FINAL

ENVIRONMENTAL ASSESSMENT

Sacramento River Winter-run Chinook Salmon Management Measures for Fisheries Managed under the Pacific Coast Salmon Fishery Management Plan

(Regulatory Identifier Number 0648-BH40)

Prepared by the
National Marine Fisheries Service

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List of Acronyms

CCC	California Coastal Chinook
CCC coho	Central California Coastal Coho
CCE	California Current Ecosystem
CDFW	California Department of Fish and Wildlife
CEQ	Council on Environmental Quality
CZMA	Coastal Zone Management Act
DPS	Distinct Population Segment
E^0_3	Forecast age-3 escapement in the absence of fisheries
EA	Environmental Assessment
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
ENSO	El Niño/Southern Oscillation
ESA	Endangered Species Act (U.S. Federal act unless otherwise specified)
ESU	Evolutionarily Significant Unit
FMP	Fishery Management Plan (for Pacific Salmon)
FONSI	Finding of No Significant Impact
IPHC	International Pacific Halibut Commission
KRFC	Klamath River Fall Chinook
MBTA	Migratory Bird Treaty Act
MEW	Model Evaluation Workgroup
MMPA	Marine Mammal Protection Act
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NWFSC	NOAA's Northwest Fisheries Science Center
PDO	Pacific Decadal Oscillation
PFMC	Pacific Fishery Management Council
RPA	Reasonable and Prudent Alternative
SRFC	Sacramento River Fall Chinook
SRKW	Southern Resident Killer Whale
SRWC	Sacramento River Winter-run Chinook
SSC	Scientific and Statistical Committee
STT	Salmon Technical Team

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1.0 Introduction

Ocean salmon fisheries off the West Coast states of California, Oregon, and Washington are managed by the Pacific Fishery Management Council (Council) under the Pacific Coast Salmon Fishery Management Plan (FMP) (PFMC 2016a). Management of the salmon stocks in the FMP can be affected when the National Marine Fisheries Service (NMFS) lists evolutionarily significant units (ESUs) of Pacific salmon (Waples 1991) as either threatened or endangered under the U.S. Endangered Species Act (ESA). If a fishery is expected to interact with ESA-listed salmon (i.e., result in a "take" of an ESA-listed species[1]), NMFS conducts a formal consultation under section 7 of the ESA to evaluate fishery impacts, and issues a biological opinion to report the findings. The Council and NMFS implement any reasonable and prudent measures required by the opinion, or, if the opinion concludes the fishery is likely to jeopardize the continued existence of the listed salmon, implement the reasonable and prudent alternative described in the opinion.

The Sacramento River Winter-run Chinook salmon ESU (SRWC) has been listed as endangered under the ESA since 1994 (59 FR 440, January 4, 1994) (Table 1-1). NMFS has periodically consulted on the impacts of ocean salmon fisheries on SRWC, most recently in 2010. In the 2010 biological opinion, NMFS determined that ocean salmon fisheries are likely to jeopardize the continued existence of SRWC, but not modify or destroy critical habitat. The opinion described an interim RPA and required NMFS to develop a long-term RPA that would include an abundance-based harvest control rule. In 2012, NMFS issued a long-term RPA to limit impacts of fisheries on SRWC. The RPA consists of two parts: part one includes fishing season and size limit restrictions, part two specifies an abundance-based harvest control rule (NMFS 2012). The Council had concerns that the control rule might be unnecessarily restrictive and insufficiently responsive to changing conditions that could affect abundance; therefore, in November 2015, the Council commissioned an *ad hoc* SRWC Workgroup (SRWC Workgroup) to develop a new control rule that would address the Council's concerns and be evaluated by NMFS in a new biological opinion. The fishing season and size limit restrictions would be included in the management measures, regardless of any change in the harvest control rule.

In 2017, the Council recommended a new harvest control rule, developed through the Council process, for consideration by NMFS (Tracy 2017). This environmental assessment (EA) analyzes the environmental effects of implementing management measures, including a new harvest control rule, for SRWC. Because the fishing season and size limit restrictions would be the same in each alternative (Table 2-1), the analysis in this EA focuses on the alternative harvest control rules.

1.1 How This Document is Organized

This EA analyzes alternatives for a harvest control rule to limit impacts on ESA-listed SRWC. The Preferred Alternative, including both the fishing season and size limit restrictions and the harvest control

[1] Under the ESA, the term "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct (50 CFR 222.102).

rule, has been analyzed in a biological opinion on the effects of Council-managed salmon fisheries on SRWC, beginning in 2018.

- Section 1 provides background information, purpose and need, and describes the Proposed Action.
- Section 2 describes the alternatives.
- Section 3 describes the affected environment.
- Section 4 analyzes the potential environmental impacts of the alternatives.
- Section 5 addresses the consistency of the Preferred Alternative with laws other than the National Environmental Policy Act (NEPA).
- Section 6 lists the references cited in this document.
- Section 7 lists the persons and agencies consulted.
- Section 8 is the finding of no significant impact (FONSI)

1.2 Background

Chinook salmon (*Oncorhynchus tshawytscha*) is native to the United States West Coast, and other areas in the Pacific Ocean. Juveniles rear in fresh water for up to two years prior to migrating to the ocean, where they grow and mature for up to five years. Adult Chinook salmon return to fresh water to spawn; only spawning once before dying. Chinook salmon in California's Sacramento and San Joaquin River Basins comprise three ESUs: Sacramento River Winter-run, Central Valley Spring-run, and Central Valley Fall-run. SRWC are native to the upper Sacramento River and its tributaries, specifically the Pit and McCloud Rivers (Myers et al. 1998). SRWC exhibit unique life history traits that differentiate them from other forms of Chinook salmon in California. Adult SRWC enter the Sacramento River from November to June and spawn from late-April to mid-August, with a peak from May to June (Myers et al. 1998). SRWC also mature at two to three years, a relatively young age for Chinook salmon (Myers et al. 1998).

After the completion of Red Bluff Diversion Dam on the Sacramento River in 1964, SRWC had three-year average spawning runs in excess of eighty thousand salmon (1967-1969) (54 FR 32085, August 4, 1989). By 1985 these runs had been reduced to below three thousand salmon, prompting the American Fisheries Society to petition NMFS to list SRWC as threatened under the ESA. NMFS first listed SRWC as threatened under the ESA via an emergency interim rule (54 FR 32085, August 4, 1989) and ultimately reclassified these salmon as endangered as abundance continued to decline (55 FR 46515, November 5, 1990).

The 2010 biological opinion resulted in a determination that fisheries were likely to jeopardize the survival of the species. To address this jeopardy opinion, NMFS implemented an interim RPA for fisheries in 2010 and 2011, during which time the current RPA Management Framework was developed; the current RPA was implemented in 2012. As mentioned above, the 2012 RPA consists of two parts. Part one specified the time periods and minimum size limits for Chinook salmon in fisheries south of Point Arena, California. Part two is an abundance-based framework harvest control rule that sets an allowable impact rate for salmon fisheries south of Point Arena, California that is based on the geometric mean of the previous three years of spawner escapement and does not allow for any fishery

impacts if the three-year geometric mean is 500 or fewer spawners. Development of the harvest control rule was informed by a Management Strategy Evaluation (Winship et al. 2012).

In a letter to NMFS, the Council expressed concern that the control rule would be unnecessarily restrictive in some years due to the lack of *de minimis*[2] fishing provisions in years of low abundance and requested that NMFS consider alternative control rules that would provide for *de minimis* fishing while not increasing the risk to SRWC (McIsaac 2013). In response, NMFS solicited public comment on the 2012 management strategy evaluation (79 FR 3783, January 23, 2014) and, after considering the comments of the Council and the public, NMFS reported to the Council in March 2015 that the RPA would not be revised at that time. However, NMFS cautioned the Council that the harvest control rule in the RPA, which depends on retrospective abundance-based management, might not be adequately responsive to low survival of juvenile salmon due to the ongoing California drought. For example, juvenile freshwater survival from the 2014 brood year was estimated at only five percent. Based on information from NMFS and the State of California, the Council adopted restrictive fishery management measures with more conservative impact rates on SRWC than required by the RPA for the years 2015 through 2017, see Table 1-1.

Table 1-1. Comparison of SRWC maximum age-3 impact rates imposed by the existing control rule (2012 RPA) and actual impact rates adopted by the Pacific Fishery Management Council (Source: Council's Preseason Reports III for the years 2012-2017).

Year	RPA limit	Council adopted limit
2012	13.7%	13.7%
2013	12.9%	12.9%
2014	15.4%	15.4%
2015	19.0%	17.5%
2016	19.9%	12.8%
2017	15.8%	12.2%

In September 2015, the Council and NMFS agreed that it was necessary to reconsider the 2012 RPA including developing alternatives that incorporate forward-looking indicators, such as juvenile survival, to be more responsive to changes in SRWC productivity. In November 2015, the Council commissioned the SRWC Workgroup to develop new harvest control rule alternatives.

1.3 Purpose and Need

The purpose of the Proposed Action is to incorporate new information on SRWC juvenile productivity and survival into a harvest control rule limiting impacts on SRWC and to implement that control rule through notice-and-comment rulemaking. The need for the proposed action is to determine if a revised control rule, incorporating new information, can be developed that is more responsive to changes in the

[2] *De minimis* fishery impacts allow for limited fishing impacts when abundance is low, that will not affect the long-term productivity of the stock.

abundance of SRWC than the existing harvest control rule and that optimizes fishing opportunities without jeopardizing the survival of SRWC.

1.4 Proposed Action

The Proposed Action is to adopt a harvest control rule to identify appropriate impact levels to SRWC from Council-managed salmon fisheries beginning in 2018 and to implement that control rule through notice-and-comment rulemaking. This harvest control rule would be analyzed in a biological opinion conducted under section 7 of the ESA and would be used in formulating annual management measures for ocean salmon fisheries.

1.5 Public Participation

The alternatives analyzed in this document were developed through the Council process. This involved discussion at seven Council meetings and several meetings of the Council's SRWC Workgroup. All of these meetings were open to the public to attend either in person or via webinar and announced in the *Federal Register*. The Council meetings and some of the SRWC Workgroup meetings were also streamed live online. Opportunity for public comment was provided at all meetings. Additionally, NMFS will make the draft EA available for public comment prior to preparing a final EA.

Table 1-2. Public Meetings of the Pacific Fishery Management Council and the SRWC Workgroup during development of the alternatives analyzed in this EA. Table shows the date and location of the meetings.

Pacific Fishery Management Council Meetings	SRWC Workgroup Meetings
March 3 – 14, 2016 (Sacramento, CA)	March 8, 2016 (Sacramento, CA)
June 21 – 28, 2016 (Tacoma, WA)	June 15, 2016 (webinar)
September 12 – 20, 2016 (Boise, ID)	August 16-17, 2016 (Santa Cruz, CA)
November 13 – 21, 2016 (Garden Grove, CA)	September 16, 2016 (Boise, ID)
April 6 – 11, 2017 (Sacramento, CA)	October 18, 2016 (Portland, OR with SSC)
September 11 – 18, 2017 (Boise, ID)	August 3, 2017 (webinar)
November 13 – 20, 2017 (Costa Mesa, CA)	August 24, 2017 (STT and MEW webinar)

1.6 Previous Documents That May Be Related to this EA

These documents are listed here to provide additional context to the reader.

An Evaluation of Preseason Abundance Forecasts for Sacramento River Winter Chinook Salmon (O'Farrell et al. 2016). Describes and analyzes a model for utilizing juvenile Chinook salmon productivity and survival to forecast spawning escapement.

Community profiles for West Coast and North Pacific fisheries–Washington, Oregon, California, and other U.S. states (Norman et al. 2007). This document profiles 125 fishing communities in Washington, Oregon, California, and two other U.S. states with basic social and economic characteristics.

Evaluation of Sacramento River winter Chinook salmon control rules: updated Management Strategy Evaluation analysis, dated August 14, 2017 (SRWC Workgroup 2017a). This document provides analysis of alternatives in terms of extinction risk to SRWC and effects on fishing opportunity. This document was included in the Pacific Fishery Management Council Briefing Book for September 2017.

Further evaluation of Sacramento River winter Chinook control rules, dated October 18, 2017 (SRWC Workgroup 2017b). This document provides further analysis of the final suite of alternatives considered by the Pacific Fishery Management Council, and was included in the Briefing Book for November 2017.

Pacific Coast Fishery Ecosystem Plan for the U.S. Portion of the California Current Large Marine Ecosystem (PFMC 2013c). Chapter 3 contains a comprehensive description of the California Current ecosystem and the fisheries that are dependent upon it.

Pacific Coast Salmon Fishery Management Plan (FMP) (PFMC 2016a). The FMP forms the basis for Pacific salmon management, including harvest, conservation objectives, consistency with national standards, and essential fish habitat (EFH). It has been amended 19 times.

2.0 Description of Alternatives

All alternatives are identified with a Council Option number designation (e.g., CR8 is the Council's control rule option number 8), these correspond to the Council documents, including reports by the SRWC Workgroup, that are cited in this EA. All alternatives analyzed in this EA, except Alternative 6 (No-fishing Alternative), would incorporate the fishing season and size restrictions currently in place, see Table 2-1. These season and size restrictions implemented alone have generally resulted in an average SRWC age-3 impact rate of approximately 20 percent (NMFS 2012). All alternatives, except Alternative 6 (No-fishing Alternative) analyzed in this EA set an annual ocean salmon fishery impact rate cap for age-3 SRWC in fisheries south of Point Arena, California.

Table 2-1. Fishing season and size restrictions that would be applied to ocean salmon fisheries for Chinook, south of Point Arena, California, under all alternatives.

Fishery	Location	Shall open no earlier than	Shall close no later than	Minimum size limit (total length*) shall be
Recreational	Between Point Arena and Pigeon Point	1st Saturday in April	2nd Sunday in November	20 inches
	Between Pigeon Point and the U.S./Mexico border	1st Saturday in April	1st Sunday in October	
Commercial	Between Point Arena and the U.S./Mexico border†	May 1	September 30†	26 inches
	†*Exception: Between Point Reyes and Point San Pedro, there may be an October commercial fishery conducted Monday through Friday, but shall end no later than October 15*.			

*Total length of salmon means the shortest distance between the tip of the snout or jaw (whichever extends furthest while the mouth is closed) and the tip of the longest lobe of the tail, without resort to any force or mutilation of the salmon other than fanning or swinging the tail (50 CFR 660.402).

All alternatives for the harvest control rule use a forecast of escapement to set an allowable age-3 impact rate, except Alternative 6 (No-fishing Alternative). The No-action Alternative uses the most recent three-year geometric mean of SRWC spawning escapement. Other than the No-action Alternative, all fishing alternatives use juvenile survival (i.e., fry to the end of age-2 in the ocean) to model a forecast of age-3 escapement absent fishing. The model used is a modification of Winship et al. (2014) and is detailed in O'Farrell et al. (2016), which is incorporated by reference in its entirety.

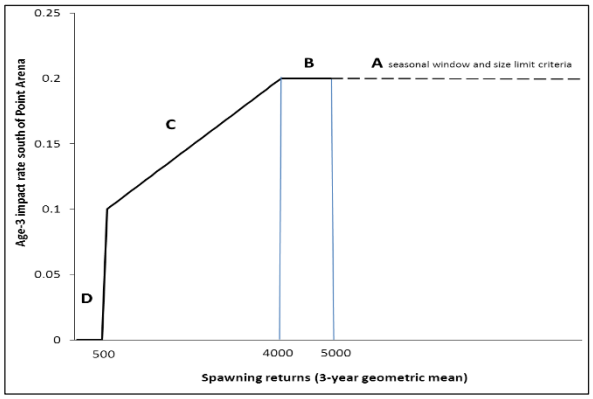
2.1 Alternative 1 – No-action Alternative (Council option CR8)

Under the No-action Alternative, the harvest control rule described in the 2012 RPA would continue to be used to set annual age-3 impact rates for SRWC in Council-managed fisheries south of Point Arena, California.

This alternative uses the geometric mean of the three most recent spawning escapements to set the annual impact rate. As such it is a retrospective analysis.

At three-year geometric mean abundance greater than 5,000, no impact rate cap is imposed. At three-year geometric mean abundance between 5,000 and 4,000, the impact rate cap is 20 percent. At three-year geometric mean abundance between 4,000 and 500, the impact rate cap declines linearly from 20 percent at 4,000 abundance to 10 percent at 500 abundance. At three year geometric mean abundance below 500, the impact rate cap is zero percent.

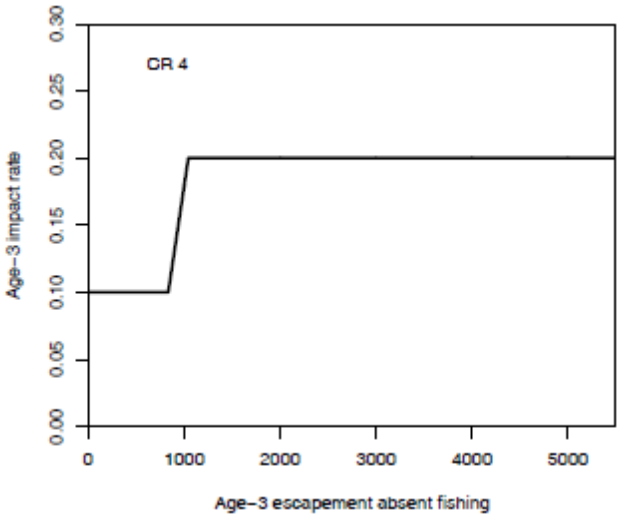
Figure 2-1. Diagrammatic representation of Alternative 1.



2.2 Alternative 2 – Council option CR4

Alternative 2 sets the maximum allowable age-3 impact rate based on the forecast age-3 escapement in the absence of fisheries (E^0_3). At E^0_3 above 1,042, the allowable impact rate is 20 percent. When E^0_3 is between 1,042 and 833, the allowable impact rate declines linearly from 20 percent to 10 percent. When E^0_3 is below 833, the allowable impact rate is fixed at 10 percent.

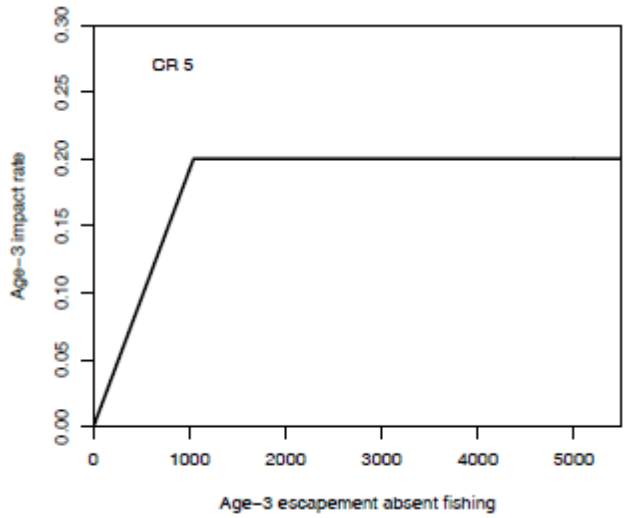
Figure 2-2. Diagrammatic representation of Alternative 2.



2.3 Alternative 3 – Council option CR5

Alternative 3 sets the maximum allowable age-3 impact rate based on the forecast age-3 escapement in the absence of fisheries (E^0_3). At E^0_3 above 1,042, the allowable impact rate is fixed at 20 percent. When E^0_3 is between 1,042 and 0, the allowable impact rate declines linearly from 20 percent to 0 percent.

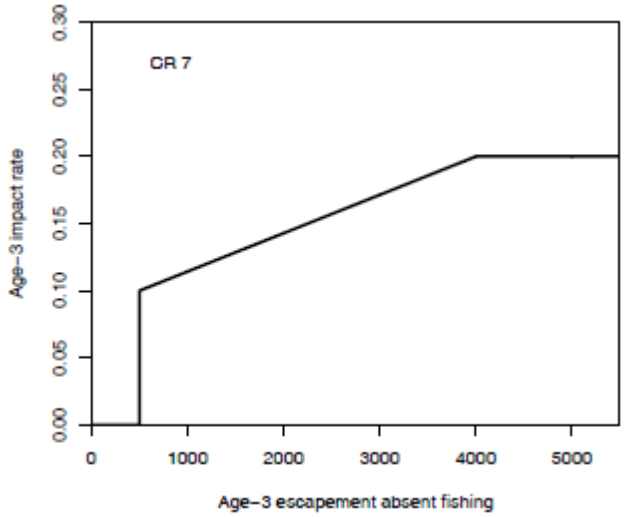
Figure 2-3. Diagrammatic representation of Alternative 3.



2.4 Alternative 4 – Council option CR7

Alternative 4 sets the maximum allowable age-3 impact rate based on the forecast age-3 escapement in the absence of fisheries (E^0_3). At E^0_3 above 4,000, the allowable impact rate is fixed at 20 percent. At E^0_3 between 4,000 and 500, the allowable impact rate declines linearly from 20 percent to 10 percent. Below E^0_3 = 500, allowable the impact rate is fixed at 0 percent.

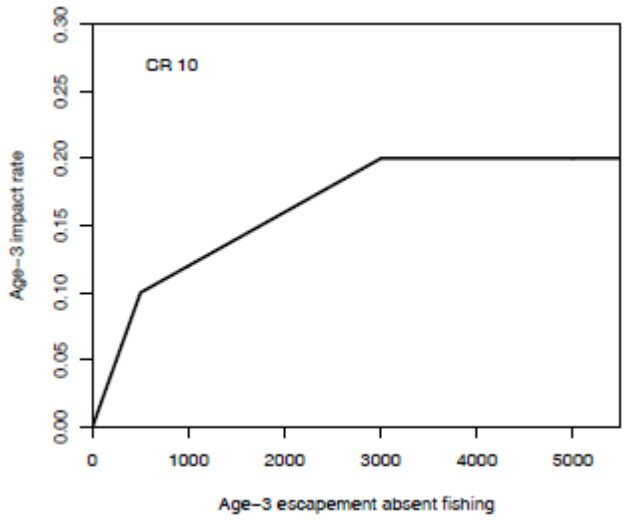
Figure 2-4. Diagrammatic representation of Alternative 4.



2.5 Alternative 5 – Council option CR10 (Preferred Alternative)

Alternative 5 sets the maximum allowable age-3 impact rate based on the forecast age-3 escapement in the absence of fisheries (E^0_3). At E^0_3 above 3,000, the allowable impact rate is fixed at 20 percent. At E^0_3 between 3,000 and 500, the allowable impact rate declines linearly from 20 percent to 10 percent. At E^0_3 between 500 and 0, the allowable impact rate declines linearly from 10 percent to 0 percent.

Figure 2-5. Diagrammatic representation of Alternative 5.



2.6 Alternative 6 – Council option CR1 (No-fishing Alternative)

Alternative 6 would not allow any salmon fishing opportunity south of Point Arena, California, regardless of SRWC abundance. This would not be consistent with the purpose and need for the proposed action, but this alternative is included to provide a full range of alternatives for analysis.

2.7 Alternatives Considered But Rejected from Further Analysis

The Council considered four additional alternatives that were rejected from further analysis.

- Council option CR2 had a fixed impact rate at the historic level of 34 percent; this level of impact exceeds impact rates attained under the time and size restrictions imposed by the first component of the RPA; therefore, this alternative was not consistent with the purpose and need.
- Council option CR3 had a fixed impact rate of 20 percent, regardless of SRWC abundance; this lack of flexibility was not consistent with the purpose and need.
- Council options CR6 and CR9 contained features similar to other alternatives being considered and were rejected because they did not contribute meaningfully to the range of alternatives being analyzed.

Descriptions and analyses of these rejected alternatives are available in the SRWC Workgroup's updated Management Strategy Evaluation analysis (SRWC Workgroup 2017a).

2.7 Summary of Analyzed Alternatives

The control rule in the No-action Alternative uses the spawning escapement from the previous three years to establish an abundance that is used to determine the maximum age-3 impact rate for the current year. The other fishing alternatives use juvenile abundance and survival rate, ocean natural mortality, and maturation rates to predict age-3 escapement in the absence of fishing (E^0_3), this forecast is the abundance that is used to determine the maximum age-3 impact rate for the current year (SRWC Workgroup 2016). Alternatives differ somewhat in the abundance level at which the harvest control

rule would require an age-3 impact rate cap below 20 percent, the lowest impact rate cap that would be applied (either 10 percent or zero), and whether or not the control rule would allow *de minimis* fishery impacts at low abundance.

Table 2-2. Comparison of the key features of the five analyzed alternatives.

Alternative	Basis for abundance estimate	Abundance level at which impact rate cap below 20 percent is triggered	Minimum impact rate cap	*De minimis* fishing provision†
Alternative 1. No-action Alternative	Retrospective 3-year geometric mean spawning escapement	4,000	0.00 (at abundance < 500)	No
Alternative 2. CR4	Abundance forecast based on age-3 escapement in the absence of fisheries (E^0_3)	1,042	0.10 (at abundance ≤ 833)	Yes
Alternative 3. CR5	Same as Alternative 2	1,042	0.00 (at abundance = 0)	Yes
Alternative 4. CR7	Same as Alternative 2	4,000	0.00 (at abundance ≤ 500)	No
Alternative 5. CR10 (Preferred Alternative)	Same as Alternative 2	3,000	0.00 (at abundance = 0)	Yes
Alternative 6. CR1 (No-fishing Alternative)	Not applicable	Not applicable	Not applicable	No

†For this action a *de minimis* fishing provision means that the control rule alternative has a non-zero allowable impact rate across all levels of abundance greater than zero.

3.0 Affected Environment

The resources that comprise the affected environment for the proposed action are listed in Table 3-1 and described in this chapter. The effects of the proposed action on these resources are analyzed in Chapter 4 – Environmental Impact of Alternatives. Not all of the resources described in this chapter will be analyzed in detail Chapter 4, largely because salmon management measures are not expected to have more than minimal effects on these resources.

Table 3-1. Affected environment resources identified in initial scoping for the Proposed Action.

Affected Environment Resources	
Fisheries and Fish Resources	
	• Salmon species • Overfished species • Non-salmon Species (Pacific and California halibut, coastal pelagic species, invertebrates (e.g., crab, shrimp/prawns, and sea cucumbers), highly migratory species, groundfish,)
Protected Resources	
	• ESA-listed salmon • Marine mammals (e.g., SRKW, sea lions, Guadalupe fur seal)
Marine Ecosystem and Fish Habitat	
Socioeconomics	
Social Impact Assessment	
	• Tourism and recreation • Environmental justice

3.1 Analysis Area

The Proposed Action affects Council-managed salmon fisheries south of Point Arena, California (38°57'30" north latitude) to the U.S./Mexico border. The analysis area is the exclusive economic zone (EEZ), from three to 200 miles offshore, off the coast of California, from Point Arena to the U.S./Mexico border. This analysis area lies within the larger Council management area referred to as south of Horse Mountain.

3.2 Fisheries and Fish Resources

Several fisheries occur in the analysis area, including salmon, coastal pelagic species (e.g., northern anchovy, market squid, Pacific sardine, Pacific mackerel, and jack mackerel), halibut, groundfish (e.g., species such as rockfish and flatfish that live on or near the bottom of the ocean), highly migratory species (e.g., tunas and billfish) and invertebrates (e.g., Dungeness crab, shrimp/prawns, and sea cucumbers). Each of these fisheries are subject to specific regulations. Effort in commercial and recreational fisheries may shift from one fishery to another based on fishing season, stock abundance, and, in the case of commercial fisheries, economic factors. Quantifying effort shift is, however, difficult.

3.2.1 Salmon species

Two species of anadromous Pacific salmon (*Oncorhynchus* spp.) are commonly encountered in ocean salmon fisheries in the analysis area: Chinook salmon (*O. tshawytscha*) and coho (*O. kisutch*). Coho salmon are not targeted in fisheries off the California coast, and have not been lawful to retain since the 1990s (CDFW 2017a). Incidental mortality of coho salmon in commercial and recreational salmon fisheries south of Point Arena is estimated to be very low. In the Council's Preseason Report III, for the years 2012 through 2017, the expected exploitation rate for Lower Columbia natural, Oregon Coast natural, and Rogue/Klamath coho in fisheries south of Point Arena averaged less than one percent (0.03 percent, 0.67 percent, and 0.97 percent, respectively). Central California coastal (CCC) coho are ESA-listed as endangered; fishery impacts on these coho are managed under an RPA in a 1999 biological

opinion that includes the prohibition of both coho-directed fisheries and coho retention in Chinook-directed fisheries off California (NMFS 1999).

The Council manages several stocks of Chinook salmon under the FMP (PFMC 2016a). In the ocean, stocks of salmon comingle which results in mixed-stock fisheries. Non-target stocks, including ESA-listed stocks, will be encountered in mixed-stock fisheries. The Council's Salmon Technical Team (STT) models the degree to which non-target stocks are impacted by proposed fisheries, and the Council uses tools such as harvest restrictions, time and area closures, and mark-selective fisheries to limit impacts to non-target stocks (PFMC and NMFS 2017). In the analysis area, the primary management tools are time and area closures and recreational bag limits. The primary salmon stock targeted in the action area is Sacramento River fall Chinook (SRFC).

Fisheries in the analysis area are managed to meet FMP conservation objectives for SRFC and Klamath River fall Chinook (KRFC), and to comply with ESA consultation requirements for any ESA-listed salmon stocks that are affected by salmon fisheries in the analysis area (see section 3.3.1.1 ESA-listed salmon). As mentioned above, retention of coho in salmon fisheries off California has been unlawful since the 1990s. In every year since 2010, ESA consultation requirements for SRWC have contributed to constraining Chinook fisheries in the analysis area.

Table 3-2. Chinook salmon landings south of Horse Mountain, California (40°05'00" N. lat.), 2010 through 2017, and constraining stocks.

Year	Chinook landings in thousands of fish†		Constraining stocks††, †††
	Commercial	Recreational	
2010	15.1	14.0	SRWC, SRFC, KRFC
2011	64.4	39.2	SRWC, CCC
2012	209.6	83.6	SRWC, CCC
2013	287.3	79.4	SRWC, CCC
2014	165.9	58.9	SRWC, CCC, KRFC
2015	109.9	33.8	SRWC, CCC, KRFC
2016	54.9	32.6	SRWC, KRFC
2017	47.5 projected	35.0 projected	SRWC, KRFC

† Source: Pacific Fishery Management Council. Preseason Report III for the years 2011 through 2017.

†† Source: Pacific Fishery Management Council. Review of Ocean Salmon Fisheries for the Years 2010 through 2017.

††† CCC = California Coastal Chinook, KRFC = Klamath River fall-run Chinook, SRFC = Sacramento River fall-run Chinook, SRWC = Sacramento River winter-run Chinook

3.2.2 Overfished species

3.2.2.1 Overfished salmon stocks

There are currently no overfished salmon stocks[3]. In any given year, if there were overfished salmon stocks, or salmon stocks approaching an overfished condition, fisheries would be constrained to limit impacts on the overfished stocks. This scenario has occurred in the past; for example, commercial salmon fisheries south of Cape Falcon, Oregon were closed in 2008 under a "conservation alert" for Sacramento River fall Chinook (73 FR 23971, May 1, 2008). The Council recommends annual fishery management measures that meet harvest control rules, conservation objectives, and other criteria for all stocks in the FMP. If any stocks were to be determined to be overfished, a rebuilding plan would be implemented, and the requirements of the rebuilding plan would be included in the criteria the Council must take into consideration when shaping annual fisheries.

3.2.2.2 Overfished groundfish stocks

There are two overfished species of groundfish in the analysis area: cowcod (*Sebastes levis*) and yelloweye rockfish (*Sebastes ruberrimus*). Cowcod is managed as a single stock in U.S. waters, extending from the U.S./Mexico border to just north of Cape Mendocino (40°10' N. latitude) (Dick 2011; Quimby 2014). This stock was declared overfished in 2000. Yelloweye rockfish is managed as a single stock in U.S. waters along the Pacific coast, including the analysis area for the proposed action. Yelloweye rockfish was declared overfished in 2002. Landing of cowcod and yelloweye rockfish is prohibited in California by federal regulation. Cowcod and yelloweye rockfish are bottom-oriented species that can occur at great depths (PFMC 2016d), whereas salmon are found higher in the water column. This makes bycatch of cowcod and yelloweye rockfish in salmon fisheries unlikely. Additionally, conservation areas have been established to limit impacts from fisheries in those areas through non-retention of groundfish caught within the conservation areas. Therefore, the harvest control rule would not have any impact on any overfished groundfish species.

3.2.3 Non-salmon species managed in fisheries

Pacific halibut, and Pacific halibut fisheries, occur north of Point Arena, California; therefore, there would not be any impacts to Pacific halibut in the analysis area. However, reduced fishing opportunities in California for salmon and groundfish since 2006 have resulted in a shift of fishing effort toward halibut (CDFW 2017b). Halibut allocations are established annually in the International Pacific Halibut Commission's (IPHC) regulations and the PFMC's Area 2A Catch Sharing Plan (e.g., 82 FR 18581, April 20, 2017). Allocation of halibut quota to fisheries in California would not be affected by the Proposed Action, as the IPHC's halibut quota for the U.S. West Coast and the sub-area allocations set forth in the Catch Sharing Plan are set annually under separate processes from setting the annual salmon management measures.

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[3] At the March 2018 Council meeting, the Council's Salmon Technical Team reported that five salmon stocks meet the FMP criteria for being overfished, based on assessments in the Review of 2017 Ocean Salmon Fisheries. NMFS is responsible for making overfished determinations and likely will not make any determination prior to June 2018.

Fisheries for coastal pelagic species (e.g., northern anchovy, market squid, Pacific sardine, Pacific mackerel, and jack mackerel), Dungeness crab, shrimp/prawns, and sea cucumbers occur in the analysis area and are managed by either NMFS and the PFMC (coastal pelagics) or the State of California (crab, shrimp/prawns, and sea cucumbers). The species targeted in these fisheries are not encountered in ocean salmon fisheries. It is possible that reductions in salmon fishing opportunities could result in a shift of effort toward these other species in California; however, we could not find any documentation to support this.

Fishers that participate in salmon fisheries, both commercial and recreational, may also fish for groundfish (species such as rockfish and flatfish that live on or near the bottom of the ocean). Groundfish fisheries are managed under the Council's Groundfish FMP[4]. Commercial salmon trollers that retain groundfish are considered to be participating in the open access groundfish fishery with non-trawl gear; therefore, they must comply with the regulations for the open access groundfish fishery. Likewise, recreational fishers that retain groundfish, must comply with recreational groundfish regulations.

Albacore (*Thunnus alalunga*) is harvested on the West Coast, including the analysis area, by many of the same commercial and recreational fishermen that fish for salmon. Fishery impacts to albacore are managed under the Council's Highly Migratory Species FMP[5]. Commercial and recreational fishers shift effort between salmon and albacore in response to available fishing opportunities, catch limits, angler demand (recreational fisheries), and changing prices for the species being harvested (commercial fisheries).

3.3 Protected Resources

Protected species include those protected by three Federal laws: the ESA, the Marine Mammal Protection Act (MMPA), and the Migratory Bird Treaty Act (MBTA). This section describes the affected environment relative to protected resources. In some cases there are overlapping regulatory jurisdictions and mechanisms, and in some cases (e.g., salmon) some stocks of a biological species are protected resources and others are not.

3.3.1 ESA-listed salmon

Several ESUs of Pacific salmon that are ESA-listed as threatened or endangered occur in the areas where Council-managed ocean salmon fisheries occur. As stated above in section 3.2.1, the only salmon species encountered in fisheries in the action area are Chinook and coho salmon. ESA-listed Chinook and coho salmon ESUs are listed in Table 3-3; those ESUs that occur within the action area are shown in bold font.

[4] The current Groundfish FMP can be found on the Council's website at: http://www.pcouncil.org/groundfish/fishery-management-plan/

[5] The current HMS FMP can be found on the Council's website at: http://www.pcouncil.org/highly-migratory-species/fishery-management-plan-and-amendments/

Table 3-3. ESA-listed Chinook and coho salmon ESUs that may be affected by Council-managed ocean salmon fisheries (79 FR 20802, April 14, 2014). ESUs that occur in the analysis area are indicated in bold.

ESA-listed ESUs	Status	Most recent citation
Chinook (*Oncorhynchus tshawytscha*)		
Sacramento River Winter-run	**Endangered**	**70 FR 37160 (June 28, 2005)**
Snake River Fall-run	Threatened	70 FR 37160 (June 28, 2005)
Snake River Spring/Summer-run	Threatened	70 FR 37160 (June 28, 2005)
Puget Sound	Threatened	70 FR 37160 (June 28, 2005)
Lower Columbia River	Threatened	70 FR 37160 (June 28, 2005)
Upper Willamette River	Threatened	70 FR 37160 (June 28, 2005)
Upper Columbia River Spring-run	Endangered	70 FR 37160 (June 28, 2005)
Central Valley Spring-run	**Threatened**	**70 FR 37160 (June 28, 2005)**
California Coastal	**Threatened**	**70 FR 37160 (June 28, 2005)**
Coho (*Oncorhynchus kisutch)*		
Central California Coastal	**Endangered**	**77 FR 19552 (April 2, 2012)**
Southern Oregon/Northern California Coastal	**Threatened**	**70 FR 37160 (June 28, 2005)**
Oregon Coastal	Threatened	76 FR 35755 (June 20, 2011)
Lower Columbia River	Threatened	70 FR 37160 (June 28, 2005)

NMFS has issued biological opinions on the impacts of Council-managed salmon fisheries on ESA-listed salmon. Based on those biological opinions, NMFS provides guidance to the Council during the pre-season planning process for setting annual management measures for ocean salmon fisheries based on the coming year's abundance projections. This guidance addresses allowable impacts on ESA-listed salmon. The Council structures fisheries to not exceed those allowable impacts. As mentioned above (section 3.2.1), retention of coho in California fisheries is prohibited.

The ESA-listed salmon that occur in the analysis area are: SRWC, Central Valley spring Chinook, California Coastal Chinook, Central California coastal coho, and Southern Oregon/Northern California coho (indicated in bold in Table 3-3). NMFS has previously consulted on the effects of Council-area salmon fisheries on these ESUs and has produced the biological opinions listed in Table 3-4.

Table 3-4. NMFS biological opinions regarding ESA-listed salmon ESUs likely to be affected by Council-area ocean salmon fisheries in the analysis area.

Date	Duration	Citation	Species Considered
April 28, 1999	until reinitiated	NMFS 1999	S. Oregon/N. California Coasts coho Central California Coast coho Oregon Coast coho
April 28, 2000	until reinitiated	NMFS 2000	Central Valley Spring-run Chinook California Coastal Chinook
June 13, 2005	until reinitiated	NMFS 2005	California Coastal Chinook
In progress	until reinitiated	NMFS 2018 (in prep.)	Sacramento River winter-run Chinook

The proposed action is not expected to affect any of these ESUs other than SRWC, as the most restrictive of the measures required to protect each ESU would continue to limit the fishery in the analysis area. Therefore, the only ESA-listed salmon that will be considered in Chapter 4 is SRWC.

3.3.2 Marine Mammals

ESA-listed marine mammal species that co-occur with Council-managed salmon fisheries include Guadalupe fur seal, southern sea otter, northern sea otter, and Southern Resident killer whale (SRKW). Among the ESA-listed marine mammals, only the SRKW is known to interact with Pacific salmon or salmon fisheries, in that SRKW are known to prey on salmon. The range of SRKW in spring, summer, and fall includes the inland waterways of Washington state and the transboundary waters between the United States and Canada. In recent years, SRKW have been regularly spotted as far south as central California during the winter months (http://www.nmfs.noaa.gov/pr/species/mammals/whales/killer-whale.html) and their range is currently defined as extending as far south as Point Sur, California (Teresa Mongillo, pers. comm.[6]). In 2009 NMFS consulted on the effects of the ocean salmon fisheries on the SRKW and concluded that Council-managed salmon fisheries were not likely to jeopardize these whales. In the time since that consultation, there has been additional research on SRKW life history, feeding habits, fecundity, and mortality rates. This new information indicates that prey base, environmental contaminants, and disturbance by vessel traffic are among the factors that may affect the recovery of SRKW. NMFS is working with researchers from the U.S. and Canada to evaluate impacts of various human activities, including salmon fisheries, on the survival and recovery of SRKW. Until such time as sufficient information is developed to inform a new ESA consultation on the impacts of salmon fisheries on the survival and recovery of SRKW, NMFS is working on identifying and developing short-term management actions to improve Chinook salmon availability and reducing acoustic and vessel disturbance in key SRKW foraging areas. SRWC occur at the southern end of the SRKW range and it is not clear at this point how they contribute to the SRKW diet.

Table 3-4 displays ESA-listed marine mammals that occur in West Coast marine waters and their listing status.

[6] Personal communication from T. Mongillo (NMFS) to P. Mundy (NMFS), email dated September 28, 2017.

Table 3-4. ESA-listed marine mammals that may occur in the action area.

Species	ESA listing
Whales	
Humpback (*Megaptera novaeangliae*)	
Central America DPS*	Endangered
Mexico DPS	Threatened
Sei (*Balaenoptera borealis*)	Endangered
North Pacific Right (*Eubalaena japonica*)	Endangered
Blue whale (*Balaenoptera musculus*)	Endangered
Fin whale (*Balaenoptera physalus)*	Endangered
Sperm whale (*Physter macrocephalus*)	Endangered
Southern Resident Killer whale (*Orcinus orca*)	Endangered
Other marine mammals	
Southern sea otter (*Enhydra lutris nereis*)	Threatened
Guadalupe fur seal (*Arctocephalus townsendi*)	Threatened

*DPS – Distinct Population Segment

A number of non-ESA-listed marine mammals may also occur in the analysis area, these include: northern fur seal (*Callorhinus ursinus*), California sea lion (*Zalophus californianus)*, Steller sea lion (*Eumetopias jubatus*), harbor seal (*Phoca vitulina*), northern elephant seal (*Mirounga angustirostris*) – eastern DPS, bottlenose dolphin (*Tursiops truncatus*), Pacific white-sided dolphin (*Lagenorhynchus obliquidens*), short-beaked common dolphin (*Delphinus delphis*), harbor porpoise (*Phocoena phocoena*), Dall's porpoise (*Phocoenoides dalli*), and minke whale (*Balaenoptera acutorostrata*). These species, like all marine mammals, are protected under the MMPA. The non-ESA-listed marine mammal species that are known to interact with ocean salmon fisheries are California sea lion and harbor seals, both species will feed on salmon, when available, and have been documented preying on hooked salmon in commercial and recreational fisheries (e.g., Weise and Harvey 1999). All are protected under the MMPA. Ocean salmon fisheries employ hook-and-line gear and are classified under NMFS' MMPA List of Fisheries as Category III (83 FR 5349, February 7, 2018), indicating there is no record of substantive impacts to marine mammals (MMPA 118(c)(1)).

3.3.3 Seabirds

Numerous seabird species, as well as raptors, are protected under the MBTA, including several that are present in areas coincident with Pacific salmon. These seabirds include grebes, loons, petrels, albatrosses, pelicans, double-crested cormorants, gulls, terns, auks, and auklets (PFMC 2013c). ESA-listed bird species include short-tailed albatross (endangered) and marbled murrelet (threatened).

Interactions with the Pacific salmon fishery typically occur in two ways: when seabirds feed on outmigrating juvenile salmon, and when seabirds are entangled or otherwise interact with fishing gear or activities. Predation on juvenile salmon by seabirds is known to occur in estuarine environments, such as the lower Columbia River, as salmon smolts migrate downstream and into marine waters. We do not know the extent to which seabirds in the analysis area depend upon juvenile salmonids as prey. Council-managed ocean salmon fisheries are limited to hook-and-line tackle. Interactions with seabirds are uncommon in these fisheries.

3.4 Marine Ecosystem and Fish Habitat

Salmon FMP stocks interact with a number of ecosystems along the Pacific Coast, including the California Current Ecosystem (CCE), numerous estuary and freshwater areas and associated riparian habitats. Salmon contribute to ecosystem function as predators on lower trophic level species, as prey for higher trophic level species, and as nutrient transportation from marine ecosystems to inland ecosystems. Because of their wide distribution in both the freshwater and marine environments, Pacific salmon interact with a great variety of habitats and other species of fish, mammals, and birds. The analysis area for the Proposed Action is dominated by the CCE. An extensive description of the CCE can be found in chapter three of the Council's Pacific Coast Fishery Ecosystem Plan, which is incorporated herein by reference (PFMC 2013c).

Council managed salmon fisheries use hook and line gear, exclusively. This gear does not touch the ocean floor and does not disturb any habitat features. Therefore, salmon fisheries have no physical impact on habitat.

3.5 Socioeconomic Environment

SRWC are primarily encountered in Council-managed recreational and commercial salmon fisheries south of Point Arena, California. Detailed information on the economic impacts of Council-managed salmon fisheries is found in the Council's annual Review of Ocean Salmon Fisheries (e.g., PFMC 2017b and PFMC 2018).

NOAA's Northwest Fisheries Science Center (NWFSC) has published profiles on West Coast fishing communities (Norman et al. 2007). This report includes social and economic characteristics for 125 fishing communities on the West Coast. The community profiles include sections on: people and place, infrastructure, involvement in West Coast fisheries, and involvement in North Pacific fisheries. The California communities profiled in Norman et al. (2007) are: Albion, Arroyo Grande, Atascadero, Avila Beach, Bodega Bay, Corte Madera, Costa Mesa, Crescent City, Culver City, Dana Point, Dillon Beach, El Granada, El Sobrante, Eureka, Fields Landing, Fort Bragg, Half Moon Bay, Kneeland, Lafayette, Long Beach, Los Angeles, Los Osos, Marina, McKinleyville, Monterey, Morro Bay, Moss Landing, Novato, Oxnard, Pebble Beach, Point Arena, Port Hueneme, Princeton, San Diego, San Francisco, San Jose, San Pedro, Santa Ana, Santa Barbara, Santa Cruz, Santa Rosa, Sausalito, Seaside, Sebastopol, Sunset Beach, Tarzana, Terminal Island, Torrance, Trinidad, Ukiah, Valley Ford, and Ventura. The profiles of California communities in the analysis area are incorporated herein by reference.

Since 2010. coastal community economic impacts from salmon fisheries south of Point Arena have ranged from a low of $6.3 million in 2010 to a high of $40.0 million in 2013 (PFMC 2017b). Revenues have declined each year since 2013 (PFMC 2017b). Each year, fisheries have been constrained to meet escapement objectives for two or more salmon stocks (see Table 3-2). Therefore, while constraining fisheries to protect SRWC has had economic impact, it is not the only factor. Coastal community economic impacts in the analysis area for 2007 through 2016 are presented in Table 3-5.

Table 3-5. Coastal community economic impacts in the analysis area from recreational and commercial salmon fisheries, 2007 through 2016. Adjusted to real 2016 dollars (reported in thousands) (PFMC 2017b, Table IV-16).

Year	Coastal community impacts south of Pt. Arena (thousands of dollars in 2016 real dollars)		
	Commercial fishery	Recreational fishery	Combined fisheries
2007	$ 10,241	$ 5,804	$ 16,045
2008*	$ 0	$ 0	$ 0
2009*	$ 0	$ 0	$ 0
2010	$ 260	$ 6,000	$ 6,260
2011	$ 3,290	$ 10,591	$ 13,881
2012**	$ 16,481	$ 18,212	$ 34,693
2013	$ 21,439	$ 18,615	$ 40,054
2014	$ 10,070	$ 15,504	$ 25,574
2015	$ 5,160	$ 12,133	$ 17,293
2016	$ 4,961	$ 10,299	$ 15,260

*In 2008 and 2009 all ocean salmon fishing in the analysis area was closed due to low abundance of Sacramento River fall Chinook (not an ESA-listed species).

**2012 was the implementation year of the current SRWC harvest control rule.

3.6 Social Impact Assessment

3.6.1 Tourism and recreation

Fishing is an important recreational and tourist activity for many West Coast communities (Norman et al. 2007). Economic benefits to these communities come not only directly from fishing activities, e.g., charter boat fees, licensing, bait, and tackle, but also indirectly, e.g., restaurants, grocery stores, lodging, tourist attractions, and shopping (Norman et al. 2007). See Table 3-5, above, for recent economic impacts from the recreational salmon fishery in the analysis area.

3.6.2 Environmental Justice

The NWFSC has published profiles on West Coast fishing communities (Norman et al. 2007). This report includes demographics and descriptions of community involvement in fisheries. The profiles of communities within the analysis area are incorporated herein by reference. The Proposed Action was developed through the Council process, including several meetings that were open to the public (see section 1.5). Public involvement in the process of developing the alternatives was encouraged for all meetings through in-person testimony or submitting comments directly to the Council.

3.7 Human Health and Safety

Vessels participating in ocean salmon fisheries are subject to licensing by the states and compliance with U.S. Coast Guard regulations. Nothing in the Proposed Action would affect these requirements, nor would it affect how fishing is conducted.

4.0 Environmental Impacts of Alternatives

This chapter will analyze the environmental impacts of the alternatives on the resources described in Chapter 3, for which there are identifiable impacts. The Proposed Action will have no impact on fish and fisheries other than salmon. In addition to non-ESA-listed salmon, the Proposed Action may have impacts on ESA-listed SRWC and the socioeconomic environment, which are discussed in the following subsections. Several resources included in the Affected Environment are not analyzed in detail in this chapter, because they would not be more than minimally affected by the proposed action and differences among effects of the alternatives are insubstantial. These resources, and the effects of this action on them, are described below:

- Fisheries and Fish Resources: Species of salmon other than Chinook and coho would not likely be affected by any of the alternatives. Coho salmon are not retained in the ocean salmon fishery in the analysis area (in order to limit impacts on ESA listed species), thus impacts from the fishery to coho are limited to catch and release mortality which is not likely to be affected substantially by any of the alternatives as those are not likely to change overall fishery effort in significant ways in most years, other than the No-fishing Alternative. Fisheries for halibut, coastal pelagic, groundfish, albacore, and invertebrates are all managed separately from salmon fisheries, and effort-shift between these fisheries and the salmon fishery has not been quantified. Species targeted by these fisheries are rarely if ever encountered in the salmon fishery. Overfished species of groundfish are generally not contacted in the ocean salmon fishery, thus are not expected to be affected by this action.
- Marine mammals: Ocean salmon fisheries have been designated as Category III under the MMPA; therefore, they have a remote or no likelihood of causing incidental mortality or serious injury to marine mammals. Salmon fisheries generally can affect SRKW because they reduce the numbers of fish that SRKW might otherwise prey on. As discussed above, NMFS has consulted under ESA section 7 on the effects of Council-area salmon fisheries on SRKW and has concluded that these fisheries are not likely to jeopardize SRKW (NMFS 2009). NMFS West Coast Region completed the most recent five-year review of the Southern Resident killer whale ESA listing in December 2016. There is new information that indicates Chinook salmon abundance may correlate with killer whale population growth rate, and while this information is under review, it is possible that future protective measures for SRKW in Council area fisheries will change as a result of this new information. However, at this time ocean salmon regulations are covered by the NMFS 2009 biological opinion, and on that basis it is expected that the proposed action would not have significant impacts to Southern Resident killer whales as fishery impacts under the proposed action are similar to those in recent years. The proposed action would continue to limit salmon fisheries south of Point Arena to the months of April through October (see Table 2-1). SRKW are believed to be in the analysis area only during the winter months. Therefore, the proposed action would occur in a time and area at which SRKW are not present, and the salmon being impacted would not be available to SRKW with or without the proposed action.
- Seabirds: Some seabirds prey on juvenile salmon, thus salmon fisheries have the potential to reduce prey available to seabirds by removing adult salmon that could otherwise spawn and produce additional juveniles. Council-area salmon fisheries are managed to meet spawning

escapement goals for adult salmon. However, in recent years survival of juvenile SRWC has fallen below historic levels due to environmental effects. Although the proposed action would establish maximum fisheries impact rates on adult SRWC, it is unlikely that the proposed action would have more than a minimal, if any, effect on the availability of juvenile salmon for seabirds, as environmental effects likely limit juvenile abundance more than the proposed action.

- Marine Ecosystem and Fish Habitat: Salmon fisheries do not disturb bottom habitat; therefore, the proposed action would not have any effect on the physical environment. The removal of adult salmon by the ocean fisheries is not considered to significantly affect the lower trophic levels or the overall marine ecosystem because salmon are not the only or primary predator in the marine environment (NMFS 2003; Appendix B). The analysis of the SRWC Workgroup indicates that the expected abundance of SRWC spawners is not substantially different among the alternatives other than the no fishing alternative (SRWC Workgroup 2017a and 2017b). Spawning escapement goals for other stocks are set in the FMP and would not be affected by the Proposed Action. Therefore, in addition to having no impact on the physical habitat, the Proposed Action is not expected to impact marine nutrient transport. Therefore, no significant impacts are expected on biodiversity or ecosystem function from the Alternatives analyzed in this EA.
- Environmental Justice: The Proposed Action is not expected to have any effect on Environmental Justice.
- Human Health and Safety: The Proposed Action would have no impact on human health and safety.

The primary sources of analyses for comparing the impacts of the alternatives are the reports of the Council's SRWC Workgroup, these are cited below and publicly available on the Council's website (www.pcouncil.org).

4.1 Salmon and Salmon Fishery Resources

4.1.1 Alternative 1 – No-action Alternative (Council option CR8)

The current harvest control rule has been in place since 2012. Forecast age-3 abundance for SRWC under this alternative is based on the most recent three-year geometric mean of spawning escapement. This method of forecasting would continue to be used under the No-action Alternative. Because this method is based on abundance in previous years, it assumes survival of future cohorts of salmon will be similar to that of previous cohorts. The limitations of this method of forecasting were demonstrated during the recent drought in California (2011-2016), when juvenile survival was severely limited by environmental factors, resulting in lower age-3 abundance for the affected cohorts than was forecast using the methods of the existing control rule.

As described above in Table 1-1, the current harvest control rule has specified allowable age-3 impact rates for SWRC ranging from a low of 12.9 percent (2013) to a high of 19.9 percent (2016). However, in the three most recent years (2015, 2016, and 2017), responding to low juvenile survival during the California drought, the Council recommended fisheries with impact rates below those specified by the

harvest control rule. In the period from 2012 through 2017, the average (i.e., arithmetic mean) allowable age-3 impact rate under the existing harvest control rule was 16.1 percent; whereas, the average adopted by the Council was 14.1 percent.

The SRWC Workgroup's simulation analysis (SRWC Workgroup 2017a) estimated frequency with which each alternative would recommend a SRWC age-3 impact rate (i_3) among 4 "bins": $i_3 = 0$, $0 < i_3 \leq 0.10$, $0.10 < i_3 < 0.20$, and $i_3 \geq 0.20$ (Table 4-1). The simulations predict that the No-action Alternative would recommend an allowable age-3 impact rate of 20 percent in 62 percent of the simulations.

Table 4-1. Proportion of simulations in which the allowable age-3 impact rate (i_3) among 4 "bins": $i_3 = 0$, $0 < i_3 \leq 0.10$, $0.10 < i_3 < 0.20$, and $i_3 \geq 0.20$, using the Base scenario as an example (SRWC Workgroup 2017a, O'Farrell pers. comm. 2017).

Alternative	SRWC Age-3 impact rate			
	0	0 – 0.1	0.1 – 0.2	0.2
Alternative 1 – No-action Alternative (Council option CR8)	0.00	0.00	0.37	0.62
Alternative 2 – Council option CR4	0.00	0.03	0.01	0.95
Alternative 3 – Council option CR5	0.00	0.01	0.03	0.95
Alternative 4 – Council option CR7	0.01	0.00	0.36	0.63
Alternative 5 – Council option CR10 (Preferred Alternative)	0.00	0.01	0.25	0.74
Alternative 6 – Council option CR1 (No-fishing Alternative)	1.00	0.00	0.00	0.00

In all years since 2012, impacts to SRWC have been a constraining factor to Council-managed salmon fisheries; however, the same environmental conditions that affect SRWC productivity also affect other stocks, and harvest impacts to a number of stocks are considered together to shape fisheries. Fishery impacts to Chinook stocks other than SRWC must meet conservation criteria for those stocks. Since 2012, fisheries in the analysis area have been constrained to meet the conservation requirements for California Coastal Chinook and Klamath River fall Chinook, in addition to SRWC (see Table 3-2, above). Under the No-action alternative, SRWC would be expected to continue to constrain fisheries similar to the past six years.

The SRWC Workgroup estimated that the mean annual number of SRWC spawners under alternatives 1, 2, 3, 4, and 5 would be approximately seven thousand (SRWC Workgroup 2017a and 2017b).

4.1.2 Alternative 2 – Council option CR4

Alternatives 2, 3, 4, and 5 use juvenile survival (i.e., fry to the end of age-2 in the ocean) to model a forecast of age-3 escapement absent fishing. The model used is a modification of Winship et al. (2014) and is detailed in O'Farrell et al. (2016), which is incorporated by reference above in section 2.0.

Under Alternative 2, the allowable impact rate specified by the harvest control rule would often be the maximum, 20 percent; simulations analyzed by the SRWC Workgroup suggest this would occur 95

percent of the time (SRWC Workgroup 2017b) (Table 4-1, above). This would constrain fisheries less frequently than the No-action Alternative.

Fishery impacts to Chinook stocks other than SRWC must meet conservation criteria for those stocks. Because Alternative 2 would allow somewhat higher impact rates on SRWC than the No-action Alternative, conservation criteria for other stocks would possibly constrain the fishery in more years than the conservation criteria for SRWC in the future.

Impacts to salmon and the salmon fishery from Alternative 2 would be similar to Alternative 3, and would allow for more fishing opportunity than Alternatives 1, 4, and 5 (SRWC Workgroup 2017b).

The SRWC Workgroup estimated that the mean annual number of SRWC spawners under alternatives 1, 2, 3, 4, and 5 would be approximately seven thousand (SRWC Workgroup 2017a and 2017b).

4.1.3 Alternative 3 – Council option CR5

Alternatives 2, 3, 4, and 5 use juvenile survival (i.e., fry to the end of age-2 in the ocean) to model a forecast of age-3 escapement absent fishing. The model used is a modification of Winship et al. (2014) and is detailed in O'Farrell et al. (2016), which is incorporated by reference above in section 2.0.

Under Alternative 3, the allowable impact rate specified by the harvest control rule would often be the maximum, 20 percent; simulations analyzed by the SRWC Workgroup suggest this would occur 95 percent of the time (SRWC Workgroup 2017b) (Table 4-1, above). This would constrain fisheries less frequently than the No-action Alternative.

Fishery impacts to Chinook stocks other than SRWC must meet conservation criteria for those stocks. Because Alternative 3 would allow somewhat higher impact rates on SRWC than the No-action Alternative, conservation criteria for other stocks could be constraining to the fishery in more years than the SRWC conservation criteria in the future.

Impacts to salmon and the salmon fishery from Alternative 3 would be similar to Alternative 2, and would allow for more fishing opportunity than Alternatives 1, 4, and 5 (SRWC Workgroup 2017a).

The SRWC Workgroup estimated that the mean annual number of SRWC spawners under alternatives 1, 2, 3, 4, and 5 would be approximately seven thousand (SRWC Workgroup 2017a and 2017b).

4.1.4 Alternative 4 – Council option CR7

Alternatives 2, 3, 4, and 5 use juvenile survival (i.e., fry to the end of age-2 in the ocean) to model a forecast of age-3 escapement absent fishing. The model used is a modification of Winship et al. (2014) and is detailed in O'Farrell et al. (2016), which is incorporated by reference above in section 2.0.

Based on the SRWC Workgroup's analysis, Alternative 4 would specify allowable impact rates on SRWC that are similar to those of the No-action Alternative, and would specify the highest impact rate, 20 percent, 63 percent of the time (SRWC Workgroup 2017a) (Table 4-1, above), slightly more often than the No-Action Alternative and significantly less often than Alternatives 2 and 3. Alternative 4 also includes a zero impact provision when SRWC falls below 500, as does the No-action Alternative.

Simulations suggest this alternative would allow zero impacts one percent of the time under Alternative 4 (SWRC Workgroup 2017a) (Table 4-1, above). Based on the SRWC Workgroup's analysis, Alternative 4 would be the most constraining of Council-managed salmon fisheries of the analyzed alternatives, other than the No-action and No-fishing Alternatives.

Fishery impacts to stocks other than SRWC must meet conservation criteria for those stocks. Because Alternative 4 would allow impact rates on SRWC similar to the No-action Alternative, it would continue to constrain fisheries at approximately the same frequency. However, in years SRWC is not constraining, salmon fisheries would still need to meet the criteria set for the other stocks.

Impacts to salmon and the salmon fishery from Alternative 4 would be similar to the No-action Alternative, and this alternative would allow for less fishing opportunity than Alternatives 2, 3, and 5 (SRWC Workgroup 2017a, SRWC Workgroup 2017b).

The SRWC Workgroup estimated that the mean annual number of SRWC spawners under alternatives 1, 2, 3, 4, and 5 would be approximately seven thousand (SRWC Workgroup 2017a and 2017b).

4.1.5 Alternative 5 – Council option CR10 (Preferred Alternative)

Alternatives 2, 3, 4, and 5 use juvenile survival (i.e., fry to the end of age-2 in the ocean) to model a forecast of age-3 escapement absent fishing. The model used is a modification of Winship et al. (2014) and is detailed in O'Farrell et al. (2016), which is incorporated by reference above in section 2.0.

Based on the SRWC Workgroup's analysis, Alternative 5 would specify the highest impact rate, 20 percent, 74 percent of the time (SWRC Workgroup 2017a, SWRC Workgroup 2017b) (Table 4-1, above), more often than the No-action Alternative or Alternative 4, but less often than Alternatives 2 and 3. Unlike the No-action Alternative, Alternative 5 includes a *de minimis* provision, as does Alternative 3, allowing some level of fishing impact on SRWC at all levels of abundance.

As mentioned above, fishery impacts to stocks other than SRWC must meet conservation criteria for those stocks. Alternative 5 would constrain fisheries somewhat less frequently than the No Action alternative, Alternative 4, and the No-fishing Alternative, but more often than Alternatives 2 or 3. However, in years SRWC is not constraining, salmon fisheries would still need to meet the criteria set for the other stocks.

This alternative would provide a moderate level of fishing opportunity compared to the other alternatives (SRWC Workgroup 2017a, SRWC Workgroup 2017b).

The SRWC Workgroup estimated that the mean annual number of SRWC spawners under alternatives 1, 2, 3, 4, and 5 would be approximately seven thousand (SRWC Workgroup 2017a and 2017b).

4.1.6 Alternative 6 – Council option CR1 (No-fishing Alternative)

Under Alternative 6, no salmon fishing would be allowed in the action area, regardless of the forecast abundance of SRWC. This would have negative impacts to the ocean salmon fishery. It is possible that this would increase fishing opportunity in freshwater fisheries managed by the State of California,

targeting Chinook salmon stocks other than SRWC, but NMFS has no way to predict what management actions the state might take.

The SRWC Workgroup estimated that the mean annual number of SRWC spawners under alternatives 1, 2, 3, 4, and 5 would be approximately seven thousand; under Alternative 6, the mean annual number of SRWC spawners would be approximately eleven thousand (SRWC Workgroup 2017a and 2017b). This would be a positive effect for SRWC, assuming these fish were not taken in freshwater fisheries.

4.2 Protected Resources

The SRWC Workgroup considered two measures of extinction risk for SRWC under the alternatives (SRWC Workgroup 2017a, SRWC Workgroup 2017b). The first measure, population size, predicts the risk of extinction due to low abundance, based on the three-year sum of spawning escapement. The second measure, catastrophe, predicts the risk of extinction due to generational changes in population size. As shown below (Tables 4-2 and 4-3), the SRWC Workgroup's simulation analyses demonstrated no significant difference in extinction risk among the alternatives using either measure, population size or catastrophe

Table 4-2. Proportion of simulations resulting in high, moderate, and low risk of extinction for the population size criterion using the Base scenario (SRWC Workgroup 2017a, O'Farrell pers. comm. 2017).

Alternative	Level of Extinction Risk		
	Low	Moderate	High
Alternative 1 – No-action Alternative (Council option CR8)	0.996	0.004	0.000
Alternative 2 – Council option CR4	0.992	0.008	0.000
Alternative 3 – Council option CR5	0.994	0.006	0.000
Alternative 4 – Council option CR7	0.995	0.005	0.000
Alternative 5 – Council option CR10 (Preferred Alternative)	0.995	0.005	0.000
Alternative 6 – Council option CR1 (No-fishing Alternative)	1.000	0.000	0.000

Table 4-3. Probability of high, moderate, and low risk of extinction for the catastrophe criterion using the Base scenario (SRWC Workgroup 2017a, O'Farrell pers. comm. 2017).

Alternative	Level of Extinction Risk		
	Low	Moderate	High
Alternative 1 – No-action Alternative (Council option CR8)	0.563	0.435	0.002
Alternative 2 – Council option CR4	0.573	0.424	0.003
Alternative 3 – Council option CR5	0.574	0.424	0.002
Alternative 4 – Council option CR7	0.573	0.425	0.002
Alternative 5 – Council option CR10 (Preferred Alternative)	0.570	0.429	0.002
Alternative 6 – Council option CR1 (No-fishing Alternative)	0.571	0.427	0.002

The SRWC Workgroup also ran simulations on the effects of the alternatives on SRWC spawner abundance. As with the extinction risk analyses shown above, there was little difference among alternatives 1 through 5; however, under Alternative 6 mean spawner abundance would be 62 to 67 percent higher than under the other alternatives(Table 4-4, below).

Table 4-4. Mean SRWC spawner abundance for each control rule using the Base scenario (SRWC Workgroup 2017a, M. O'Farrell personal communication).

Alternative	Mean spawner abundance
Alternative 1 – No-action Alternative (Council option CR8)	6,935
Alternative 2 – Council option CR4	6,754
Alternative 3 – Council option CR5	6,716
Alternative 4 – Council option CR7	6,900
Alternative 5 – Council option CR10 (Preferred Alternative)	6,852
Alternative 6 – Council option CR1 (No-fishing Alternative)	11,241

Because of the lack of meaningful difference in the effects on protected resources among the alternatives, other than spawner abundance, we do not provide an alternative-by-alternative discussion in this section. The analyses provided by the SRWC Workgroup suggest that, while Alternative 6 would result in more spawners it would not have a corresponding reduction in extinction risk over the other alternatives.

4.3 Socioeconomics

4.3.1 Alternative 1 – No-action Alternative (Council option CR8)

The No-action Alternative would continue to use the current harvest control rule. In three of the six years this harvest control rule has been in place, the Council has recommended a lower impact rate than specified by the control rule because the method of forecasting SRWC was not responsive to recent changes in SRWC productivity and juvenile survival due to environmental conditions. Under this alternative, it is reasonable to expect that SRWC would continue to constrain fisheries, as shown in Table 3-2. Constraining fisheries had an economic impact on the coastal communities; however, in no year was SWRC the only constraining stock. Moreover, the years that had the most constrained fisheries in the last decade were 2008 and 2009, when fisheries in the analysis area were closed to limit impacts to Sacramento River fall Chinook, not an ESA-listed species, rather than SRWC.

This alternative would be expected to have economic impacts to fishery-dependent communities similar to the past six years. There would be no differential impact to minority populations, low-income populations, or Indian tribes.

4.3.2 Alternative 2 – Council option CR4

The SRWC Workgroup's analyses (SRWC Workgroup 2017a, SRWC Workgroup 2017b) indicate that there is little difference between the fishery impacts of Alternatives 2 and 3. Both of these control rules would allow a 20 percent age-3 impact rate on SRWC in most years. Because these alternatives are the least constraining on the fishery, they would likely have the most beneficial impacts on for the coastal communities in the analysis area, compared to the other alternatives, including the No-action Alternative. Alternative 2 would be slightly more beneficial to fishery-dependent communities than Alternative 3, because, while Alternative 3 has a de minimis feature, Alternative 2 never specifies SRWC fishery impacts below 10 percent. However, as mentioned above, impacts to other stocks in the analysis area may, in some years, constrain fisheries more than any alternative being considered in the proposed action, with the exception of Alternative 6.

This alternative would be expected to have a positive impact of low magnitude on economic benefits to fishery-dependent communities that would vary year-to-year, but not likely to be significant. There would be no differential impact to minority populations, low-income populations, or Indian tribes.

4.3.3 Alternative 3 – Council option CR5

The SRWC Workgroup's analyses (SRWC Workgroup 2017a, SRWC Workgroup 2017b) indicate that there is little difference between the fishery impacts of Alternatives 2 and 3. Both of these control rules would allow a 20 percent age-3 impact rate on SRWC in most years. Because these alternatives are the least constraining on the fishery, they would likely have the most beneficial impacts on for the coastal communities in the analysis area, compared to the other alternatives, including the No-action alternative. Alternative 2 would be slightly more beneficial to fishery-dependent communities than Alternative 3, because, while Alternative 3 has a de minimis feature, Alternative 2 never specifies SRWC fishery impacts below 10 percent. However, as mentioned above, impacts to other stocks in the analysis

area may, in some years, constrain fisheries more than any alternative being considered in the proposed action, with the exception of Alternative 6.

This alternative would be expected to have a positive impact of low magnitude on economic benefits to fishery-dependent communities that would vary year-to-year, but not likely to be significant. There would be no differential impact to minority populations, low-income populations, or Indian tribes.

4.3.4 Alternative 4 – Council option CR7

Although the SRWC Workgroup's analyses (SRWC Workgroup 2017a, SRWC Workgroup 2017b) showed little contrast among the alternatives, Alternative 4 would be the most constraining on fisheries, other than Alternative 6. As with the No-action Alternative, Alternative 4 would result in no fishing in the analysis area when the age-3 escapement of SRWC falls below 500, the two alternatives would, however, arrive at that forecast using different models. Economic impacts in the analysis area when no fishing is allowed would be similar to the years 2008 and 2009, as shown on Table 3-5. However, according to the simulations run by the SRWC Workgroup, Alternative 4 would only result in fishery closure one percent of the time (Table 4-1, above). However, as mentioned above, impacts to other stocks in the analysis area may, in some years, constrain fisheries more than any alternative being considered in the proposed action, with the exception of Alternative 6.

This alternative would be expected to have a negative impact of low magnitude on economic benefits to fishery-dependent communities that would vary year-to-year, but not likely to be significant, as the risk of fishery closure is very low. There would be no differential impact to minority populations, low-income populations, or Indian tribes.

4.3.5 Alternative 5 – Council option CR10 (Preferred Alternative)

The SRWC Workgroup's analyses (SRWC Workgroup 2017a, SRWC Workgroup 2017b) showed that, although there was little contrast among the alternatives, Alternative 5 would be intermediate in fishery constraints and, therefore, economic impacts compared to the No-action Alternative and the other two action alternatives. However, as mentioned above, impacts to other stocks in the analysis area may, in some years, constrain fisheries more than any alternative being considered in the proposed action, with the exception of Alternative 6.

Although analysis of simulations using this alternative indicate intermediate fishery constraints compared to the other alternatives, this alternative does include a *de minimis* provision and would allow impacts at all non-zero forecast abundance. Because of this feature, this alternative, by itself, is unlikely to result in fishery closure in the analysis area. Therefore, this alternative would be expected to have a positive impact of low magnitude on economic benefits to fishery-dependent communities that would vary year-to-year, but not likely to be significant. However, as mentioned above, impacts to other stocks in the analysis area may, in some years, constrain fisheries more than any alternative being considered in the proposed action, with the exception of Alternative 6. There would be no differential impact to minority populations, low-income populations, or Indian tribes.

4.3.6 Alternative 6 – Council option CR1 (No-fishing Alternative)

Under Alternative 6 there would be no salmon fishing in the analysis area. This alternative would be the most constraining of all the alternatives being considered and, therefore, have the largest economic impact on fishery dependent communities in the analysis area.

This alternative would have a negative impact of substantial magnitude on economic benefits to fishery-dependent communities. There would be no differential impact to minority populations, low-income populations, or Indian tribes.

4.4 Cumulative Effects and Climate Change

A cumulative effects analysis is required by the Council on Environmental Quality (CEQ) (40 CFR part 1508.7). The purpose of a cumulative effects analysis is to consider the combined effects of many actions on the human environment over time that would be missed if each action were evaluated separately. CEQ guidelines recognize that it is not practical to analyze the cumulative effects of an action from every conceivable perspective, but rather, the intent is to focus on those effects that are truly meaningful. A formal cumulative impact assessment is not necessarily required as part of an EA under NEPA as long as the significance of cumulative impacts has been considered (U.S. EPA 1999). The following addresses the significance of the expected cumulative impacts as they relate to the Pacific Coast salmon fishery.

4.4.1 Consideration of the Affected Resources

The affected resources in the analysis area for the proposed action are described in Chapter 3. The significance of the cumulative effects will be discussed in relation to these affected resources listed below.

- Fishery and Fish Resources.
- Protected Resources.
- Socioeconomic Environment.

4.4.2 Geographic Boundaries

The analysis focuses on actions related to Council-managed ocean salmon fisheries that impact SRWC. These fisheries occur south of Point Arena, California; therefore, the core analysis area is the exclusive economic zone (EEZ), from three to 200 miles offshore, off the coasts of the state of California, from Point Arena to the U.S./Mexico border (Section 3.1).

4.4.3 Temporal Boundaries

The temporal scope of past and present actions for the affected resources is primarily focused on actions that have occurred after framework FMP implementation (1984) and more importantly, since implementation of the current SRWC harvest control rule (2012). The temporal scope of future actions for all affected resources extends about five years into the future. This period was chosen because the dynamic nature of resource management and lack of information on future projects make it very difficult to predict impacts beyond this timeframe with any certainty.

4.4.4 Past, Present, and Reasonably Foreseeable Future Actions

Fishery Actions

The Council sets management measures for ocean salmon fisheries annually based on stock forecasts and in accordance with conservation objectives set in the FMP and guidance provided by NMFS for managing impacts to ESA-listed stocks. Additionally, the Council and NMFS manage ocean salmon fisheries during the fishing season to keep fisheries impacts within the constraints set preseason. The Council also conducts annual methodology reviews to improve models and other tools for assessing salmon stocks.

Salmon, primarily Chinook, are bycatch in the Council-managed groundfish fisheries. NMFS conducted an ESA consultation on this bycatch, completed in 2017, which concluded that the groundfish fisheries are not likely to jeopardize any ESA listed salmon species. The Incidental Take Statement in the biological opinion anticipates that a limited number of Chinook and coho will be taken in the groundfish fisheries and requires careful monitoring of that take. For areas in which the groundfish fishery has been closed or limited in recent years, precaution in expanding the fishery to avoid higher levels of salmon take is required.

Non-Fishing Related Actions

Non-fishing activities in the marine environment can introduce chemical pollutants and sewage; and result in changes in water temperature, salinity, dissolved oxygen, and suspended sediment which poses a risk to the affected resources. Human-induced non-fishing activities tend to be localized in nearshore areas and marine project areas. When these activities co-occur, they are likely to work additively or synergistically to decrease habitat quality and may indirectly constrain the sustainability of the managed resources, non-target species, and protected resources. Decreased habitat suitability tends to reduce the tolerance of affected species to the impacts of fishing effort. The overall impact to the affected species and their habitats on a population level is unknown, but likely neutral to low negative compared to the status quo, since a large portion of these species have a limited or minor exposure to the localized non-fishing perturbations.

For many of the proposed non-fishing activities to be permitted by other Federal agencies, those agencies would examine the potential impacts on the affected resources. The Magnuson-Stevens Act (50 CFR 600.930) imposes an obligation on other Federal agencies to consult with the Secretary of Commerce on actions that may adversely affect Essential Fish Habitat (EFH); and the Secretary may provide recommendations to minimize such effects. The Council may provide comments and recommendations on any Federal or state action that may affect habitat, including EFH, for their managed species and by commenting on actions likely to substantially affect habitat, including EFH. In addition, under the Fish and Wildlife Coordination Act (Section 662),

> whenever the waters of any stream or other body of water are proposed or authorized to be impounded, diverted, the channel deepened, or the stream or other body of water otherwise controlled or modified for any purpose whatever, including navigation and drainage, by any department or agency of the U.S., or by any public or private agency under Federal permit or license, such department or agency first shall consult with the

U.S. Fish and Wildlife Service (USFWS), Department of the Interior, and with the head of the agency exercising administration over the wildlife resources of the particular state wherein the

activity is taking place. This act provides another avenue for review of actions by other Federal and state agencies that may impact resources that NMFS manages in the reasonably foreseeable future. In addition, NMFS and the USFWS share responsibility for implementing the ESA. ESA requires NMFS to designate "critical habitat" for any species it lists under the ESA (i.e., areas that contain physical or biological features essential to conservation, which may require special management considerations or protection) and to develop and implement recovery plans for threatened and endangered species. The ESA provides another avenue for NMFS to review actions permitted, funded or undertaken by federal agencies that may impact endangered and threatened species under NMFS' jurisdiction and their critical habitat. Federal reviews under these provisions may help to limit the adverse effects of activities in the analysis area, however, they do not completely eliminate such effects which are likely to continue into the next several years.

The effects of climate on the biota of the California Current ecosystem have been recognized for some time. The El Niño/Southern Oscillation (ENSO) is widely recognized to be the dominant mode of inter-annual variability in the equatorial Pacific, with impacts throughout the rest of the Pacific basin and the globe. During the negative (El Niño) phase of the ENSO cycle, jet stream winds are typically diverted northward, often resulting in increased exposure of the Pacific Coast of the U.S. to subtropical weather systems. The impacts of these events to the coastal ocean generally include reduced upwelling winds, deepening of the thermocline, intrusion of offshore (subtropical) waters, dramatic declines in primary and secondary production, poor recruitment, reduced growth and survival of many resident species (such as salmon and groundfish), and northward extensions in the range of many tropical species. Concurrently, top predators such as seabirds and pinnipeds often exhibit reproductive failure. In addition to inter-annual variability in ocean conditions, the North Pacific seems to exhibit substantial inter-decadal variability, which is referred to as the Pacific (inter) Decadal Oscillation (PDO).

Within the California Current itself, Mendelssohn, et al. (2003) described long-term warming trends in the upper 50 to 75 m of the water column. Recent paleoecological studies from marine sediments have indicated that 20th century warming trends in the California Current exceeded natural variability in ocean temperatures over the last 1,400 years. Statistical analyses of past climate data have improved our understanding of how climate has affected North Pacific ecosystems and associated marine species productivities. Our ability to predict future impacts on the ecosystem stemming from climate forcing events remains poor at best.

4.4.5 Magnitude and Significance of Proposed Action

In determining the magnitude and significance of the cumulative effects, the additive and synergistic effects of the proposed action, as well as past, present, and future actions, must be taken into account. The following section presents the effects of past, present, and reasonably foreseeable future actions on each of the managed resources. This is followed by a discussion on the synergistic effects of the proposed action, as well as past, present, and reasonably foreseeable future actions.

4.4.5.1 Fishery and Fish Resources

Past, present, and reasonably foreseeable future actions that affect the salmon fishery and fish resources are considered annually when the Council sets management measures for ocean salmon fisheries based on stock forecasts and in accordance with conservation objectives set in the FMP and guidance provided by NMFS for managing impacts to ESA-listed stocks. Additionally, the Council and NMFS manage ocean salmon fisheries during the fishing season to keep fisheries impacts within the constraints set preseason. The Council also conducts annual methodology reviews to improve models and other tools for assessing salmon stocks. Therefore, the magnitude of effects of the proposed action on the salmon fishery and fish resources is expected to be low positive compared to the status quo, and the significance of effects of the proposed action on the salmon fishery and fish resources is expected to be not significant.

4.4.5.2 Protected Resources – SRWC

Past, present, and foreseeable future actions that affect ESA-listed SRWC are considered annually when the Council sets management measures for ocean salmon fisheries; NMFS provides guidance for managing impacts to ESA-listed stocks based on biological opinions and stock productivity information provided by the states and analyzed by the STT. Fishery management actions have been taken for many years to manage impacts on SRWC, and the states have developed information to better inform fishery management decisions. The magnitude of effects of the proposed action on ESA-listed SRWC is expected to be similar to the effects of the No Action alternative, based on comparing the action alternatives to the No-action Alternative (see section 4.2) and the significance of effects of the proposed action on ESA-listed SRWC is expected to be not significant.

4.4.5.3 Socioeconomic Environment

Each year the Council evaluates the socioeconomic impact of past salmon fisheries in the stock assessment and fishery evaluation document (e.g., PFMC 2017b) and also evaluates foreseeable future impacts in the annual preseason reports; these documents are also used as the basis for the NEPA analysis for the annual management measures. Impacts of the Preferred Alternative on the socioeconomic environment is described in section 4.3.5. The magnitude of the effects of the proposed action on the socioeconomic environment is expected to be low positive compared to the status quo, and the significance of effects of the proposed action on the socioeconomic environment is expected to be not significant.

4.4.6 Summary of Cumulative Impacts

Alternative 5 is the Preferred Alternative (see Chapter 2). The magnitude and significance of the cumulative effects include the additive and synergistic effects of the proposed action, as well as past, present, and reasonably foreseeable future actions, and are included in the discussion throughout this section.

Impacts of the proposed action on the salmon fishery and fish resources will vary year-to-year, depending on the forecast abundance of SRWC. The Council manages ocean salmon fisheries through an intensive preseason analysis process and inseason management to shape salmon fisheries impacts on salmon stocks within the parameters of the FMP conservation measures and ESA requirements. The

Preferred Alternative is expected to have a positive impact on the salmon fishery through increased opportunity for harvest of Chinook salmon through adopting a new harvest control rule that is based on the latest scientific information that reduces the uncertainty of management response to the productivity and abundance of SRWC, potentially allowing less constrained fisheries in some years in areas that SRWC occur compared to the No-action Alternative, with little or no increased extinction risk to SWRC (Table 4-3, above). Taking the expected impacts of the Preferred Alternative into account in addition to past, present, and reasonably foreseeable future actions, no significant cumulative impacts are expected on the fishery and fish resources.

Relative to ESA-listed SRWC, the Preferred Alternative employs an abundance projection methodology that is responsive to both juvenile survival and projected adult escapement, and would be used to manage impacts to SRWC consistent with the requirements of the ESA. Taking the expected impacts of the Preferred Alternative into account in addition to past, present, and reasonably foreseeable future actions, no significant cumulative impacts are expected on ESA-listed SRWC.

The Preferred Alternative would reduce constraints on fisheries in the analysis area in years that SRWC was a limiting stock; this would be expected to have a positive impact on fishery dependent communities. Given inter-annual variations in abundance of the numerous salmon stocks managed in Council-area fisheries, the Preferred Alternative does not ensure positive economic impacts relative to the No Action alternative in all years, nor do the other alternatives. Taking the expected impacts of the preferred alternative into account in addition to past, present, and reasonably foreseeable future actions, no significant cumulative impacts are expected on the socioeconomic environment.

5.0 Consistency With Other Applicable Law

5.1 Magnuson-Stevens Fishery Conservation and Management Act (MSA)

The MSA provides parameters and guidance for Federal fisheries management. Overarching principles for fisheries management are found in the MSA's National Standards, which articulate a broad set of policies governing fisheries management. In crafting fisheries management regimes, the Councils and NMFS must balance their recommendations to meet these applicable national standards.

As discussed previously, the purpose of this action is to incorporate new information on SRWC juvenile productivity and survival into a harvest control rule that is responsive to changes in the productivity and abundance of SRWC to optimize fishing opportunities without jeopardizing the survival of SRWC.

National Standard 1 requires that conservation management measures shall prevent overfishing while achieving on a continuing basis, the optimum yield from each fishery for the United States fishing industry. The alternatives analyzed in this EA are consistent with National Standard 1.

National Standard 2 requires the use of the best available scientific information. The Council's SRWC Workgroup developed alternatives for the Proposed Action using data developed in recent years by the state of California. The information used to inform the Proposed Action represents the best available

scientific information for the affected populations of Chinook salmon. The alternatives analyzed in this EA are consistent with National Standard 2.

National Standard 6 requires conservation objectives and management measures to take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches. All alternatives in this EA are consistent with National Standard 6 as each provides an abundance-based methodology that takes into account annual variations in SRWC productivity, additionally the FMP allows for inseason management of Council-area salmon fisheries to meet conservation objectives and preseason management objectives. The alternatives analyzed in this EA area consistent with National Standard 6.

National Standard 8 requires that conservation and management measures shall, consistent with the conservation requirements of the MSA, take into account the importance of fishery resources to fishing communities in order to "(A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities." Alternatives 2, 3, and 5 (Preferred Alternative) allow for somewhat less restrictive fisheries than the No-action Alternative, based on impacts to SRWC while providing a harvest control rule that is responsive to the conservation needs of that ESA-listed stock.

National Standard 9 requires the reduction, to the extent practicable, of bycatch or bycatch mortality. There is no difference among alternatives in bycatch mortality. All alternatives will be subject to the same size restrictions for Chinook salmon retention in the analysis area. Only Chinook salmon can be retained in salmon fisheries in the analysis area; therefore, there would be no differential bycatch or bycatch mortality to coho salmon among the alternatives. Ocean salmon fisheries require the use of barbless hooks to minimize bycatch mortality. The alternatives analyzed in this EA are consistent with National standard 9.

National Standard 10 requires, to the extent practicable, conservation and management measures to promote the safety of human life at sea. The Alternatives in this EA are not expected to have significant effects on season structure or other factors that would increase risks to salmon fishermen. All alternatives in this EA are consistent with National Standard 10.

5.2 Coastal Zone Management Act

Section 307(c)(1) of the Federal Coastal Zone Management Act (CZMA) requires all Federal activities that directly affect the coastal zone be consistent with approved state coastal zone management programs to the maximum extent practicable. The alternatives in this EA would be implemented in a manner that is consistent to the maximum extent practicable with the enforceable policies of the approved coastal zone management programs of California. This determination has been submitted to the responsible state agencies for review under section 307(c)(1) of the CZMA, and reviewed for consistency with the California and California San Francisco Bay Conservation and Development Commission coastal zone management programs.

Under the CZMA, each state develops its own coastal zone management program, which is then submitted for Federal approval. This has resulted in programs which vary widely from one state to the next. None of the alternatives are expected to affect any state's coastal management program.

5.3 Endangered Species Act

Section 7(a)(2) of the ESA requires that Federal agencies ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of critical habitat. In addition, Section 7(a)(3) of the ESA requires that Federal agencies consult with NMFS and the U.S. Fish and Wildlife Service on any action authorized, funded, or carried out by such agency that may affect a species listed under the ESA or their designated critical habitat.

The Proposed Action would identify a harvest control rule to manage impacts to SRWC. This action is not expected to have adverse effects on any critical habitat. Fisheries conducted according to this control rule will impact individual SRWC; however, as discussed above, the control rule is intended to limit impacts to SRWC to avoid jeopardy. NMFS intends to consult with itself on Council-managed salmon fisheries impacts on SRWC under the proposed control rule. The Proposed Action would not be implemented unless, and until, a biological opinion resulting from that consultation concludes that the Proposed Action is not likely to jeopardize SRWC. This consultation is expected to be completed prior to implementing 2018 ocean salmon fisheries on May 1, 2018.

5.4 Marine Mammal Protection Act

The MMPA of 1972 is the principle Federal legislation that guides marine mammal species protection and conservation policy in the United States. Under the MMPA, NMFS is responsible for the management and conservation of 153 stocks of whales, dolphins, porpoise, as well as seals, sea lions, and fur seals; while the US Fish and Wildlife Service is responsible for walrus, sea otters, and the West Indian manatee.

Off the West Coast, Guadalupe fur seal, and northern and southern sea otter are listed as threatened under the ESA. Sperm whale (California/Oregon/Washington stock), humpback whale (WA, OR, CA, Mexico stock), blue whale eastern north Pacific stock, and fin whale (California/Oregon/Washington stock) are listed as depleted under the MMPA. Any species listed as endangered or threatened under the ESA is automatically considered depleted under the MMPA.

The commercial salmon troll fisheries off the West Coast are classified as Category III fisheries, indicating a remote or no likelihood of causing incidental mortality or serious injury to marine mammals (82 FR 3655, January 12, 2017). Recreational salmon fisheries are assumed to have similar impacts as they use similar gear and techniques. The Alternatives considered in this EA are not expected to have significant impacts to marine mammals (see section 3.3.2 in this EA).

5.5 Migratory Bird Treaty Act (MBTA) and EO 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds)

The MBTA of 1918 was designed to end the commercial trade of migratory birds and their feathers that, by the early years of the 20th century, had diminished populations of many native bird species. The act states that it is unlawful to take, kill, or possess migratory birds and their parts (including eggs, nests, and feathers) and is a shared agreement between the United States, Canada, Japan, Mexico, and Russia to protect a common migratory bird resource. The MBTA prohibits the directed take of seabirds, but the incidental take of seabirds does occur. The Proposed Action does not directly affect any seabirds protected by the MBTA (see section 3.3.3 of this EA).

5.7 Paperwork Reduction Act

The purposes of the Paperwork Reduction Act (PRA) are to minimize the burden of information collection by the Federal Government on the public; maximize the utility of any information thus collected; improve the quality of information used in Federal decision making, minimize the cost of collection, use and dissemination of such information; and improve accountability. The PRA requires Federal agencies to obtain clearance from the Office of Management and Budget before collecting information. This clearance requirement is triggered if certain conditions are met. "Collection of information" is defined broadly. In summary it means obtaining information from third parties or the public by or for an agency through a standardized method imposed on 10 or more persons. Collection of information need not be mandatory to meet the trigger definition. Even information collected by a third party, if at the behest of a Federal agency, may trigger the clearance requirement. Within NMFS the Office of the Chief Information Officer is responsible for PRA compliance. Obtaining clearance can take up to 9 months and is one aspect of NMFS review and approval of Council decisions.

The alternatives in this EA do not include collection of information from sources or of types not already present in the FMP and salmon regulations.

5.8 EO 12898 (Environmental Justice)

Executive Order 12898 obligates Federal agencies to identify and address "disproportionately high adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations in the United States" as part of any overall environmental analysis associated with an action. NOAA guidance, NAO 216-6, at 7.02, states that "consideration of Executive Order 12898 should be specifically included in the NEPA documentation for decision making purposes." Agencies should also encourage public participation "especially by affected communities" as part of a broader strategy to address environmental justice issues.

The environmental justice analysis must first identify minority and low-income groups that live in the project area and may be affected by the action. Typically, census data are used to document the occurrence and distribution of these groups. Agencies should be cognizant of distinct cultural, social, economic or occupational factor that could amplify the adverse effects of the Proposed Action. (For example, if a particular kind of fish is an important dietary component, fishery management actions affecting the availability or price of that fish could have a disproportionate effect.) In the case of Indian tribes, pertinent treaty or other special rights should be considered. Once communities have been identified and characterized, and potential adverse impacts of the alternatives are identified, the analysis must determine whether these impacts are disproportionate. Because of the context in which

environmental justice developed, health effects are usually considered and three factors may be used in an evaluation: whether the effects are deemed significant, as the term is employed by NEPA; whether the rate or risk of exposure to the effect appreciably exceeds the rate for the general population or some other comparison group; and whether the group in question may be affected by cumulative or multiple sources of exposure. If disproportionately high adverse effects are identified, mitigation measures should be proposed. Community input into appropriate mitigation is encouraged.

The Proposed Action is not expected to affect minority and low-income communities, because it does not directly affect the manner in which fisheries are conducted; the Proposed Action identifies a harvest control rule to limit fishery impacts to SRWC, and to be implemented through the annual management measures for ocean salmon fisheries. Fisheries conducted under the FMP are not expected to disproportionally affect minority and low-income communities. West Coast Indian tribes are part of the Council's decision-making process on salmon management issues, and tribes with treaty rights to salmon, groundfish, or halibut have a seat on the Council. Available demographic data detailed in Norman et al. (2007) show that coastal counties where fishing communities are located are variable in terms of social indicators like income, employment, and race and ethnic composition. As a result, the alternatives are not expected to have notable effects on fishing communities in general, nor on minority and low income groups in particular.

5.9 EO 13132 (Federalism)

Executive Order 13132 enumerates eight "fundamental federalism principles." The first of these principles states "Federalism is rooted in the belief that issues that are not national in scope or significance are most appropriately addressed by the level of government closest to the people." In this spirit, the Executive Order directs agencies to consider the implications of policies that may limit the scope of or preempt states' legal authority. Preemptive action having such "federalism implications" is subject to a consultation process with the states; such actions should not create unfunded mandates for the states; and any final rule published must be accompanied by a "federalism summary impact statement."

The Council and process offers many opportunities for states and Indian tribes (through their agencies, Council appointees, consultations, and meetings) to participate in the formulation of management frameworks and management measures implementing the framework. This process encourages states and tribes to institute complementary measures to manage fisheries under their jurisdiction that may affect federally managed stocks.

The Proposed Action would not have federalism implications subject to Executive Order 13132.

5.10 EO 13175 (Consultation and Coordination with Indian Tribal Government)

Executive Order 13175 is intended to ensure regular and meaningful consultation and collaboration with tribal officials in the development of Federal policies that have tribal implications, to strengthen the United States government-to-government relationships with Indian tribes, and to reduce the imposition of unfunded mandates upon Indian tribes.

The Secretary recognizes the sovereign status and co-manager role of Indian tribes over shared Federal and tribal fishery resources. At Section 302(b)(5), the Magnuson-Stevens Act reserves a seat on the Council for a representative of an Indian tribe with Federally-recognized fishing rights from California, Oregon, Washington, or Idaho. Through the tribal representative on the Council, the Tribes have the opportunity to exercise this role. The Proposed Action was developed through the Council process. Therefore, the Proposed Action is consistent with EO 13175.

5.11 Regulatory Flexibility Act

The purpose of the Regulatory Flexibility Act (RFA) is to relieve small businesses, small organizations, and small governmental entities of burdensome regulations and record-keeping requirements. Major goals of the RFA are: (1) to increase agency awareness and understanding of the impact of their regulations on small business, (2) to require agencies communicate and explain their findings to the public, and (3) to encourage agencies to use flexibility and to provide regulatory relief to small entities. The RFA emphasizes predicting impacts on small entities as a group distinct from other entities and the consideration of alternatives that may minimize the impacts while still achieving the stated objective of the action. An initial regulatory flexibility analysis (IRFA) is conducted unless it is determined that an action will not have a "significant economic impact on a substantial number of small entities."

The Proposed Action is to adopt a harvest control rule to limit fishery impacts on SRWC, an ESA listed species. The Proposed Action does involve a rulemaking; therefore, the RFA applies and a regulatory flexibility analysis has been prepared. Additionally, the RFA does apply to the annual management measures and the effects of this control rule as applied in those measures will be considered in the analysis on the annual management measures.

5.12 EO 12866 (Regulatory Planning and Review)

EO 12866, Regulatory Planning and Review, was signed on September 30, 1993, and established guidelines for promulgating new regulations and reviewing existing regulations. The EO covers a variety of regulatory policy considerations and establishes procedural requirements for analysis of the benefits and costs of regulatory actions. Section 1 of the EO deals with the regulatory philosophy and principles that were to guide agency development of regulations. It stresses that in deciding whether and how to regulate, agencies should assess all of the costs and benefits across all regulatory alternatives. Based on this analysis, NMFS should choose those approaches that maximize net benefits to society, unless a statute requires another regulatory approach.

The Regulatory Impact Review is designed to determine whether the proposed action could be considered a "significant regulatory action" according to EO 12866. EO 12866 defines a "significant

regulatory action", and requires agencies to provide analysis of the costs and benefits of such action and reasonable feasible alternatives. An action may be considered "significant" if it is expected to: 1) have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or state, local, or tribal governments or communities; 2) create a serious inconsistency or otherwise interfere with action taken or planned by another agency; 3) materially alter the budgetary impact of entitlement, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or 4) raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the EO. Pursuant to the procedures established to implement section 6 of E.O. 12866, the Office of Management and Budget has determined that this action is not significant.

6.0 References

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7.0 List of Persons and Agencies Consulted

This action is a Council-recommended action that includes all interested and potential cooperating agencies, such as tribal government representatives and state representatives for Washington, Oregon, Idaho, and California.

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8.0 Finding of no Significant Impact

Sacramento River Winter-run Chinook Salmon Management Measures

for

Fisheries Managed under the Pacific Coast Salmon Fishery Management Plan

(Regulatory Identifier Number 0648-BH40)

FINDING OF NO SIGNIFICANT IMPACT

Background

Proposed Action: The Proposed Action is to adopt management measures including (1) fishing season and size restrictions and (2) a harvest control rule to identify appropriate impact levels to Sacramento River winter-run Chinook salmon (SRWC) from Council-managed salmon fisheries beginning in 2018 and to implement that control rule through notice-and-comment rulemaking.

Alternatives Evaluated in the Environmental Assessment (EA):

Alternative 1 – No-action Alternative (Council option CR8)
Alternative 2 – Council option CR4
Alternative 3 – Council option CR5
Alternative 4 – Council option CR7
Alternative 5 – Council option CR10 (Preferred Alternative)
Alternative 6 – Council option CR1 (No-fishing Alternative)

Selected Alternative:

Alternative 5 – Council option CR10 (Preferred Alternative)

Related Consultations:

NMFS West Coast Region has completed an Endangered Species Act (ESA) section 7 consultation on the proposed action. The consultation resulted in a biological opinion with the NMFS consultation number WCR-2017- 8012.

Significance Review

The Council on Environmental Quality (CEQ) Regulations state that the determination of significance using an analysis of effects requires examination of both context and intensity, and lists ten criteria for intensity (40 CFR 1508.27). In addition, the Companion Manual for National Oceanic and Atmospheric Administration Administrative Order 216-6A provides sixteen criteria, the same ten as the CEQ Regulations and six additional, for determining whether the impacts of a proposed action are significant. Each criterion is discussed below with respect to the proposed action and considered individually as well as in combination with the others.

1. Can the proposed action reasonably be expected to cause both beneficial and adverse impacts that overall may result in a significant effect, even if the effect will be beneficial?

The proposed action is not expected to result in significant effects, either beneficial or adverse, based on the analysis of the alternatives provided by the Council's *ad hoc* Sacramento River Winter-run Chinook Workgroup (Workgroup). These analyses are summarized and referenced in Chapter 4 of the EA.

2. Can the proposed action reasonably be expected to significantly affect public health or safety?

The proposed action is not expected to affect public health or safety. The proposed action provides a method to set allowable impacts on SRWC from ocean salmon fisheries but does not establish any requirements for how fishing activities are conducted. The proposed action does not affect federal, state, and local requirements for safe operation of fishing vessels and compliance with those requirements.

3. Can the proposed action reasonably be expected to result in significant impacts to unique characteristics of the geographic area, such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas?

The proposed action would not result in any impacts to unique characteristics of the geographic area. Because the proposed action only determines allowable fishing impacts, it does not implement fisheries or interact in any way with the physical environment.

4. Are the proposed action's effects on the quality of the human environment likely to be highly controversial?

The effects of the proposed action on the quality of the human environment are not expected to be controversial. The alternatives were developed over a two-year time period in which they were discussed at several Council and Workgroup meetings that were open to the public. Additionally, NMFS published a proposed rule in the Federal Register soliciting comments on the approval of the proposed action; no comments were received.

5. Are the proposed action's effects on the human environment likely to be highly uncertain or involve unique or unknown risks?

The effects of the proposed action on the human environment are not likely to be highly uncertain or involve unique or unknown risks. The alternatives, including the No-action Alternative, were analyzed extensively by the Workgroup and were found to have similar expected outcomes for all analyzed metrics (e.g., extinction risk, spawner abundance). These analyses are summarized and referenced in Chapter 4 of the EA.

6. Can the proposed action reasonably be expected to establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration?

The proposed action is not expected to establish a precedent for future actions because fishery impacts on ESA-listed species are considered on a case-by-case basis due to the

different biological and environmental factors that affect each evolutionarily significant unit (ESU).

7. Is the proposed action related to other actions that when considered together will have individually insignificant but cumulatively significant impacts?

No. The EA concludes in Chapter 4 that no cumulatively significant impacts are expected from the proposed action. Ocean salmon fisheries are assessed and established annually and are responsive to the forecast abundance of the many affected salmon stocks. Management measures for the ocean salmon fisheries are analyzed each year under NEPA and the impacts have not been found to be significant.

8. Can the proposed action reasonably be expected to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources?

The proposed action does not have any ground disturbing aspects; therefore, it is not expected to affect any significant scientific, cultural, or historical resources.

9. Can the proposed action reasonably be expected to have a significant impact on endangered or threatened species, or their critical habitat as defined under the Endangered Species Act of 1973?

The proposed action is not expected to have a significant impact on endangered or threatened species, or their critical habitat. The only ESA-listed species that will be affected by the proposed action is SRWC. The Workgroup analyzed the impacts of the alternatives, including the No-action Alternative, on the extinction risk to SRWC and found modest differences among the alternatives. These analyses are summarized and referenced in Chapter 4 of the EA. Additionally, NMFS has completed an ESA Section 7 consultation on the effects of the proposed action on SRWC and has determined in a biological opinion that the proposed action is not likely to jeopardize the species.

10. Can the proposed action reasonably be expected to threaten a violation of Federal, state, or local law or requirements imposed for environmental protection?

The proposed action will not violate environmental laws. It has been determined to be consistent with the ESA, Marine Mammal Protection Act (MMPA), Magnuson-Stevens Fishery Conservation and Management Act, Data Quality Act, Fish and Wildlife Coordination Act, and other applicable laws.

11. Can the proposed action reasonably be expected to adversely affect stocks of marine mammals as defined in the Marine Mammal Protection Act?

The proposed action does not implement any action that affects marine mammals. The product of the proposed action will be used in the setting of annual salmon management measures. These fisheries have been determined to be Category III under the MMPA, meaning they have a remote likelihood of, or no known, incidental mortality or serious injury of marine mammals.

12. Can the proposed action reasonably be expected to adversely affect managed fish species?

The proposed action is not expected to adversely affect managed fish species. The proposed action will provide a tool that sets fishing levels, through fishing season and size restrictions and a harvest control rule, that provide necessary conservation constraints for SRWC while allowing access to other harvestable salmon stocks. The EA concludes in Chapter 4 that no other managed fish species will be affected by the proposed action.

13. Can the proposed action reasonably be expected to adversely affect essential fish habitat (EFH) as defined under the Magnuson-Stevens Fishery Conservation and Management Act?

The proposed action is not expected to have any effect on EFH; it will only set an allowable impact rate on SRWC through fishing season and size restrictions and a harvest control rule. NMFS' biological opinion includes consultation on EFH and concluded the proposed action would not result in adverse effects on EFH.

14. Can the proposed action reasonably be expected to adversely affect vulnerable marine or coastal ecosystems, including but not limited to, deep coral ecosystems?

The proposed action is not expected to adversely affect vulnerable marine or coastal ecosystems. The proposed action will set fishery impact limits on SRWC through fishing season and size restrictions and a harvest control rule.

15. Can the proposed action reasonably be expected to adversely affect biodiversity or ecosystem functioning (e.g., benthic productivity, predator-prey relationships, etc.)?

The proposed action is not expected to adversely affect biodiversity or ecosystem functioning. The proposed action includes time and area fishing restrictions that will limit fishing to time periods when Southern Resident killer whales, which prey on salmon, are not present. The proposed action will allow spawning escapement of adult salmon which will conserve SRWC and allow transport of marine derived nutrients to the freshwater environment.

16. Can the proposed action reasonably be expected to result in the introduction or spread of a nonindigenous species?

The proposed action will not result in the introduction or spread of nonindigenous species. The proposed action sets allowable impact limits, through fishing season and size restrictions and a harvest control rule, on SRWC from ocean salmon fisheries.

DETERMINATION

In view of the information presented in this document and the analysis contained in the supporting Environmental Assessment prepared for Sacramento River winter-run Chinook salmon management measures for fisheries managed under the Pacific Coast Salmon Fishery Management Plan and the biological opinion on the effects of this action on Sacramento River winter-run Chinook salmon, it is hereby determined that the Sacramento River winter-run Chinook salmon management measures for fisheries managed under the Pacific Coast Salmon Fishery Management Plan will not significantly impact the quality of the human environment as described above and in the supporting Environmental Assessment. In addition, all beneficial and adverse impacts of the proposed action have been addressed to reach the conclusion of no significant impacts. Accordingly, preparation of an environmental impact statement for this action is not necessary.

Barry A. Thom
Regional Administrator
West Coast Region
National Marine Fisheries Service

3/30/2018
Date