.8	21.0	25.8
1997	1.2	0.7	2.0	2.5	4.4	19.2	1.4	20.6	0.0	2.2	2.2	4.9	22.7	27.7
1998	1.8	0.5	2.3	0.9	3.2	21.5	1.3	22.8	0.0	1.2	1.2	5.1	23.9	29.0
1999	1.0	0.5	1.5	0.5	2.0	17.1	1.2	18.3	0.1	1.0	1.1	4.5	20.3	24.9
2000	1.2	0.6	1.8	0.5	2.3	16.7	0.9	17.6	0.2	1.3	1.5	4.5	20.1	24.6
2001	2.8	0.4	3.2	0.9	4.1	13.9	1.2	15.1	0.3	0.9	1.2	4.7	16.5	21.2
2002	14.3	0.5	1.9	0.8	2.8	14.9	1.2	16.1	0.3	1.2	1.6	4.0	15.7	19.7
2003	2.4	0.5	2.9	0.9	3.8	16.3	1.8	18.2	1.0	2.5	3.6	5.2	21.4	26.6
2004	2.4	0.8	3.2	0.3	3.5	14.8	1.7	16.5	0.4	1.7	2.1	3.5	15.2	18.7
2005	2.5	1.1	3.7	b/	3.7	15.5	1.8	17.3	0.5	2.5	3.0	3.5	18.8	22.4
2006	3.6	1.2	4.9	0.9	5.7	17.7	1.8	19.5	0.3	2.8	3.1	4.4	16.9	21.3
2007	3.1	1.5	4.6	b/	4.6	16.2	1.6	17.7	0.5	2.5	3.0	4.3	15.7	20.0
2008	2.9	2.0	4.9	0.4	5.3	15.5	1.7	17.2	1.0	2.3	3.3	2.3	16.2	18.5
2009	2.1	1.3	3.3	0.3	3.6	13.0	2.2	15.2	0.7	2.7	3.4	1.5	13.6	15.1
2010	2.9	1.7	4.7	0.5	5.2	11.7	1.8	13.5	0.7	3.6	4.3	1.2	15.4	16.6
2011	3.6	1.8	4.5	0.9	5.4	13.9	2.4	16.3	0.5	4.8	5.3	1.2	14.2	15.4
2012	3.2	2.0	5.2	0.6	5.8	15.5	2.5	18.0	0.4	5.9	6.3	0.9	13.5	14.4
2013	3.3	2.2	5.6	0.4	6.0	14.5	2.9	17.3	0.4	5.2	5.6	0.7	15.9	16.6
2014	3.0	1.5	4.5	0.8	5.3	13.8	2.7	16.5	0.4	5.0	5.4	0.8	17.6	18.4
2015	3.0	1.6	4.6	b/	4.6	16.4	3.6	19.9	0.5	5.3	5.8	0.9	15.3	16.2
2016[c/]	4.6	3.0	7.5	1.6	7.5	18.8	5.5	24.3	0.8	6.4	7.2	1.3	17.7	19.0

TABLE IV-14. Oregon and Washington recreational salmon, bottomfish, and sturgeon angler trips (thousands) by ocean port area and boat type for the area north of Cape Falcon. (Page 3 of 3)

	Columbia River and Buoy 10					Westport			La Push			Neah Bay and Area 4B Add-On		
Year	Charter	Private	Subtotal	Jetty	Total	Charter	Private	Total	Charter	Private	Total	Charter	Private	Total
						STURGEON EFFORT[g/]								
1984	1.7	28.4	30.1	-	30.1	-	-	-	-	-	-	-	-	-
1985	5.0	31.2	36.2	-	36.2	-	-	-	-	-	-	-	-	-
1986	5.7	35.7	41.4	-	41.4	-	-	-	-	-	-	-	-	-
1987	6.0	43.2	49.2	-	49.2	-	-	-	-	-	-	-	-	-
1988	6.2	32.4	38.5	-	38.5	-	-	-	-	-	-	-	-	-
1989	4.3	22.0	26.3	-	26.3	-	-	-	-	-	-	-	-	-
1990	3.9	28.0	31.9	-	31.9	-	-	-	-	-	-	-	-	-
1991	3.6	26.0	29.7	-	29.7	-	-	-	-	-	-	-	-	-
1992	5.0	38.3	43.3	-	43.3	-	-	-	-	-	-	-	-	-
1993	6.1	48.6	54.6	-	54.6	-	-	-	-	-	-	-	-	-
1994	7.5	40.4	47.8	-	47.8	-	-	-	-	-	-	-	-	-
1995	7.7	55.2	62.9	-	62.9	-	-	-	-	-	-	-	-	-
1996	11.1	45.2	56.3	-	56.3	-	-	-	-	-	-	-	-	-
1997	12.2	48.4	60.7	-	60.7	-	-	-	-	-	-	-	-	-
1998	14.2	64.3	78.5	-	78.5	-	-	-	-	-	-	-	-	-
1999	13.2	57.1	70.3	-	70.3	-	-	-	-	-	-	-	-	-
2000	11.6	52.1	63.7	-	63.7	-	-	-	-	-	-	-	-	-
2001	10.8	40.9	51.7	-	51.7	-	-	-	-	-	-	-	-	-
2002	9.9	45.9	55.8	-	55.8	-	-	-	-	-	-	-	-	-
2003	6.6	38.1	44.7	-	44.7	-	-	-	-	-	-	-	-	-
2004	7.4	32.2	39.6	-	39.6	-	-	-	-	-	-	-	-	-
2005	8.7	51.2	59.9	-	59.9	-	-	-	-	-	-	-	-	-
2006	6.7	37.3	44.0	-	44.0	-	-	-	-	-	-	-	-	-
2007	7.9	39.8	47.7	-	47.7	-	-	-	-	-	-	-	-	-
2008	7.5	38.5	46.0	-	46.0	-	-	-	-	-	-	-	-	-
2009	6.1	43.0	49.1	-	49.1	-	-	-	-	-	-	-	-	-
2010	5.4	31.4	36.8	-	36.8	-	-	-	-	-	-	-	-	-
2011	3.6	21.7	25.3	-	25.3	-	-	-	-	-	-	-	-	-
2012	2.4	16.5	18.9	-	18.9	-	-	-	-	-	-	-	-	-
2013	1.5	14.8	16.3	-	16.3	-	-	-	-	-	-	-	-	-
2014	0.1	1.5	1.7	-	1.7	-	-	-	-	-	-	-	-	-
2015	a/	1.0	1.0	-	1.0	-	-	-	-	-	-	-	-	-
2016[c/]	a/	2.5	2.5	-	2.5	-	-	-	-	-	-	-	-	-

a/ Fewer than 50 angler trips.
b/ Columbia River north jetty was not sampled in 2005 and 2007 due to construction limiting access; the outer jetty was not sampled in 2015 due to construction limiting access to near-beach areas.
c/ Preliminary.
d/ Oregon data is a minimum estimate, as the jetty is not sampled, and bottomfish sampling of vessels only occurs when the ocean is open for salmon.
e/ No Oregon bottomfish trips are included.
f/ Includes tuna trips: Ilwaco - 9 charter, 14 private; Westport - 784 charter, 0 private.
g/ Annual sturgeon angler trips for the lower Columbia River from the western tip of Puget Island to mouth.

TABLE IV-15. Buoy 10[a/b/] and Area 4B add-on recreational salmon angler trips and catch by boat type.
(Page 1 of 2)

	Angler Trips			Chinook Catch			Coho Catch			Pink Catch	
Year or Avg.	Charter	Private	Jetty	Charter	Private	Jetty	Charter	Private	Jetty	Charter	Private
					OREGON BUOY 10						
1987-1990	4,002	38,619	4,029	793	6,415	29	3,292	18,348	690	0	0
1991-1995	1,528	21,547	4,555	122	1,318	30	1,625	14,520	1,389	0	0
1996-2000	626	15,760	1,832	126	2,712	3	206	3,764	353	0	0
2001	1,616	54,444	4,115	47	5,578	10	1,481	56,403	523	0	0
2002	512	39,943	1,589	31	10,728	-	2	3,058	52	0	0
2003	991	45,461	2,315	47	7,903	-	624	28,518	526	0	0
2004	66	33,092	1,170	19	9,191	-	17	7,585	47	0	0
2005	135	33,051	935	18	6,875	6	51	4,785	36	0	0
2006	37	24,194	1,457	1	1,350	-	-	2,800	-	0	0
2007	156	19,983	793	6	2,511	-	38	4,841	97	0	0
2008	198	19,020	-	43	5,608	-	69	4,487	-	0	0
2009	182	39,425	1,684	1	3,550	16	164	27,000	466	0	0
2010	82	30,159	710	2	4,537	11	8	5,171	22	0	0
2011	70	30,074	1,705	3	7,150	34	6	5,029	315	0	0
2012	468	39,753	1,368	52	12,934	22	42	4,909	104	0	0
2013	459	40,648	1,754	81	15,448	41	50	4,638	148	0	0
2014	237	70,402	3,696	13	19,033	41	385	39,873	2,295	0	0
2015	150	67,883	6,081	43	25,227	246	88	22,067	3,442	0	0
2016[c/]	96	59,778	4,114	5	13,551	404	13	5,560	582	0	0
					WASHINGTON BUOY 10						
1987-1990	10,678	71,927	6,567	1,907	14,398	68	8,353	40,415	1,627	1	11
1991-1995	4,162	41,770	5,908	466	3,710	42	5,178	31,681	1,426	0	16
1996-2000	1,957	23,952	1,045	393	3,999	24	950	6,305	82	0	0
2001	2,765	62,944	-	-	6,791	-	3,282	70,349	-	0	0
2002	1,001	40,927	485	232	8,424	26	98	3,023	-	0	0
2003	216	39,844	-	22	8,344	-	139	24,633	-	0	0
2004	685	33,805	-	45	6,791	-	139	7,381	-	0	0
2005	183	20,879	-	5	2,383	-	34	1,972	-	0	0
2006	421	14,597	-	5	351	-	8	879	-	0	0
2007	711	14,421	-	33	1,226	-	343	3,037	-	0	0
2008	804	12,445	-	154	2,544	-	436	3,581	-	0	0
2009	389	31,123	-	4	2,369	-	312	20,185	-	0	0
2010	106	21,241	-	7	2,250	-	11	2,767	-	0	0
2011	372	17,188	-	43	3,689	-	70	2,194	-	0	0
2012	447	23,034	-	51	5,491	-	82	2,248	-	0	0
2013	93	22,813	-	6	7,018	-	27	2,757	-	0	0
2014	179	32,675	333	-	7,701	-	179	14,673	339	0	0
2015	316	33,386	-	30	10,947	-	337	10,918	-	0	0
2016[c/]	149	28,668	2,145	7	3,797	16	62	2,691	274	0	0

TABLE IV-15. Buoy 10[a/b/] and Area 4B add-on recreational salmon angler trips and catch by boat type. (Page 2 of 2)

	Angler Trips			Chinook Catch			Coho Catch			Pink Catch	
Year or Avg.	Charter	Private	Jetty	Charter	Private	Jetty	Charter	Private	Jetty	Charter	Private
					TOTAL BUOY 10						
1987-1990	14,680	110,547	10,596	2,700	20,812	98	11,645	58,763	2,317	1	11
1991-1995	5,690	63,317	10,463	588	5,029	72	6,803	46,201	2,814	0	16
1996-2000	2,583	39,712	2,877	519	6,710	27	1,157	10,070	435	0	0
2001	4,381	117,388	4,115	47	12,369	10	4,763	126,752	523	0	0
2002	1,513	80,870	2,074	263	19,152	26	100	6,081	52	0	0
2003	1,207	85,305	2,315	69	16,247	0	763	53,151	526	0	0
2004	751	66,897	1,170	64	15,982	0	156	14,966	47	0	0
2005	318	53,930	935	23	9,258	6	85	6,757	36	0	0
2006	458	38,791	1,457	6	1,701	0	8	3,679	0	0	0
2007	867	34,404	793	39	3,737	0	381	7,878	97	0	0
2008	1,002	31,465	0	197	8,152	0	505	8,068	0	0	0
2009	571	70,548	1,684	5	5,919	16	476	47,185	466	0	0
2010	188	51,400	710	9	6,787	11	19	7,938	22	0	0
2011	442	47,262	1,705	46	10,839	34	76	7,223	315	0	0
2012	915	62,787	1,368	103	18,425	22	124	7,157	104	0	0
2013	552	63,461	1,754	87	22,466	41	77	7,395	148	0	0
2014	416	103,077	4,029	13	26,734	41	564	54,546	2,634	0	0
2015	466	101,269	6,081	73	36,174	246	425	32,985	3,442	0	0
2016[c/]	245	88,446	6,259	12	17,348	420	75	8,251	856	0	0
					TOTAL AREA 4B ADD-ON[d/]						
1989-1990	1,084	10,941	-	62	375	-	2,095	18,021	-	36	212
1991-1995	429	6,852	-	12	153	-	725	9,188	-	73	970
1996	36	1,511	-	-	5	-	61	2,266	-	0	0
1997	136	1,788	-	-	4	-	65	1,429	-	139	412
1998	71	6,296	-	5	98	-	125	7,937	-	0	3
1999[e/]	-	-	-	-	-	-	-	-	-	0	0
2000	373	3,046	-	-	8	-	614	3,796	-	0	0
2001-2005	-	-	-	-	-	-	-	-	-	0	0
2006[e/]	-	-	-	-	-	-	-	-	-	0	0
2007	-	-	-	-	-	-	-	-	-	0	0
2008	-	782	-	-	11	-	-	137	-	0	0
2009[f/]	-	-	-	-	-	-	-	-	-	0	0

a/ From 2000, catch downstream of boundary line from Tongue Pt., OR to Rocky Pt., WA. Prior to 2000, only catch downstream of Astoria-Megler Br.
b/ Prior to 1987, data on charter and private anglers were combined. Total Buoy 10 catch and effort data prior to 1987 are provided in Table B-21.
c/ Preliminary.
d/ There was no Area 4B add-on fishery prior to 1989.
e/ There was no Area 4B add-on fishery opening because the Area 4 ocean quota was not attained.
f/ There has been no Area 4B add-on fishery planned since 2008.

TABLE IV-16. Estimates of California coastal community and state personal income impacts in thousands of real (inflation adjusted, 2016) dollars of the troll and recreational ocean salmon fishery for major port areas.[a/]

Year or Avg.	Crescent City	Eureka	Fort Bragg	San Francisco	Monterey	Coastal Community Total[b/]	State-Level Total
				OCEAN TROLL[c/]			
1976-1980	6,679	16,965	16,635	21,822	9,366	71,466	91,879
1981-1985	3,383	4,081	9,551	18,029	6,143	41,187	51,279
1986-1990	1,272	3,149	16,751	32,527	12,165	65,864	80,833
1991-1995	10	149	1,053	12,241	6,974	20,427	24,616
1996-2000	11	178	744	12,815	7,770	21,517	22,766
2001	16	327	1,081	11,362	2,404	15,189	15,766
2002	286	548	3,904	16,238	4,373	25,349	26,928
2003	231	40	15,865	16,531	2,607	35,275	39,232
2004	2,034	449	7,780	24,441	5,501	40,206	41,051
2005	152	457	5,672	14,122	7,412	27,815	28,510
2006	-	-	2,586	6,686	1,031	10,302	10,622
2007	348	862	3,565	8,507	1,734	15,016	15,284
2008	-	-	-	-	-	-	-
2009	-	-	-	-	-	-	-
2010[d/]	-	34	1,485	159	101	1,779	2,416
2011	35	434	4,176	2,646	644	7,936	9,904
2012	20	700	4,033	12,707	3,774	21,234	25,032
2013	109	1,717	10,034	19,464	1,975	33,299	38,916
2014	105	752	6,420	9,510	560	17,346	20,199
2015	26	433	5,093	4,338	822	10,712	13,337
2016[e/]	2	65	1,761	4,055	906	6,788	8,358
				RECREATIONAL			
1976-1980	1,296	1,502	875	13,149	881	17,702	19,857
1981-1985	1,419	1,463	701	11,644	930	16,157	18,187
1986-1990	2,405	2,506	1,222	14,231	3,824	24,188	28,188
1991-1995	872	939	1,418	12,037	5,765	21,031	24,693
1996-2000	404	744	1,448	12,068	5,301	19,965	23,227
2001	375	814	2,198	8,040	3,222	14,649	15,606
2002	167	906	2,325	10,094	4,973	18,465	19,612
2003	95	682	1,755	7,315	2,395	12,242	12,968
2004	143	1,143	2,276	11,836	4,646	20,044	21,203
2005	108	723	1,841	8,952	3,385	15,009	15,869
2006	64	714	1,517	6,082	2,037	10,414	11,055
2007	90	932	1,224	4,311	1,493	8,050	8,613
2008	-	-	28	-	-	28	32
2009	48	241	-	-	-	288	337
2010	21	442	912	3,695	2,305	7,375	10,555
2011	78	1,598	2,072	7,033	3,558	14,341	20,507
2012	814	2,770	2,088	12,395	5,817	23,883	33,947
2013	723	2,747	2,512	14,923	3,692	24,598	34,215
2014	465	1,982	2,519	12,056	3,448	20,469	28,496
2015	67	1,043	1,670	10,332	1,801	14,913	20,173
2016[e/]	58	1,021	1,305	9,388	911	12,682	16,968

a/ Estimates of income impacts are provided from output of the Fishery Economic Assessment Model (FEAM) and IOPAC. These are the income impacts associated with expenditures in the troll and/or recreational sectors. There is no differentiation between money that may be new to the area versus money that may otherwise have been expended in other sectors. Values through 1995 are based on a 1992 run of the FEAM using 1989 IMPLAN data. Values from 1996 through 2000 are based on a 1998 run of the FEAM using 1996 IMPLAN data. Values from 2001 through 2009 are based on a run of the FEAM using 2000 PacFIN landings and 1998 IMPLAN data. Beginning with the 2010 data year, income impact estimates are based on the NWFSC's IOPAC model, which uses updated IMPLAN and landings data, and survey-based industry cost data. A description of the transition from FEAM-based to IOPAC-based impact multipliers and comparisons of results from the two models are found in Appendix E of the Review of 2014 Ocean Salmon Fisheries:
http://www.pcouncil.org/salmon/stock-assessment-and-fishery-evaluation-safe-documents/review-of-2014-ocean-salmon-fisheries/

b/ Total personal income impacts on coastal areas. Totals do not include impacts of one coastal area on another.

c/ Excluding pink salmon.

d/ Eureka impacts are from fish caught in the Fort Bragg area fishery and landed in Eureka.

e/ Preliminary.

TABLE IV-17. Estimates of Oregon coastal community and state personal income impacts in thousands of real (inflation adjusted, 2016) dollars of the troll and recreational ocean salmon fishery for major port areas.[a/]

Year or Avg.	Astoria	Tillamook	Newport	Coos Bay	Brookings	Coastal Community Total[b/]	State-Level Total
			OCEAN TROLL[c/]				
1976-1980	4,288	5,519	12,947	19,924	8,283	50,960	69,093
1981-1985	1,389	1,787	4,191	7,390	3,208	17,965	24,414
1986-1990	641	3,738	8,320	16,039	3,040	31,778	42,918
1991-1995	89	697	2,856	1,387	141	5,171	6,971
1996-2000	148	292	3,022	1,745	421	5,628	6,858
2001	403	823	6,160	3,237	664	11,287	13,738
2002	1,153	977	5,275	4,663	843	12,911	15,637
2003	1,130	1,024	6,829	6,209	732	15,922	19,265
2004	953	762	6,746	7,340	1,571	17,372	18,773
2005	789	1,314	5,619	5,566	1,317	14,606	15,783
2006	1,033	643	1,688	455	396	4,214	4,521
2007	305	432	703	2,050	816	4,306	4,622
2008	434	212	-	-	76	722	761
2009	177	166	146	20	44	554	592
2010	956	158	1,276	1,118	189	3,697	5,208
2011	241	58	522	2,327	260	3,408	4,483
2012	710	283	1,962	2,275	353	5,582	7,942
2013	347	488	1,544	6,565	614	9,558	12,886
2014	1,846	1,009	5,388	8,020	1,189	17,451	24,587
2015	1,085	638	2,528	3,747	506	8,505	11,879
2016[d/]	300	157	2,859	1,236	126	4,677	6,929
			RECREATIONAL				
1979	3,594	1,148	5,465	5,534	2,664	18,405	23,729
1980	4,340	1,907	6,034	5,800	2,589	20,669	26,620
1981-1985	2,119	1,708	4,081	4,161	2,896	14,964	19,427
1986-1990	1,450	1,814	5,646	4,113	3,015	16,039	20,881
1991-1995	985	793	1,796	1,603	1,132	6,308	8,180
1996-2000	381	437	431	475	913	2,638	3,478
2001	1,481	798	1,883	1,578	1,101	6,841	8,384
2002	864	1,132	1,484	1,730	811	6,021	7,411
2003	1,260	1,309	2,969	2,162	636	8,336	10,255
2004	1,132	1,423	2,742	2,043	786	8,126	10,008
2005	821	587	932	1,270	525	4,135	5,067
2006	590	691	732	908	446	3,367	4,137
2007	828	939	1,420	1,136	457	4,780	5,875
2008	238	370	308	308	198	1,422	1,750
2009	834	1,012	2,048	611	252	4,757	5,856
2010	960	733	1,287	328	333	3,641	5,453
2011	744	715	1,225	400	350	3,434	5,230
2012	596	677	1,411	667	1,062	4,414	6,924
2013	676	793	1,508	1,144	1,177	5,298	8,622
2014	1,222	1,408	3,662	1,135	986	8,413	12,975
2015	894	861	1,800	553	504	4,613	7,047
2016[d/]	347	575	759	415	234	2,329	3,749

a/ Estimates of income impacts are provided from output of the Fishery Economic Assessment Model (FEAM) and IOPAC. These are the income impacts associated with expenditures in the troll and/or recreational sectors. There is no differentiation between money that may be new to the area versus money that may otherwise have been expended in other sectors. Values through 1995 are based on a 1992 run of the FEAM using 1989 IMPLAN data. Values from 1996 through 2000 are based on a 1998 run of the FEAM using 1996 IMPLAN data. Values from 2001 through 2009 are based on a run of the FEAM using 2000 PacFIN landings and 1998 IMPLAN data. Beginning with the 2010 data year, income impact estimates are based on the NWFSC's IOPAC model, which uses updated IMPLAN and landings data, and survey-based industry cost data. A description of the transition from FEAM-based to IOPAC-based impact multipliers and comparisons of results from the two models are found in Appendix E of the Review of 2014 Ocean Salmon Fisheries:
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b/ Total personal income impacts on coastal areas. Totals do not include impacts of one coastal area on another.

c/ Excluding pink salmon.

d/ Preliminary.

TABLE IV-18. Estimates of Washington coastal community and state personal income impacts in thousands of real (inflation adjusted, 2016) dollars of the troll and recreational ocean salmon fishery for major port areas.[a/]

Year or Avg.	Neah Bay	La Push	Westport	Ilwaco[b/]	Coastal Community Total[c/d/]	Puget Sound	State-Level Total
			OCEAN TROLL[e/f/]				
1976-1980	6,192	8,454	16,760	6,002	37,409	8,332	59,678
1981-1985	1,217	493	4,592	1,099	7,401	1,778	11,633
1986-1990	673	177	2,110	459	3,419	1,029	5,601
1991-1995[g/]	495	109	705	50	1,362	199	2,005
1996-2000	167	3	201	19	391	103	537
2001	330	0	687	46	1,063	0	1,150
2002	682	89	1,196	199	2,166	0	2,388
2003	1,239	209	1,023	150	2,621	47	3,039
2004	913	288	1,135	111	2,447	29	2,828
2005	748	447	1,151	142	2,488	1	2,812
2006	557	451	433	291	1,731	37	2,050
2007	246	250	1,021	127	1,643	22	1,828
2008	160	212	606	162	1,140	13	1,285
2009	326	336	1,173	81	1,916	37	2,185
2010	247	396	3,766	92	4,501	-	5,418
2011	567	225	1,371	94	2,256	-	2,978
2012	848	492	1,437	229	3,006	-	4,137
2013	476	441	2,602	73	3,592	-	4,504
2014	380	447	1,467	1,081	3,374	1	4,270
2015	310	631	2,965	410	4,316	24	5,315
2016	202	201	1,363	216	1,982	36	2,441
			RECREATIONAL				
1976-1980	2,281	1,132	22,690	11,107	37,210	-	50,302
1981-1985	1,380	141	8,928	4,588	15,037	-	20,349
1986-1990	1,059	121	5,066	2,731	8,977	-	12,159
1991-1995	562	110	3,127	1,586	5,385	-	7,282
1996-2000	298	81	1,464	716	2,559	-	3,450
2001	833	170	6,195	3,925	11,123	-	12,995
2002	709	181	5,707	3,124	9,721	-	11,357
2003	1,030	288	6,427	4,163	11,909	-	13,932
2004	1,208	256	5,243	3,436	10,143	-	11,893
2005	828	259	4,785	2,783	8,655	-	10,135
2006	543	228	3,533	2,163	6,467	-	7,570
2007	554	177	3,626	2,827	7,183	-	8,398
2008	240	106	2,385	1,007	3,738	-	4,368
2009	646	284	4,550	3,113	8,593	-	10,051
2010	764	327	6,208	3,365	10,665	-	17,886
2011	745	357	5,095	2,983	9,179	-	15,530
2012	928	338	5,752	2,806	9,824	-	16,596
2013	1,071	362	5,586	2,937	9,956	-	16,920
2014	1,171	476	8,178	4,653	14,478	-	24,436
2015	1,042	329	7,084	3,730	12,185	-	20,449
2016	585	110	2,701	2,561	5,958	-	10,117

a/ Estimates of income impacts are provided from output of the Fishery Economic Assessment Model (FEAM) and IOPAC. These are the income impacts associated with expenditures in the troll and/or recreational sectors. There is no differentiation between money that may be new to the area versus money that may otherwise have been expended in other sectors. Values through 1995 are based on a 1992 run of the FEAM using 1989 IMPLAN data. Values from 1996 through 2000 are based on a 1998 run of the FEAM using 1996 IMPLAN data. Values from 2001 through 2009 are based on a run of the FEAM using 2000 PacFIN landings and 1998 IMPLAN data. Beginning with the 2010 data year, income impact estimates are based on the NWFSC's IOPAC model, which uses updated IMPLAN and landings data, and survey-based industry cost data. A description of the transition from FEAM-based to IOPAC-based impact multipliers and comparisons of results from the two models are found in Appendix E of the Review of 2014 Ocean Salmon Fisheries:
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b/ Recreational values exclude recreational shorebased effort from the Columbia River north jetty.

c/ Total personal income impacts on coastal areas. Totals do not include impacts of one coastal area on another.

d/ Through 1993, commercial values include a very small amount of fish landed in Washington coastal areas not included in the major port groups.

e/ Excluding pink salmon.

f/ All commercial values in this table are based on preliminary information available at the start of each year's Salmon Review.

g/ The non-Indian commercial and recreational fisheries were closed north of Cape Falcon in 1994. Some commercial catch taken south of Cape Falcon was landed in the Puget Sound area.

TABLE IV-19. Local personal income impacts in real (inflation adjusted, 2016) dollars of the inriver commercial salmon fishery on Oregon and Washington Columbia River communities.[a/]

Year or Avg.	Non-Indian - Gillnet [b/] Chinook Spring	Chinook Fall Brights[d/]	Chinook Fall Tules	Coho	Chum	TOTAL	Treaty Indian - All Gears [c/] Chinook Spring	Chinook Fall Brights[d/]	Chinook Fall Tules	Coho	Chum	TOTAL	Columbia River Total
Oregon													
1987-2003	1,011	2,635	267	1,966	3	5,883	13	1,110	79	11	e/	1,214	7,097
2004	2,354	1,561	332	1,894	1	6,142	393	1,603	385	60	-	2,440	8,582
2005	707	1,134	198	2,072	e/	4,111	-	598	91	1	-	690	4,801
2006	1,281	1,472	96	1,391	e/	4,240	1	798	16	33	-	847	5,087
2007	1,527	809	e/	615	e/	2,951	133	777	e/	34	-	943	3,895
2008	1,380	2,199	206	1,423	e/	5,208	643	1,988	216	113	-	2,960	8,168
2009	868	1,986	299	2,228	e/	5,383	295	1,389	153	60	-	1,896	7,279
2010	2,705	1,292	221	1,116	1	5,334	847	656	126	47	e/	1,675	7,009
2011	1,664	2,063	194	1,032	e/	4,953	261	852	44	43	e/	1,200	6,153
2012	1,496	1,275	156	211	e/	3,137	104	495	7	16	e/	623	3,760
2013	1,501	3,442	172	796	e/	5,911	145	1,680	37	10	e/	1,873	7,783
2014	996	2,572	224	2,635	e/	6,426	443	1,408	22	55	e/	1,928	8,354
2015	1,954	2,282	147	406	e/	4,789	670	1,544	46	3	e/	2,263	7,052
2016[f/]	1,935	2,048	93	602	e/	4,677	218	1,308	3	12	e/	1,541	6,219
Washington[f/g/h/]													
1987-2003	446	1,135		895	2	2,478	138	2,291		37	-	2,465	4,943
2004	618	1,240		970	e/	2,828	458	1,823		66	-	2,347	5,175
2005	492	879		479	e/	1,850	298	3,000		54	-	3,351	5,201
2006	691	995		608	-	2,294	995	3,293		86	e/	4,374	6,668
2007	246	499		500	e/	1,246	1	2,858		142	e/	3,001	4,247
2008	602	1,079		596	1	2,278	1,946	3,999		390	e/	6,335	8,613
2009	612	1,233		664	1	2,510	1,306	2,391		79	-	3,776	6,286
2010	857	808		512	2	2,178	3,131	2,740		35	e/	5,906	8,085
2011	560	1,184		378	1	2,123	2,646	4,612		370	1	7,628	9,751
2012	522	1,151		98	e/	1,771	1,459	2,697		57	e/	4,212	5,984
2013	288	1,999		322	e/	2,609	1,293	6,285		161	e/	7,740	10,349
2014	358	1,981		860	e/	3,199	2,866	7,421		523	3	10,810	14,009
2015	723	2,128		114	e/	2,965	3,799	8,673		39	e/	12,510	15,476
2016[f/]	591	2,583		155	e/	3,329	2,666	6,114		122	e/	8,902	12,231
Columbia River													
1987-2003	1,457	4,037		2,861	5	8,361	151	3,480		48	e/	3,679	12,040
2004	2,971	3,134		2,864	1	8,970	851	3,811		126	-	4,787	13,757
2005	1,200	2,210		2,552	e/	5,961	-	3,689		55	-	4,041	10,003
2006	1,971	2,564		1,999	-	6,535	996	4,107		118	-	5,221	11,756
2007	1,773	1,308		1,115	e/	4,197	134	3,635		176	-	3,944	8,141
2008	1,982	3,484		2,019	1	7,486	2,589	6,202		503	-	9,295	16,781
2009	1,480	3,519		2,892	1	7,893	1,601	3,933		139	-	5,673	13,565
2010	3,561	2,320		1,627	4	7,512	3,978	3,522		82	e/	7,581	15,094
2011	2,224	3,441		1,410	1	7,076	2,907	5,508		413	1	8,828	15,903
2012	2,018	2,581		309	e/	4,908	1,563	3,199		73	e/	4,835	9,744
2013	1,789	5,613		1,118	e/	8,520	1,439	8,002		171	e/	9,612	18,132
2014	1,354	4,777		3,495	e/	9,626	3,308	8,851		578	3	12,738	22,363
2015	2,677	4,558		520	e/	7,755	4,468	10,263		42	e/	14,773	22,528
2016[f/]	2,526	4,724		757	e/	8,007	2,885	7,425		134	e/	10,443	18,450

a/ Estimates of income impacts are provided from output of the Fishery Economic Assessment Model (FEAM) and IOPAC. These are the income impacts associated with expenditures in the troll and/or recreational sectors. There is no differentiation between money that may be new to the area versus money that may otherwise have been expended in other sectors. Values through 1995 are based on a 1992 run of the FEAM using 1989 IMPLAN data. Values from 1996 through 2000 are based on a 1998 run of the FEAM using 1996 IMPLAN data. Values from 2001 through 2009 are based on a run of the FEAM using 2000 PacFIN landings and 1998 IMPLAN data. Beginning with the 2010 data year, income impact estimates are based on the NWFSC's IOPAC model, which uses updated IMPLAN and landings data, and survey-based industry cost data. A description of the transition from FEAM-based to IOPAC-based impact multipliers and comparisons of results from the two models are found in Appendix E of the Review of 2014 Ocean Salmon Fisheries:

http://www.pcouncil.org/salmon/stock-assessment-and-fishery-evaluation-safe-documents/review-of-2014-ocean-salmon-fisheries/

b/ Mainstem below Bonneville and Select Areas (Youngs Bay, Tongue Point, Blind Slough, and Deep River).

c/ Treaty Indian values do not include direct sales to consumers.

d/ For Washington and the Columbia River this column includes fall brights, tules, and jacks.

e/ Less than $500.

f/ Preliminary. (All Washington values in this table are based on preliminary information available when each year's Salmon Review is drafted.)

g/ Washington income impacts for years prior to 2000 are based on a combination of Washington and Oregon value information.

h/ Treaty Indian values are primarily mainstem Columbia set gillnet but also include Klickitat dipnet, Drano Lake (Little White Salmon River mouth), and Priest Rapids Pool fisheries.

TABLE IV-20. Local personal income impacts in real (inflation adjusted, 2016) dollars of the Buoy 10 recreational fishery in Oregon and Washington and the Area 4B add-on fishery in Washington.

Year or Avg.	Total Angler Trips (thousands)	Income Impacts (thousands of dollars)		
		Oregon	Washington	Total
	BUOY 10 (including bank fishing)			
1987-1990	136	2,680	4,673	7,354
1991-1995	79	1,524	2,594	4,118
1996-2000	45	977	1,336	2,313
2001	126	2,730	2,882	5,612
2002	84	1,836	1,726	3,562
2003	89	2,175	1,506	3,681
2004	69	1,458	1,382	2,840
2005	55	1,458	804	2,261
2006	41	1,090	623	1,713
2007	36	903	676	1,579
2008	32	835	623	1,458
2009	73	1,766	1,222	2,988
2010	52	2,062	1,760	3,823
2011	49	2,120	1,495	3,615
2012	65	2,828	1,991	4,819
2013	66	2,911	1,885	4,796
2014	108	4,960	2,739	7,698
2015	108	4,931	2,803	7,735
2016 [b/]	95	4,252	2,552	6,804
	AREA 4B ADD-ON [c/]			
1989-1990	12	-	662	662
1991-1995	6	-	386	386
1996-2000	3	-	138	138
2001	-	-	-	-
2002	-	-	-	-
2003	-	-	-	-
2004	-	-	-	-
2005	-	-	-	-
2006	-	-	-	-
2007	-	-	-	-
2008	1	-	33	33
2009	-	-	-	-
2010	-	-	-	-
2011	-	-	-	-
2012	-	-	-	-
2013	-	-	-	-
2014	-	-	-	-
2015	-	-	-	-
2016 [b/]	-	-	-	-

a/ Estimates of income impacts are provided from output of the Fishery Economic Assessment Model (FEAM) and IOPAC. These are the income impacts associated with expenditures in the troll and/or recreational sectors. There is no differentiation between money that may be new to the area versus money that may otherwise have been expended in other sectors. Values through 1995 are based on a 1992 run of the FEAM using 1989 IMPLAN data. Values from 1996 through 2000 are based on a 1998 run of the FEAM using 1996 IMPLAN data. Values from 2001 through 2009 are based on a run of the FEAM using 2000 PacFIN landings and 1998 IMPLAN data. Beginning with the 2010 data year, income impact estimates are based on the NWFSC's IOPAC model, which uses updated IMPLAN and landings data, and survey-based industry cost data. A description of the transition from FEAM-based to IOPAC-based impact multipliers and comparisons of results from the two models are found in Appendix E of the Review of 2014 Ocean Salmon Fisheries: http://www.pcouncil.org/salmon/stock-assessment-and-fishery-evaluation-safe-documents/review-of-2014-ocean-salmon-fisheries/

b/ Preliminary

c/ There were no Area 4B add-on fisheries prior to 1989.

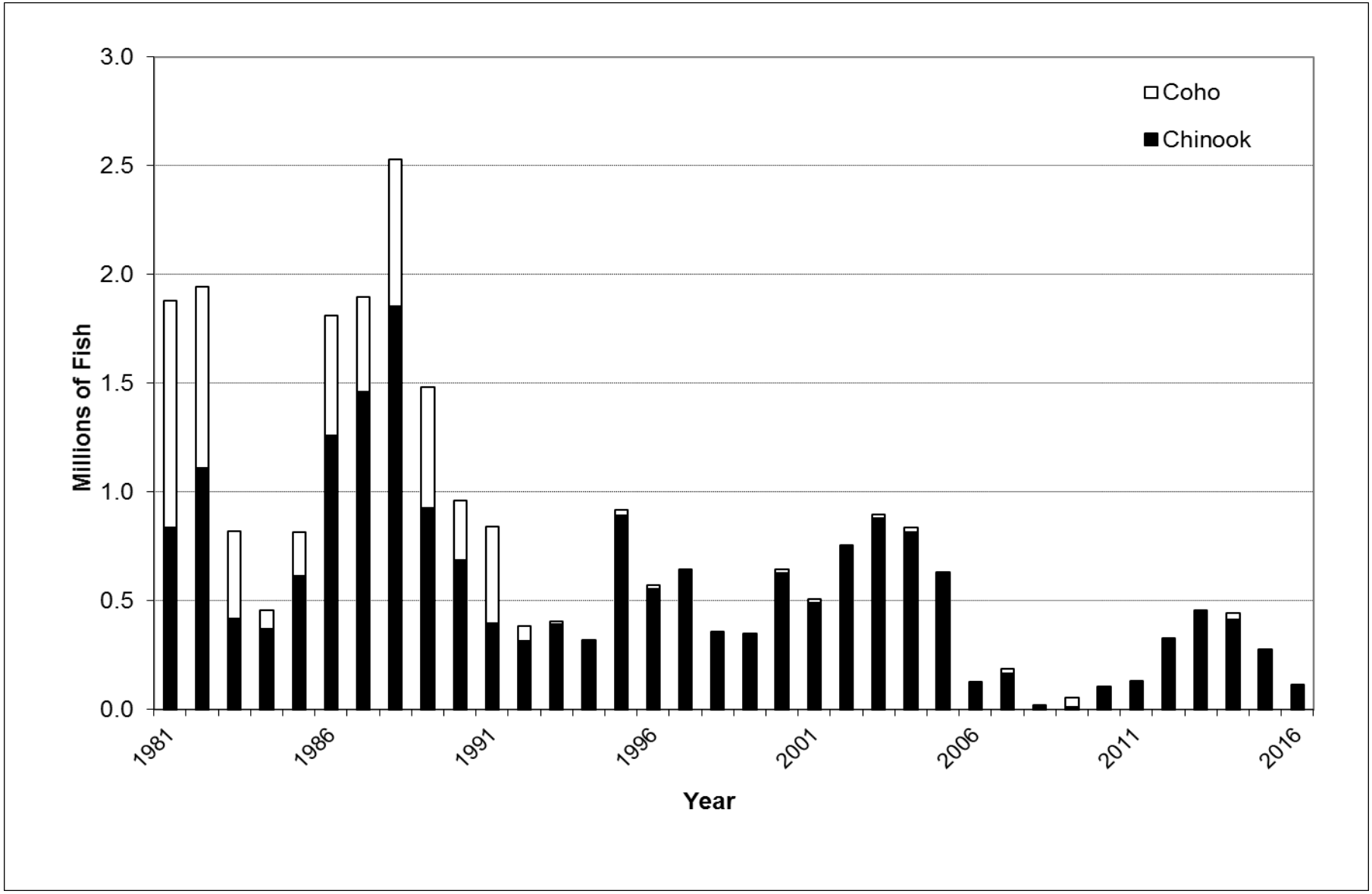


Figure IV-1. West Coast ocean non-Indian commercial Chinook and coho harvest.

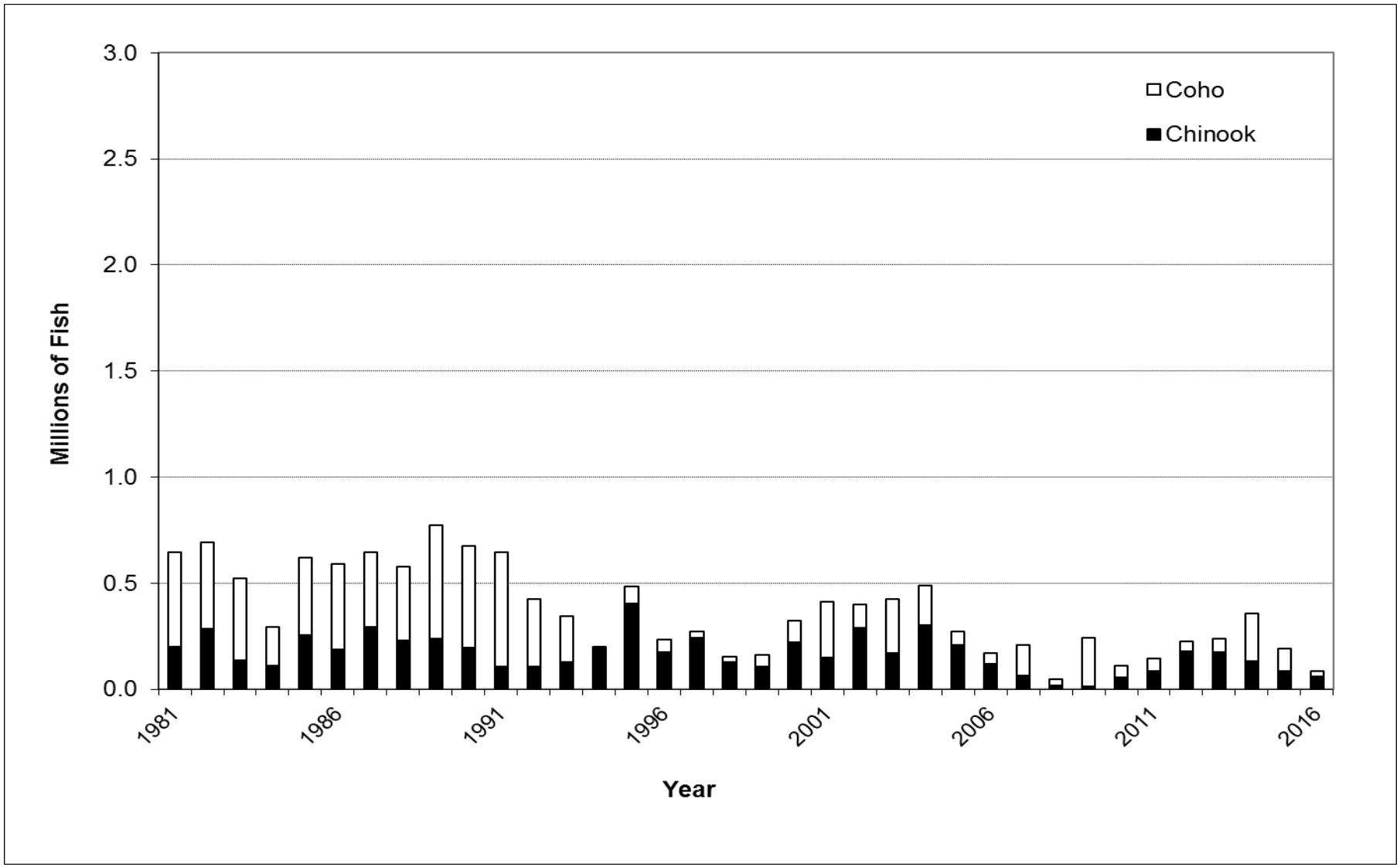


Figure IV-2. West Coast ocean recreational Chinook and coho harvest.

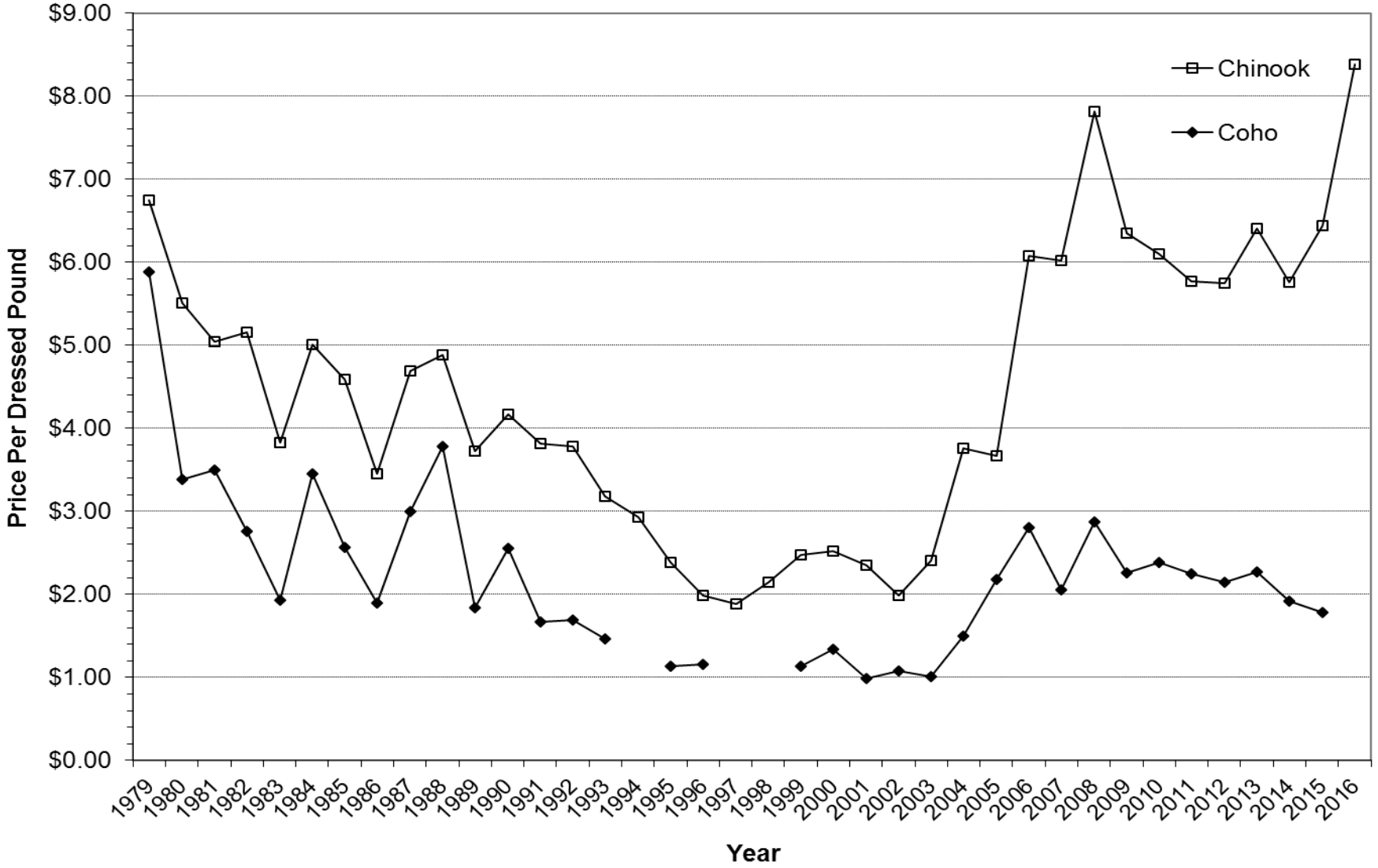


Figure IV-3. West Coast non-Indian ocean commercial salmon average annual exvessel prices (inflation adjusted, 2016 dollars).

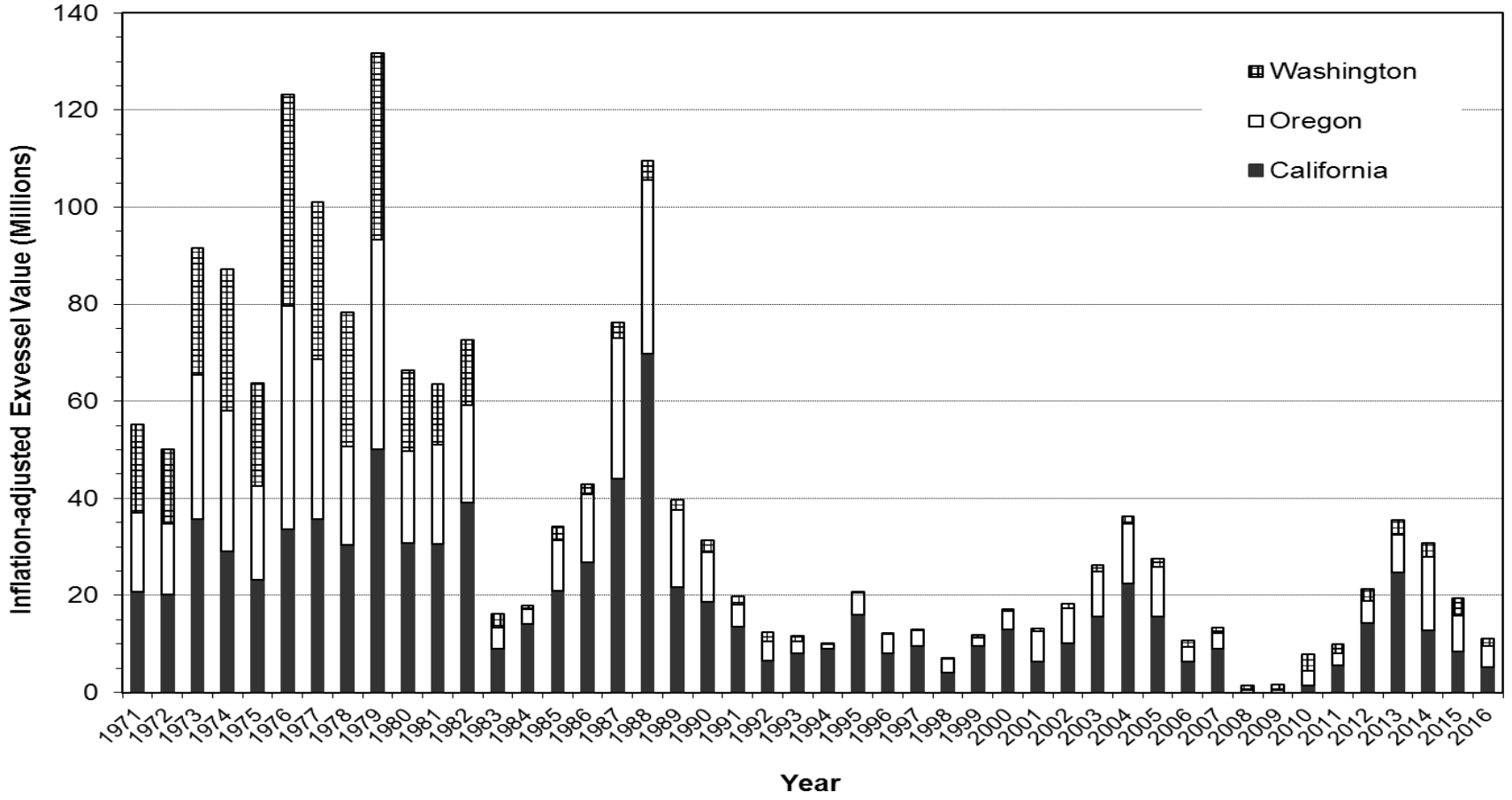
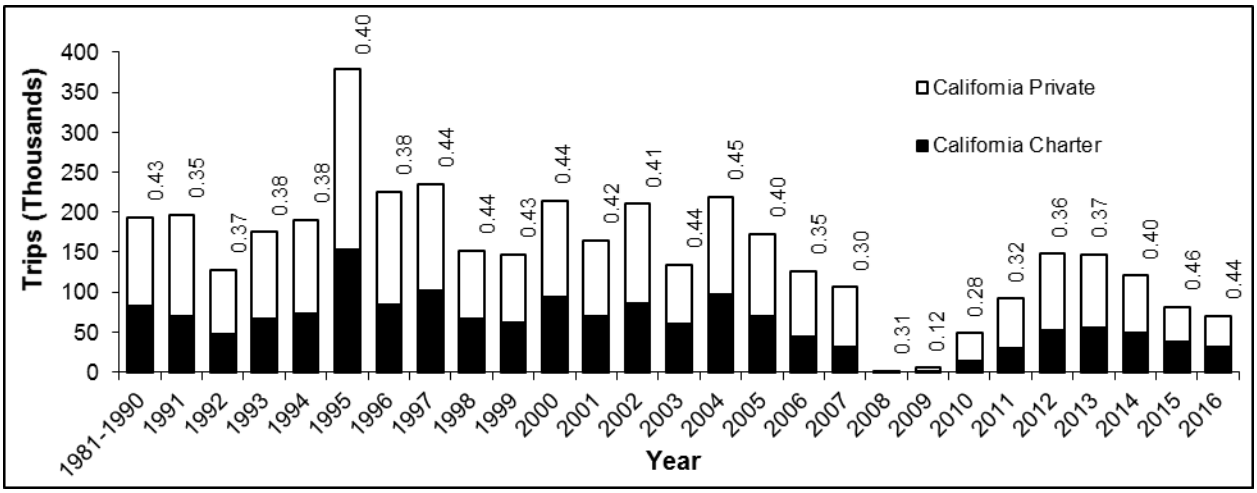
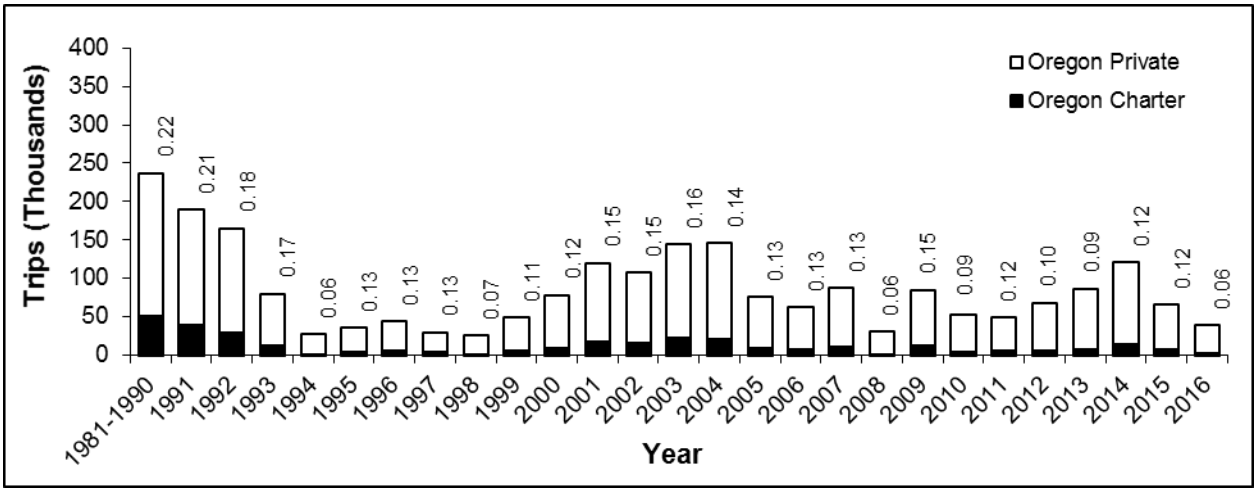


Figure IV-4. Exvessel value of West Coast non-Indian ocean commercial Chinook and coho landings by state of landing (inflation adjusted, 2016 dollars).





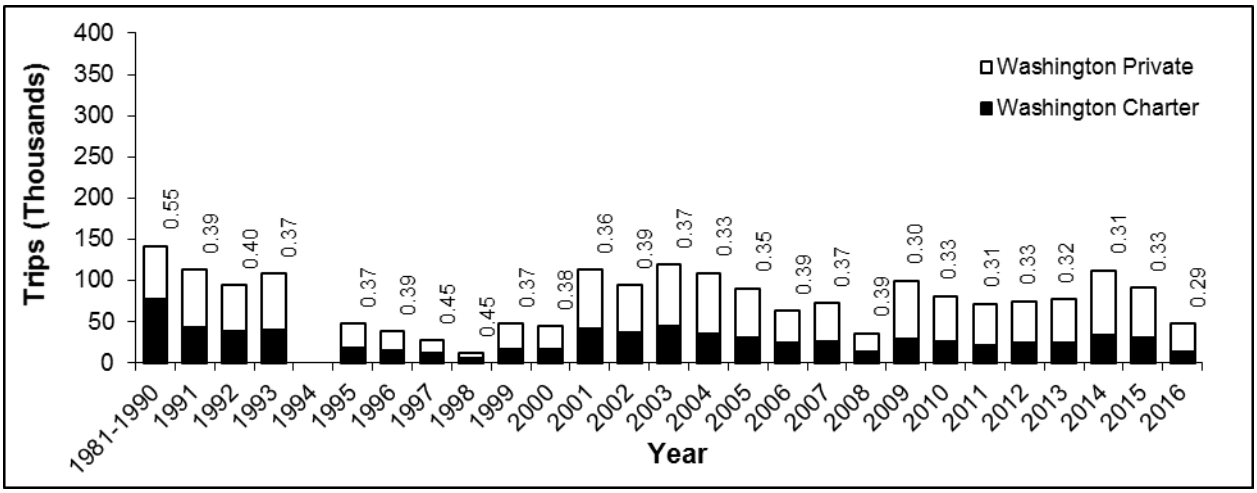


Figure IV-5. Total recreational ocean salmon trips for California, Oregon, and Washington, with proportion of charter trips shown above each bar**.**