Agenda Item H.2
Attachment 1
September 2020

ANALYTICAL DOCUMENT ORGANIZED AS A PRELIMINARY DRAFT ENVIRONMENTAL ASSESSMENT WITH UPDATED RANGE OF ALTERNATIVES FOR AMENDMENT 20 OF THE PACIFIC COAST SALMON FISHERY MANAGEMENT PLAN: PROPOSED CHANGE TO THE PRESEASON SCHEDULE AND TO THE KLAMATH MANAGEMENT ZONE BOUNDARY

AUGUST 2020

Prepared for:
Pacific Fishery Management Council

Prepared by:
Pacific Fishery Management Council Staff, and
West Coast Region National Marine Fisheries Service Staff

Table of Contents

List of Tables

List of Figures

List of Acronyms and Abbreviations

A20	Amendment 20 to the Pacific Coast Salmon Fishery Management Plan
Council	Pacific Fishery Management Council, also PFMC
CPFV	California commercial passenger fishing vessel
EEZ	Exclusive Economic Zone (3-200 NM offshore)
ESA	Endangered Species Act
FB	Fort Bragg management area in California
FMP	Fishery Management Plan
FRAM	Fishery Regulation Assessment Model
KC	California portion of the Klamath Management Zone
KMZ	Klamath Management Zone
KO	Oregon portion of the Klamath Management Zone
KOHM	Klamath Ocean Harvest Model
KRFC	Klamath River fall-run Chinook salmon
MFMT	Maximum Fishing Mortality Threshold
MSST	Minimum Stock Size Threshold.
MSY	Maximum sustainable yield
nmi	Nautical miles
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
PFMC	Pacific Fishery Management Council, also Council
SHM	Sacramento Harvest Model
S_{MSY}	Maximum sustainable yield (MSY) spawner abundance. The abundance of adult spawners that is expected, on average, to produce MSY
Spp	Species
SRFC	Sacramento River Fall-run Chinook Salmon
STT	Salmon Technical Team of the PFMC
WCR	NMFS West Coast Region

1.0 Introduction

In November 2019, the Pacific Fishery Management Council (Council, PFMC) agreed to consider two separate topics for proposed change relative to salmon management that will each require an amendment to the Pacific Salmon Fishery Management Plan (FMP). The proposed changes are 1) an adjustment to the annual preseason salmon schedule, and 2) a modification to the southern boundary of the Klamath Management Zone (KMZ). In addition, minor 'housekeeping' items were also identified that could be included in an FMP amendment to keep it up to date. These two primary topics, along with minor housekeeping updates, would constitute the twentieth amendment (A20) to the current salmon FMP.

Council-managed salmon fisheries traditionally begin May 1, following development and adoption of annual management measures at the Council's April meeting. However, it has become increasingly challenging for NOAA's National Marine Fisheries Service (NMFS) to complete the rulemaking in time to approve and implement the Council's annual recommendation by May 1. Therefore, NMFS West Coast Region (WCR) presented a proposal at the Council's September 2019 meeting to modify the schedule in the FMP for setting annual management measures for salmon fisheries (NMFS 2019). NMFS proposed that the historical annual start date (May 1) for implementing PFMC ocean salmon fisheries be changed to roughly May 15. NMFS also proposed that a fixed transmittal date of the annual salmon management rules to the Secretary of Commerce be established in the preseason schedule. The Council considered this proposal and asked NMFS and Council staff (Project Team) to develop a workplan for consideration at the November 2019 Council meeting.

Since at least 1990, the KMZ has extended from Humbug Mountain, Oregon, to Horse Mountain, California.[1] Horse Mountain delineates the boundary between the KMZ to the north and the Fort Bragg (FB) salmon management area to the south (Figure 8.1.a). Changing the current salmon management line at Horse Mountain has been a topic of consistent interest for the commercial salmon fishery sector since first proposing the change at the Council's March 2016 meeting. The commercial salmon fishery sector has made several requests of the Council, since 2016, to move the southern boundary of the KMZ five nautical miles (nmi) north, which has been presented through public comment and supported by the Salmon Advisory Subpanel (SAS). In April 2019, the Council requested the Salmon Technical Team (STT) to conduct the technical analysis needed to inform a change of the salmon management boundary line from Horse Mountain (latitude 40° 05′ N) north to latitude 40° 10′ N.

At the Council's November 2019 meeting, the Project Team provided a report (PFMC and NMFS 2019) outlining a workplan for the proposed changes to the annual preseason salmon schedule, and the STT provided a report (O'Farrell and Letvin 2019) on the boundary change as part of the annual Methodology Review. The Council agreed to consider both proposed changes for a potential FMP amendment. The Council also acknowledged that although both of these topics would ideally be included in one amendment process, if the necessary work could not be done concurrently, then the Project Team would focus on the preseason schedule proposal in order to meet its 2021 implementation goal.

[1] In 1988 and 1989, the KMZ extended from Orford Reef Red Buoy to Horse Mountain (53 FR 16002, May 4, 1988; 54 FR 19798, May 8, 1989).

At the June 2020 meeting, the Council adopted for public review a range of alternatives for both the annual management schedule and the southern KMZ boundary change being considered under Amendment 20, which are described in Section 4 of this document.

2.0 Purpose and Need

2.1 Preseason salmon schedule

The purpose of the proposed action for the preseason schedule change is to provide sufficient time between the Council's final action to set annual salmon management measures and the start of the salmon season to ensure that Federal rulemaking is completed. The need for the proposed action is to provide certainty to the fishery that management measures will be in place at the expected time.

2.2 Proposed boundary change

The purpose of the proposed action for the boundary change is to change the defined southern boundary of the KMZ from 40° 05' N lat. (Horse Mountain, California) five nautical miles north to 40° 10' N. lat. The proposed change would reduce the size of the KMZ and coincidingly increase the size of the adjacent FB fishery management area by five nautical miles (nm). The need for the proposed action is to simplify management of the fishery by aligning the southern boundary of the KMZ with the Federal boundary used in groundfish fisheries, and fulfill the request of the local commercial fishers that operate in the area to move the boundary.

In addition, there are a few items within the current FMP that need updating. The proposed amendment provides the opportunity to make any needed updates, corrections, edits, or formatting changes, as described in Section 5 of this document.

3.0 Scope of Action

3.1 Preseason salmon schedule

The scope of action for the proposed change to the preseason schedule for setting annual management measures for salmon fisheries would (1) change the expected annual start date of May 1 to roughly May 15 for Council-area ocean salmon fisheries and (2) set a fixed date by which the Council will transmit to the Secretary of Commerce its annual recommendations for ocean salmon management measures.

If the Council changes the annual start date from May 1, then the early May fisheries would need to be included in the prior year's management measures, as has been done for March and April (pre-May) fisheries since 1994.

3.2 Proposed boundary change

The scope of action for the proposed change to the salmon management boundary would reduce the size of the KMZ and coincidingly increase the size of the adjacent Fort Bragg (FB) fishery management area by five nm. The proposed action would define the boundary between the KMZ and FB as a line at 40° 10' N lat. (Figure 8.1.a).

4.0 Proposed Alternatives

4.1 Preseason salmon schedule

Historically, NMFS has been able to expedite the regulation package for setting the annual salmon management measures so that it has generally cleared the Federal rulemaking process in time for the fisheries to begin on May 1; however, achieving the May 1 date in recent years has become increasingly challenging, particularly in years when the April Council meeting is later than usual. NMFS has proposed to change the May 1 fishery implementation date to roughly May 15. This change would provide the additional time needed to complete the Federal rulemaking process, which begins once the Council has transmitted its final recommendations to the Secretary of Commerce in April.

- Alternative 4.1.1 – Status quo. Maintain the effective date of May 1.
- Alternative 4.1.2 – Annual effective date May 15.
- Alternative 4.1.3 – Annual effective date May 16.

NMFS has also recommended that the Council set a fixed date by which the annual management measures will be transmitted to NMFS. The purpose of this recommendation is to ensure NMFS has the time needed to approve and implement the annual management measures through filing a rule with the Office of the Federal Register.

- Alternative 4.1.4 – Do not amend the schedule to include an annual transmittal deadline.
- Alternative 4.1.5 – Amend the schedule to include an annual transmittal deadline that provides 24 days for NMFS to approve and implement the annual management measures. Example: An implementation date of May 15 would suggest a transmittal deadline of April 21.

4.2 Proposed boundary change

The proposed change is to modify the defined southern boundary of the KMZ from 40° 05' N. lat. (Horse Mountain) five nautical miles north to 40° 10' N lat. This would equally reduce the size of the KMZ and increase the size of the adjacent FB fishery management area by five nautical miles.

- Alternative 4.2.1 – Status quo; maintain the current southern KMZ boundary of 40° 05' N. lat. (Horse Mountain, CA).
- Alternative 4.2.2 – Modify the southern KMZ boundary to 40° 10' N lat.
- Alternative 4.2.3 - Modify the southern KMZ boundary to 40° 10' N lat. and establish a conservation zone from latitude 40° 05’ N five nautical miles north to 40° 10' N lat. during years when the *de minimis* provisions of the Klamath River fall-run Chinook (KRFC) salmon Control Rule are implemented.

5.0 Proposed housekeeping items

The primary focus of the proposed action is to consider amending the preseason salmon schedule for setting annual management measures in the FMP and consider modifying the southern boundary of the KMZ. However, this does provide an opportunity to take care of some housekeeping issues within the FMP. Some examples are included in, but not limited to, the following two sections.

5.1 Update FMP Table 3.1: status determination criteria

In 2015, the Council adopted new status determination criteria (SDC) for three stocks of salmon managed under the FMP: Southern Oregon coastal Chinook salmon, Grays Harbor fall-run Chinook salmon, and Willapa Bay natural coho. For all three stocks, the Council adopted new values for: conservation objective, S_{MSY} (the abundance of adult spawners that is expected to produce maximum sustainable yield), minimum stock size threshold (MSST), and maximum fishing mortality threshold (MFMT); for Willapa Bay natural coho, an annual catch limit (ACL) description was also adopted. These values were approved by NMFS through notice-and-comment rulemaking (80 FR 19564, April 13, 2015), but were never updated in FMP Table 3-1.

5.2 Update text to reflect NMFS regional reorganization

In 2013, NMFS merged the Northwest and Southwest Regions into one region, named the West Coast Region. All of the following terms in the FMP should be updated:

- Northwest Region should be West Coast Region;
- Southwest Region should be West Coast Region;
- NWR should be WCR;
- SWR should be WCR;
- NMFS NW Regional Administrator should be NMFS West Coast Regional Administrator.

5.3 Additional clarifying edits as needed

The STT has provided additional edits and updates for consideration that are included in Agenda Item H.2, Attachment 2, September 2020.

6.0 Council Operating Procedures

The proposed change to the preseason schedule, if adopted, would require a change to Council Operating Procedure (COP) 9, Management and Activity Cycles and COP 10 Preseason Salmon Management Process[2].

7.0 National Environmental Policy Act (NEPA)

The Project Team held a scoping meeting with a NEPA coordinator and General Counsel to determine the appropriate level of NEPA documentation.

The proposed change to the preseason schedule meets the criteria for a Categorical Exclusion, as the change proposed is mainly administrative.

The scoping participants determined that the proposed boundary change might qualify as a categorical exclusion, but because the full impact of the proposed change was unknown, an environmental assessment (EA) would better serve the Council in its decisionmaking.

Section 8 and Section 9 of this report focus on the proposed boundary change and are intended to help the Council in its deliberations when considering the proposed boundary change. These sections include the biological data as provided in the November 2019 STT report (O'Farrell and

[2] COP #10 Preseason Salmon Management Process: https://www.pcouncil.org/documents/2019/09/cop-10.pdf/

Letvin 2019) and socio-economic analysis of the alternatives. These sections will also be incorporated in the pending EA.

8.0 KMZ Boundary Change Affected Environment

8.1. Description of the action area

The KMZ currently extends from Humbug Mountain (42° 40′ N lat.) to Horse Mountain. The KMZ comprises two sub-areas for salmon management: the Oregon KMZ (KO) and the California KMZ (KC). The proposed action would affect the KC sub-area.

The KC is located on the northern California coast, off Del Norte and Humboldt Counties. Several rivers in the KC support salmon populations, including the Smith, Klamath, Trinity, Mad, Eel, and Mattole Rivers. The KC includes Federal waters in the exclusive economic zone (EEZ) (3-200 nmi offshore) and state waters (shoreward of 3 nmi). The State of California has designated conservation, or control, zones at the mouths of the Smith, Klamath, and Eel Rivers. These areas are closed to salmon fishing at various times of the year to facilitate escapement of salmon to freshwater habitats for spawning. Of these conservation zones, only the Klamath Control Zone extends into the EEZ.

Horse Mountain has been described in the annual ocean salmon management measures as the boundary between the KMZ and FB since 1988 (53 FR 16002, May 4, 1988). While not an officially designated conservation zone, portions of the KMZ have been closed to commercial salmon harvest since 1988. Since 1996, the area from Humboldt South Jetty (latitude 40°45′53″ N) to Horse Mountain has been closed to commercial salmon fishing.[3] The area affected by the proposed boundary change has been closed to commercial salmon harvest since 1988. Due to this long-term closure, there are no contemporary data from the commercial salmon fishery for the region between 40° 10′ N lat. and Horse Mountain—the specific area affected by the proposed boundary change. Recreational fishing has been allowed south to Horse Mountain when the KC area is open; however, effort and coded-wire tag (CWT) data derived from fish caught between 40° 10′ N lat. and Horse Mountain are very likely to be assigned to the FB area as almost all of the fishing activity is based out of Shelter Cove, which lies just south of the Horse Mountain boundary.

[3] Commercial salmon closures in, or adjacent to, the KMZ: 1988-1991—Punta Gorda to Horse Mountain, 1992—Florence South Jetty to Point Arena, 1993—Humbug Mountain to Horse Mountain, 1994-1995—House Rock to Horse Mountain, and 1996-2020—Humboldt South Jetty to Horse Mountain.

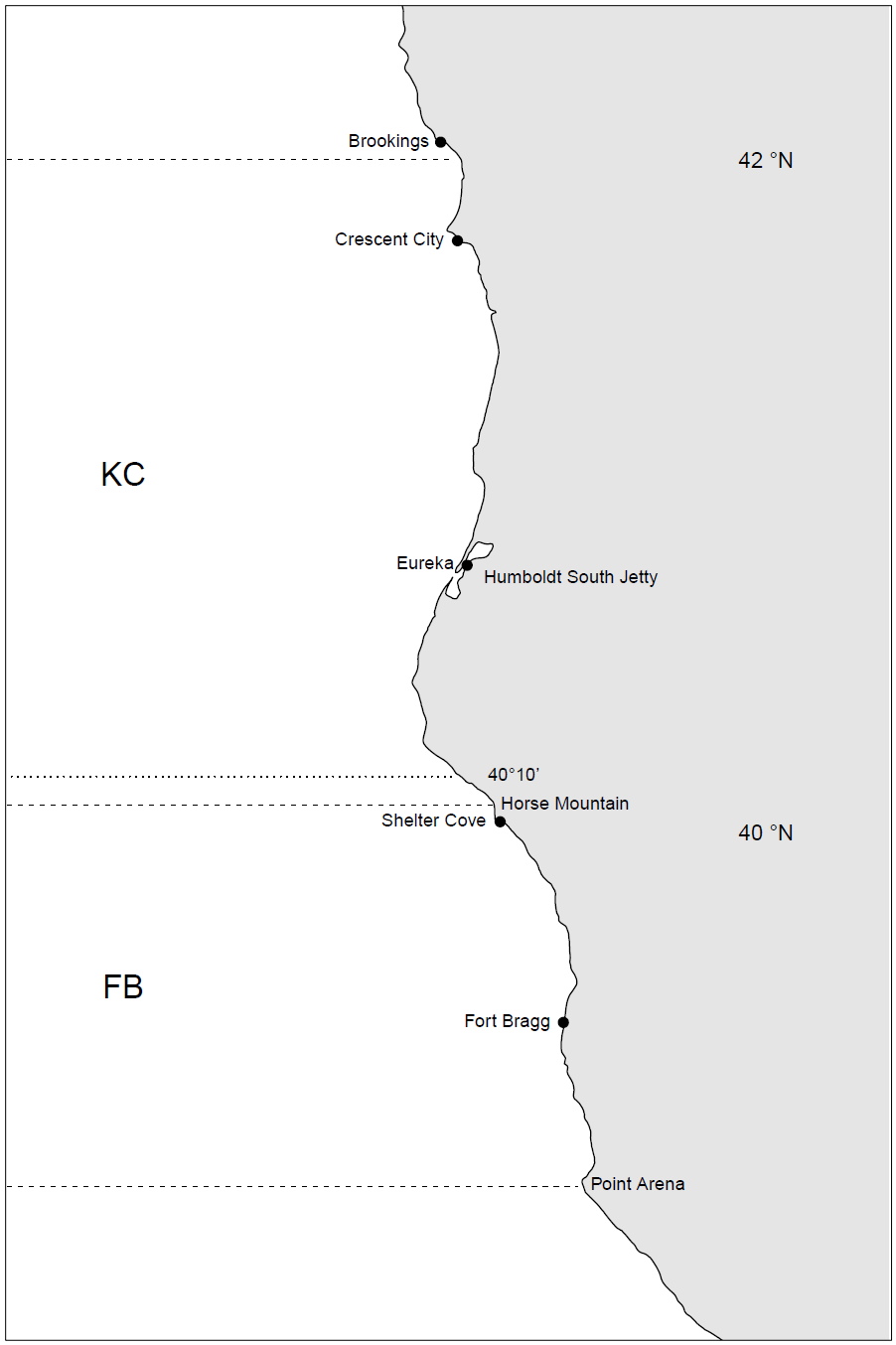

Figure 8.1.a. Map of the California Klamath Management Zone (KC) and Fort Bragg (FB) salmon management areas. Dashed lines represent the current boundary between the KC and FB management areas. The proposed action is to move the management boundary north from Horse Mountain to latitude 40°10' N, which is denoted by the dotted line. Source: O'Farrell and Letvin 2019.

8.2 Targeted salmon stocks

Council management jurisdiction for salmon fisheries is in the EEZ. In California, the State of California manages salmon fisheries shoreward of the EEZ and, for marine fisheries, adopts

regulations that conform to Federal regulations adopted by the Council, as approved by the Secretary of Commerce.

The primary stocks targeted in ocean salmon fisheries in the KC are Sacramento River fall-run Chinook salmon (SRFC) and Klamath River fall-run Chinook salmon (KRFC). These stocks are harvested in commercial and recreational ocean fisheries. NMFS determined in 2018 that these Chinook salmon stocks are overfished, due to the geometric mean of spawning escapement falling below MSST for both stocks in the three-year period 2015-2017. The Council adopted rebuilding plans for these stocks in 2019.

The SRFC stock is the largest contributing stock to ocean salmon fisheries off Oregon and California (O'Farrell et al. 2013), primarily between Cape Falcon, Oregon and Point Conception, California. Fishery contact rates for SRFC are generally higher closer to San Francisco Bay, which connects the Sacramento River to the ocean. Ocean salmon fisheries south of Cape Falcon, including KC, have been constrained to meet conservation requirements for SRFC in four years of the 15-year period 2004-2018 (PFMC and NMFS in prep.).

The KRFC stock is primarily contacted in ocean salmon fisheries between Cape Falcon and Point Sur, California. Fishery contact rates for KRFC are generally higher closer to the Klamath River mouth. KRFC are typically contacted at a higher rate by the commercial fleet than in the recreational fishery. For these reasons, commercial fisheries in areas closer to the Klamath River mouth (i.e., both portions of the KMZ, Central Oregon, and FB management areas) are the most constrained when KRFC abundance is projected to be low. Ocean salmon fisheries south of Cape Falcon, including KC, have been constrained to meet conservation requirements for KRFC in at least five years of the 15-year period 2004-2018, (PFMC and NMFS in prep.).

Coho salmon have not been retained in California commercial and recreational ocean salmon fisheries since 1994 (see section 8.3).

8.3 ESA-listed salmon stocks and critical habitat

Five evolutionarily significant units (ESUs) of salmon in California are listed as endangered or threatened under the Endangered Species Act (ESA). NMFS has consulted on the impacts of Council-area salmon fisheries on these ESA-listed salmon, under section 7 of the ESA. The biological opinions that provide incidental take statements and reasonable and prudent alternatives (RPA) for managing impacts on these ESUs are listed in the table below. The biological opinion for Southern Oregon/Northern California coast coho (SONCC coho) and Central California coast coho (CCC coho) includes an RPA that prohibits coho-directed fisheries and coho retention in Chinook-directed fisheries off California; this RPA continues a prohibition on coho retention that had been reiterated in the regulations annually since 1994. The purpose of this RPA is to limit fishery impacts on CCC coho.

Ocean salmon fisheries south of Cape Falcon, including KC, have been constrained to meet conservation requirements for ESA-listed California coastal Chinook and Sacramento River winter-run Chinook salmon in six years of the 15-year period 2004-2015 (PFMC and NMFS in prep.).

Table 8.3.a. ESA-listed salmon ESUs in California.

ESU	Current ESA status	Biological Opinion on Council-area Fisheries
Sacramento River winter-run Chinook salmon	Endangered	NMFS 2018
Central Valley spring-run Chinook salmon	Threatened	NMFS 2000
California coastal Chinook salmon	Threatened	NMFS 2000
Southern Oregon/Northern California coast coho salmon (SONCC coho)	Threatened	NMFS 1999
Central California coast coho salmon (CCC coho)	Endangered	NMFS 1999

8.4. Socio-economic environment

Ports most likely to be affected by the proposed boundary change lie within the Eureka and Fort Bragg port areas (Humboldt and Mendocino Counties) of northern California. Shelter Cove, which is the port closest in proximity to the latitude of the proposed boundary change, is located in the southwestern corner of Humboldt County.

Commercial fisheries

Commercial harvest of salmon and other species, including crab, groundfish, and shrimp, is conducted in the affected area. Harvesting vessels employ hundreds of people in local commercial fishing jobs. Landings in regional ports also support additional income and employment in seafood buying, processing, and support businesses.

Harvesting vessels that land in the area of this action are most likely to be affected by the proposed action. Annually an average of 179 salmon harvesting vessels and 42 salmon buyers operate in ports in the combined Eureka-Fort Bragg region, with 47 harvesters and 17 buyers operating in the Eureka port area, and 156 harvesters and 35 buyers in Fort Bragg (Table 8.4.a). Approximately 36 percent of the active California salmon fleet of 507 vessels from 2014 through 2019 landed in these areas. Some of the other vessels in the California salmon fleet may have caught fish in the area but returned to land in more distant ports.

Table 8.4.a. Counts of participating salmon harvesting vessels[a/] and shorebased buyers by port group and overall for the region[a/][b/], 2014-2019.

Port Group	Participant Type	2014	2015	2016	2017	2018	2019	2014-2019 Avg
Eureka	Harvesters	79	66	31	12	53	38	47
	Buyers	17	19	17	8	24	15	17
Fort Bragg	Harvesters	303	259	129	60	98	86	156
	Buyers	46	46	29	15	20	23	30
Total Regional	Harvesters	336	280	149	68	128	110	179
	Buyers	57	60	45	23	37	31	42

Source: PacFIN ex-vessel revenue data for California port areas.
a/ Counts of unique Vessel IDs or Buyer IDs.
b/ Combined ports in Eureka and Fort Bragg port groups.

The commercial vessels landing salmon in this area would all be considered small businesses, when each vessel is viewed as a single business. The average of the maximum annual exvessel revenue per vessel from all fisheries and areas combined was under $750 thousand, and the average of the maximum annual revenues from salmon was under $100 thousand. Similarly, the annual individual vessel averages from all species and areas was under $200 thousand, and the average from salmon under $27.5 thousand. With respect to both the maximums and averages, salmon revenue constituted approximately 13 to 14 percent of total exvessel revenue.

On a port by port basis, average revenue from salmon landings was greatest in Fort Bragg ($2.2 million), while average revenue from landings of all other species was greatest in Eureka ($12.3 million, Table 8.4.b). Note that although technically associated with the Bodega Bay-San Francisco management area, the port of Pt. Arena is included in the following three tables because it lies only about 3.4 nmi south of the FB area boundary at Pt. Arena, while it is separated by more than 30 nmi from the nearest other Bodega Bay area ports. Shelter Cove, which is the port in closest proximity to the proposed boundary change, averaged approximately $51 thousand ex-vessel revenue from salmon landings, and $292 thousand ex-vessel revenue from landings of all other species during 2014-2019 (all values adjusted for inflation).

Table 8.4.b. Ex-vessel revenue from landings by aggregated port, 2014-2019, adjusted for harvesting vessel and shore-based buyer confidentiality (in inflation-adjusted thousands 2019 dollars).

Port	Species Group	2014	2015	2016	2017	2018	2019	2014-2019 Avg
Orick, Trinidad, Arcata	Salmon	c	c	c	-	50	c	**11**
	Other Spp	3,391	565	3,017	1,973	3,277	1,969	**2,365**
Eureka	Salmon	561	329	48	30	302	66	**223**
	Other Spp	14,079	7,052	11,875	11,539	17,168	12,268	**12,330**
King Salmon	Salmon	c	-	-	-	c	c	**5**
	Other Spp	540	c	1,252	c	3,242	1,881	**1,196**
Shelter Cove	Salmon	127	92	44	2	12	29	**51**
	Other Spp	261	382	178	224	386	318	**292**
Fort Bragg	Salmon	5,363	4,283	1,480	356	870	563	**2,153**
	Other Spp	8,390	7,059	6,272	9,881	7,836	5,812	**7,542**
Albion	Salmon	7	c	c	c	-	1	**2**
	Other Spp	452	109	20	25	19	6	**105**
Point Arena	Salmon	180	209	58	c	c	123	**128**
	Other Spp	891	340	304	452	624	284	**483**
Totals		**34,244**	**20,656**	**24,551**	**24,539**	**33,957**	**23,336**	**26,881**

Source: PacFIN ex-vessel revenue data for California port areas.
Notes: "c" - Value withheld to preserve data confidentiality (fewer than three entities). Orick, Trinidad and Arcata (Ports 204, 231 and 212). Eureka (Port 220). King Salmon = King Salmon, Fields Landing, Humboldt and Loleta (Ports 246, 217, 219 and 224). Shelter Cove (Port 215). Fort Bragg = Westport and Fort Bragg (Ports 233 and 223). Albion = Little River, Albion, Elk and Ukiah (Ports 227, 211, 222, and 243). Point Arena (Port 213) is included due to proximity with Fort Bragg area ports.

Fort Bragg was the primary receiver of salmon landings in the area (over 80 percent), and salmon contributed a larger share of total exvessel revenue landed in Fort Bragg than for any other port (22 percent, Figure 8.2.a). During 2014-2019, salmon landings accounted for an average of approximately 15 percent of total exvessel revenue in Shelter Cove, compared with approximately 22 percent in Fort Bragg, 21 percent in Pt. Arena, but less than three percent in each of the other four ports shown.

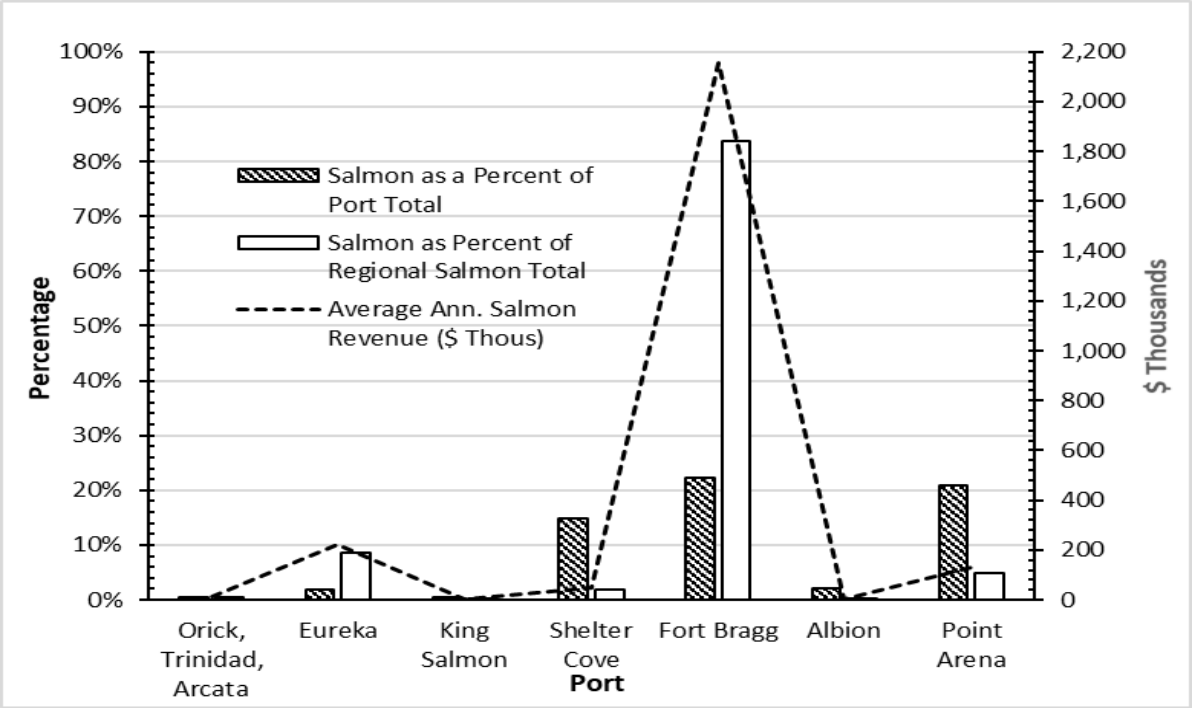

Figure 8.4.a. Average annual ex-vessel revenue from salmon landings in Eureka and Fort Bragg area ports, 2014-2019 (in inflation-adjusted thousands $2019).

Similarly, salmon landings also generated the greatest average annual income and employment impacts in Fort Bragg ($2.6 million, 91 jobs, Table 8.4.c and Table 8.4.d, respectively), while landings of all other species accounted for the greatest average annual income and employment impacts in Eureka ($16 million, 244 jobs). Shelter Cove, which is the port in closest proximity to the proposed boundary change, averaged approximately $56 thousand income impacts and two jobs from salmon landings; and $361 thousand income impacts and 11 jobs from landings of all other species during 2014-2019 (dollar values all adjusted for inflation).

Table 8.4.c. Estimated income impacts from landings by aggregated port, 2014-2019, adjusted for harvesting vessel and shore-based buyer confidentiality (in inflation-adjusted thousands $2019).

	Species Group	2014	2015	2016	2017	2018	2019	2014-2019 Avg
Orick, Trinidad, Arcata	Salmon	c	c	c	-	55	c	**13**
	Other Spp	4,333	710	3,827	2,493	4,196	2,547	**3,018**
Eureka	Salmon	622	365	53	33	334	73	**247**
	Other Spp	19,115	9,129	15,185	14,851	22,096	15,841	**16,036**

	Species Group	2014	2015	2016	2017	2018	2019	2014-2019 Avg
King Salmon	Salmon	c	-	-	-	c	c	**6**
	Other Spp	666	c	1,600	c	4,143	2,459	**1,531**
Shelter Cove	Salmon	140	102	49	2	14	32	**56**
	Other Spp	326	478	220	277	480	389	**361**
Fort Bragg	Salmon	6,353	5,074	1,754	422	1,031	667	**2,550**
	Other Spp	10,432	8,999	7,999	12,731	10,146	7,556	**9,644**
Albion	Salmon	8	c	c	c	-	2	**3**
	Other Spp	485	120	22	28	23	7	**114**
Point Arena	Salmon	213	248	69	c	c	146	**152**
	Other Spp	986	397	383	580	799	354	**583**
Totals		**43,681**	**25,907**	**31,164**	**31,488**	**43,517**	**30,092**	**34,308**

Source: PacFIN ex-vessel revenue data and IOPac income impact coefficients for California port areas.
Notes: "c" - Value withheld to preserve data confidentiality (fewer than three entities). Orick, Trinidad and Arcata (Ports 204, 231 and 212). Eureka (Port 220). King Salmon = King Salmon, Fields Landing, Humboldt and Loleta (Ports 246, 217, 219 and 224). Shelter Cove (Port 215). Fort Bragg = Westport and Fort Bragg (Ports 233 and 223). Albion = Little River, Albion, Elk and Ukiah (Ports 227, 211, 222, and 243). Point Arena (Port 213) is included due to proximity with Fort Bragg area ports.

Table 8.4.d. Estimated employment impacts from landings by aggregated port, 2014-2019, adjusted for harvesting vessel and shore-based buyer confidentiality (number of jobs).

Port	Species Group	2014	2015	2016	2017	2018	2019	2014-2019 Avg
Orick, Trinidad, Arcata	Salmon	c	c	c	-	2	c	1
	Other Spp	69	14	67	46	73	44	52
Eureka	Salmon	25	15	2	1	14	3	10
	Other Spp	276	135	232	218	345	257	244
King Salmon	Salmon	c	-	-	-	c	c	0
	Other Spp	16	c	25	c	65	38	26
Shelter Cove	Salmon	6	4	2	0	1	1	2
	Other Spp	9	13	7	9	14	15	11
Fort Bragg	Salmon	226	180	62	15	37	24	91
	Other Spp	292	214	190	277	215	158	224
Albion	Salmon	0	c	c	c	-	0	0
	Other Spp	28	8	2	2	2	1	7
Point Arena	Salmon	8	9	2	c	c	5	5
	Other Spp	56	22	17	17	22	15	25
Totals		1,011	622	609	588	796	562	698

Source: PacFIN ex-vessel revenue data and IOPac employment impact coefficients for California port areas.
Notes: "c" - Value withheld to preserve data confidentiality (fewer than three entities). Orick, Trinidad and Arcata (Ports 204, 231 and 212). Eureka (Port 220). King Salmon = King Salmon, Fields Landing, Humboldt and Loleta (Ports 246, 217, 219 and 224). Shelter Cove (Port 215). Fort Bragg = Westport and Fort Bragg (Ports 233 and 223). Albion = Little River, Albion, Elk and Ukiah (Ports 227, 211, 222, and 243). Point Arena (Port 213) is included due to proximity with Fort Bragg area ports.

Recreational Fisheries

Recreational fisheries in the affected region include anglers targeting salmon and other species (groundfish, halibut, and tuna) using chartered (or for-hire) and private vessels. Trips originating from ports in the region generate income and employment in charter businesses and businesses that provide hospitality services (restaurants, lodging and camping), groceries, bait, tackle and other supplies to recreational anglers and guides.

For Del Norte-Humboldt and Mendocino ports, an annual average of approximately 76,800 angler trips originated in the region during 2014-2019, of which approximately 60,500 (79 percent) were private trips and 16,300 trips (21 percent) were charter. An average of approximately 48,400 of total trips (63 percent) originated from Del Norte-Humboldt county ports and 28,400 trips (37 percent) originated from Mendocino County ports (Table 8.4.e). An average of approximately 25 percent of trips were taken from ports in the combined region targeted salmon. Salmon trips comprised an average of approximately 18 percent of trips taken from Del Norte-Humboldt county ports, while the average share of salmon trips was twice this amount (36 percent) for trips originating from Mendocino County ports.

Table 8.4.e. Summary of recreational effort originating from Northern California ports region and by trip type (salmon and all other) and boat mode (charter and private), 2014-2019 (thousand angler trips).

Counties	Trip Type	2014			2015			2016			2017		
		Char.	Priv.	Total	Char.	Priv.	Total	Char.	Priv.	Total	Char.	Priv.	Total
Del Norte - Humboldt	Salmon	3.4	17.3	20.6	1.9	7	8.9	1.6	7.3	9	-	-	-
	All Other	3.8	25	28.8	4.8	46.6	51.4	3.9	44.7	48.5	3.6	30.1	33.7
Mendocino	Salmon	5.4	12.1	17.5	3.4	8.4	11.8	2.3	7.3	9.6	0.8	3.8	4.7
	All Other	4.7	8.8	13.5	9.9	14.1	24	8.1	13.3	21.4	7.7	9.8	17.5
Combined	Salmon	8.8	29.3	38.1	5.4	15.4	20.7	3.9	14.6	18.5	0.8	3.8	4.7
	All Other	8.5	33.8	42.3	14.7	60.7	75.4	12	58	70	11.3	39.9	51.1
Grand Total		17.2	63.2	80.4	20.1	76.1	96.2	15.9	72.6	88.5	12.1	43.7	55.8

Counties	Trip Type	2018			2019			2014-2019 Avg.		
		Char.	Priv.	Total	Char.	Priv.	Total	Char.	Priv.	Total
Del Norte - Humboldt	Salmon	1.1	6.3	7.4	1.6	6.2	7.7	1.6	7.3	8.9
	All Other	3.7	32.8	36.5	3.5	34.4	37.9	3.9	35.6	39.5
Mendocino	Salmon	3.1	6.8	9.9	2.6	5	7.6	2.9	7.2	10.2
	All Other	8.8	8.6	17.4	8.1	7.5	15.6	7.9	10.4	18.2
Combined	Salmon	4.1	13.1	17.3	4.2	11.2	15.3	4.5	14.6	19.1
	All Other	12.5	41.4	53.9	11.5	41.9	53.4	11.7	46	57.7
Grand Total		16.6	54.6	71.2	15.7	53.1	68.8	16.3	60.5	76.8

Source: PFMC effort recreational estimates from Groundfish Spex and Salmon Review documents.

Table 8.4.f provides a breakout of salmon angler trips for individual port areas in the Northern California region reported in Table 8.2.e, especially the two port areas in the Del Norte – Humboldt region, Crescent City and Eureka. The Fort Bragg port area directly corresponds with the Mendocino region in Table 8.4.e.

Table 8.4.f. Salmon recreational angling effort by Northern California port group and boat mode (charter and private), 2014-2019 (thousand angler trips).

Boat Mode	Year	Crescent City	Eureka	Fort Bragg	Total
Charter	2014	0.1	3.2	5.4	8.8
	2015	0.0	1.9	3.4	5.4
	2016	0.0	1.6	2.3	3.9
	2017	-	-	0.8	0.8
	2018	0.0	1.0	3.1	4.1
	2019	0.0	1.5	2.6	4.2
	2014-2019 Avg	**0.0**	**1.9**	**2.9**	**4.5**
Private	2014	4.3	13.0	12.1	29.3
	2015	0.6	6.4	8.4	15.4
	2016	0.6	6.8	7.3	14.6
	2017	-	-	3.8	3.8
	2018	1.3	5.0	6.8	13.1
	2019	0.5	5.7	5.0	11.2
	2014-2019 Avg	**1.5**	**7.4**	**7.2**	**14.6**
Total	2014	4.4	16.2	17.5	38.1
	2015	0.6	8.3	11.8	20.7
	2016	0.6	8.4	9.6	18.5
	2017	-	-	4.7	4.7
	2018	1.4	6.0	9.9	17.3
	2019	0.5	7.2	7.6	15.3
	2014-2019 Avg	**1.5**	**9.2**	**10.2**	**19.1**

Table 8.4.g illustrates the number of California commercial passenger fishing vessels (CPFVs) operating recreational fishing charters during 2014-2019. Although CPFV counts fluctuated relatively little during the period, especially in Crescent City and Shelter Cove, counts in 2019 were at or near the top of the 2014-2019 range in Crescent City and Eureka port areas, while CPFV counts in 2019 in Shelter Cove and Fort Bragg were at the bottom of the range observed during the period.

Table 8.4.g. Counts of Commercial Passenger Fishing Vessels operating from Northern California port areas, 2014-2019.

Port Area	2014	2015	2016	2017	2018	2019	2014-2019 Avg
Crescent City	3	5	4	4	4	4	4
Eureka	22	13	15	15	18	22	18
Shelter Cove	5	3	3	2	3	2	3
Fort Bragg	9	11	10	11	14	9	11

Data Source: CDFW Marine Logs System

Notes: Includes all registered CPFVs that submitted logs regardless of target species. Port area may encompass more than one individual port.

During 2014-2019, salmon trips generated an average of approximately 26 percent of recreational angling income and employment impacts in the combined region (Table 8.4.h and Table 8.4.i, respectively). Mendocino County ports had relatively larger average annual income and

employment impacts from salmon angling ($1.3 million, 20 jobs) than Del Norte-Humboldt county ports, while the reverse was true for trips targeting non-salmon species (i.e., ports in Del Norte-Humboldt counties accounted for relatively larger average annual income and employment impacts from non-salmon angling of $3.4 million and 54 jobs).

Table 8.4.h. Estimated income impacts from recreational angling effort originating in Northern California ports by region and trip type, 2014-2019 (in inflation-adjusted thousands $2019).

Counties	Trip Type	2014	2015	2016	2017	2018	2019	2014-2019 Avg
Del Norte - Humboldt	Salmon	1,904	878	843	-	664	744	839
	All Other	2,559	4,359	4,050	2,904	3,125	3,205	3,367
Mendocino	Salmon	2,239	1,484	1,152	530	1,269	1,002	1,279
	All Other	1,787	3,362	2,908	2,493	2,619	2,363	2,589
Combined	Salmon	4,143	2,362	1,995	530	1,933	1,746	2,118
	All Other	4,347	7,722	6,958	5,397	5,745	5,568	5,956
Grand Total		8,490	10,084	8,953	5,927	7,677	7,315	8,074

Source: PFMC effort estimates and IOPac income impact coefficients.

Table 8.4.i. Estimated employment impacts from recreational angling effort originating in Northern California ports by region and trip type, 2014-2019 (number of jobs).

Region	Trip Type	2014	2015	2016	2017	2018	2019	2014-2019 Avg
Del Norte - Humboldt	Salmon	32	15	14	-	11	13	14
	All Other	42	70	65	47	51	52	54
Mendocino	Salmon	36	24	18	8	20	16	20
	All Other	29	55	47	41	44	40	43
Combined	Salmon	67	38	32	8	31	29	34
	All Other	71	126	112	88	95	91	97
Grand Total		138	164	144	96	126	120	132

Source: PFMC effort estimates and IOPac employment impact coefficients.

9.0 Impact analysis

9.1 Biological impacts

To assess the biological impacts the STT provided a report in November 2019 (O'Farrell and Letvin 2019). The report focused on the implications of the boundary change to the models used

to assess impacts to salmon stocks in the area – mainly KRFC and SRFC. Information in this section (9.1) is largely excerpted from the STT report (O'Farrell and Letvin 2019).

There is currently no hatchery component for California coastal Chinook, meaning we are unable to assess fishery impacts on this ESU. Genetic Stock Identification data suggest that California coastal Chinook and KRFC exhibit similar distributions in spring and early summer, but by August catch per unit effort for California coastal Chinook was increased in the FB area while KRFC catch per unit effort shifted to the northern portion of KC, near the Klamath River mouth (Satterthwaite et al. 2014). Retention of coho salmon is illegal throughout California, so any fishery mortality incurred by SONCC and California Coast coho between Horse Mountain and 40° 10' N. lat would be limited to hook-and-release mortality, dropoff mortality, and misidentified harvest.

To assess how the boundary change would affect harvest and escapement of KRFC and SRFC, the STT compared model runs for the Klamath Ocean Harvest Model (KOHM; Table 9.1.a) and the Sacramento Harvest Model (SHM; Table 9.1.b), respectively, between status quo (Alternative 4.2.1) and moving the boundary to the 40° 10' N lat. (Alternative 4.2.2). For the model runs representing a new boundary at 40° 10' N lat., contact/harvest rates and stock proportions for the expanded FB area were recalculated by melding them with their respective values for the KC area, weighted by the proportions of the expanded FB area that are within the current FB and KC areas.

Table 9.1.a. Klamath Ocean Harvest Model (KOHM) projections under Alternatives 4.2.1 and 4.2.2.

Year	Metric	KOHM: status quo	KOHM: 40°10'	% Difference
2014	Commercial harvest	19,646	19,583	-0.32%
	Recreational harvest	3,521	3,573	1.48%
	Age-3 ocean harvest rate	0.046	0.046	-0.28%
	Age-4 ocean harvest rate	0.160	0.160	0.15%
	River return	92,827	92,824	0.00%
2015	Commercial harvest	24,566	24,754	0.77%
	Recreational harvest	4,882	4,951	1.41%
	Age-3 ocean harvest rate	0.047	0.048	0.74%
	Age-4 ocean harvest rate	0.160	0.162	1.04%
	River return	119,753	119,578	-0.15%
2016	Commercial harvest	5,056	5,157	2.00%
	Recreational harvest	1,237	1,262	2.02%
	Age-3 ocean harvest rate	0.022	0.023	3.07%
	Age-4 ocean harvest rate	0.084	0.085	1.56%
	River return	52,138	52,052	-0.16%
2018	Commercial harvest	11,818	11,867	0.41%
	Recreational harvest	2,813	2,857	1.56%
	Age-3 ocean harvest rate	0.034	0.034	0.67%
	Age-4 ocean harvest rate	0.115	0.116	0.48%
	River return	91,873	91,825	-0.05%
2019	Commercial harvest	21,884	21,989	0.48%
	Recreational harvest	2,879	2,923	1.53%
	Age-3 ocean harvest rate	0.045	0.046	1.23%
	Age-4 ocean harvest rate	0.160	0.161	0.32%
	River return	97,912	97,820	-0.09%

Table 9.1.b. Sacramento Harvest Model (SHM) projections under Alternatives 4.2.1 and 4.2.2.

Year	Metric	SHM: status quo	SHM: 40°10'	% Difference
2014	Commercial harvest	191,237	190,450	-0.41%
	Recreational harvest	77,466	77,298	-0.22%
	Ocean harvest rate	0.423	0.422	-0.24%
	River return	365,948	366,903	0.26%
2015	Commercial harvest	169,853	168,559	-0.76%
	Recreational harvest	85,601	85,445	-0.18%
	Ocean harvest rate	0.392	0.390	-0.51%
	River return	396,531	397,982	0.37%
2016	Commercial harvest	83,749	83,510	-0.29%
	Recreational harvest	40,130	40,057	-0.18%
	Ocean harvest rate	0.413	0.412	-0.24%
	River return	175,731	176,042	0.18%
2018	Commercial harvest	44,763	44,634	-0.29%
	Recreational harvest	21,895	21,840	-0.25%
	Ocean harvest rate	0.291	0.290	-0.34%
	River return	162,774	162,958	0.11%
2019	Commercial harvest	142,288	141,719	-0.40%
	Recreational harvest	48,921	48,824	-0.20%
	Ocean harvest rate	0.504	0.502	-0.40%
	River return	188,423	189,089	0.35%

Discussion

Our analysis of potential effects on the KOHM and SHM suggests that moving the current KC/FB management line boundary five nm north to 40° 10' N lat. would likely have very small effects on projected harvest, harvest rates, and river mouth returns for both Klamath River and Sacramento River fall Chinook salmon. If the management area boundary line were changed to 40° 10' N lat., the modifications[4] to the KOHM and SHM described could be implemented for fishery planning in the first year. However, subsequent data collected from the "new" KC and FB management areas would complicate calculation of the weighted mean estimates used for contact rates per unit effort, harvest rates per unit effort, and stock proportions described in this report. We view the analysis presented here as an evaluation of the potential effect of the management line change rather than a new method that would be incorporated into the harvest models should the management line be shifted northward to 40° 10' N lat.

[4] See the November 2019 STT report for a description of these harvest model modifications (O'Farrell and Letvin 2019).

While this analysis suggests only small effects on projected harvest rates and river returns, a change in the KC/FB management line is not without risk. We lack data specific to the area in question between Horse Mountain and 40° 10' N lat. that could be used for a more detailed analysis. Commercial fishing in that area has been closed since at least1992. Data in the form of CWTs collected from the commercial fishery in KC prior to 1992 could have come from the area between Horse Mountain and 40° 10' N lat., but this cannot be verified. This uncertainty may be particularly problematic for KRFC, a stock that frequently constrains ocean fisheries in FB and KC, because they have relatively high impacts from the commercial fishery and their distribution is centered in KC and adjacent areas. However, the KRFC contact rates and stock proportions that were used in these analyses to represent the area between Horse Mountain and 40° 10' N lat. (i.e., parameters taken from the entire KC area) may be higher than the "true" values. Almost all of the commercial data used to inform those estimates were collected from vessels fishing from Eureka north, an area that likely has higher KRFC contributions to catch during most of the year than the area in question.

There is less of a concern surrounding the recreational fishery because most, if not all, of the vessels fishing between Horse Mountain and 40° 10' N lat. that were sampled by field staff were encountered in Shelter Cove, which lies within the current FB area. Thus, for practical purposes, stock-specific harvest proportions and contact/harvest rates per unit of effort in the area between Horse Mountain and 40° 10' N lat. are already being incorporated into the FB area in the KOHM and SHM. Moving the boundary north might benefit management of the recreational fishery, since it would "correct" the assignment of that five nm stretch into the management area for which its data is already being assigned.

In discussions with stakeholders, it was determined that an appreciable effort response to the proposed boundary change would be unlikely. However, it is possible that there would be new interest in fishing an area that has been closed to commercial salmon fishing for nearly 30 years. The realized effort response among the commercial fleet may therefore be greater than expected. A notable increase in recreational effort seems highly unlikely.

A further concern is the potential effect on ESA-listed stocks such as California coastal Chinook SONCC coho salmon, and Central California coast coho salmon. The Mattole River watershed, which flows into the ocean at 40° 18' N lat., is considered a critical component of the California coastal Chinook ESU and is the southernmost coastal extent for the SONCC coho ESU. Fishery contacts with salmon from other watersheds within these ESUs would also be expected between Horse Mountain and 40° 10' N lat.

Given the results, we find that there are small anticipated effects on the KOHM and SHM imparted by the proposed management boundary change. With regard to the Chinook Fishery Regulation Assessment Model (FRAM), the STT expects that the proposed change to the salmon management boundary would have a negligible effect, given that the anticipated changes to total catch are small. Stock compositions of the KMZ and Southern California FRAM fisheries (currently delineated by Horse Mountain) are similar. For both commercial and recreational fisheries in these areas, greater than 90 percent of the catch comes from stocks that originate south of Cape Falcon, for which Chinook FRAM is not used to forecast fishery impacts. For each of these harvest models, there are limitations to accurately estimating the effect of small-scale changes to ocean salmon fisheries.

Given the small anticipated effect on KOHM, SHM, and Chinook FRAM results, we suggest that no changes be made to these harvest models if the Council chooses to adopt the proposed change in the management area boundary. Therefore, the decision is largely one of policy, weighing the benefits to the fishery and the potential costs due to uncertainty in the effects on salmon stocks in the area of interest.

Conclusions

1. Data do not exist on a fine enough scale to directly evaluate potential changes to stock-specific fishery impacts resulting from the proposed change to the KC/FB management area boundary.
2. Such a change may increase the uncertainty in harvest model projections, primarily in terms of commercial impacts.
3. The evaluation of potential changes to harvest, harvest rates, and river return projections for KRFC and SRFC resulting from this management line adjustment suggested that effects could be small.
4. The STT recommends no changes to existing harvest models if the Council were to adopt this change to the KC/FB management area boundary line.

9.2 Socio-economic impacts

Under the no action alternative (Alternative 4.2.1), the current management line would continue to remain in place and socio-economic activity would be expected to continue at levels similar to those seen in the recent past and summarized in Section 8.4, although they may vary substantially if there are substantial changes in the status of some salmon stocks.

Overall, impacts of the action alternatives (Alternative 4.2.2 and Alternative 4.2.3), relative to no action, are not expected to affect the fishery to an extent or in a manner that it will be noticeable in the data and are not possible to estimate quantitatively due to the lack of information about stock composition and expected effort in the 5 nm area that would be moved from being managed as part of the KC to the FB area (as described in the biological impact section, Section 9.1). Therefore, this assessment of socio-economic impacts of the action alternative relative to no action is qualitative. Three areas of potential socio-economic impact are addressed: future fishing opportunities related to changing stock impacts; effects on commercial profits and catch per unit effort (CPUE); and effects on the recreational effort and experience.

Future Opportunity

The proposed movement of the management line (Alternative 4.2.2 and Alternative 4.2.3) may result in some small changes in the degree to which different stocks are impacted by fisheries, which may in turn affect the fishing seasons and quotas provided in regulation. The biological analysis indicates that relative to status quo (no action) the action alternatives would have very small potential effects on projected harvest (for KRFC between -0.05 and 2.00 percent, and for SRFC between -0.57 and -0.28 percent, see Table 9.1.a and Table 9.1.b, for KRFC and SRFC respectively).[5]

[5] The changes in number of fish harvested shown in these tables would be larger than indicated because of the other stocks that are caught with KRFC and SRFC, but the percentage changes would likely be similar.

The biological analysis notes that Alternative 4.2.2 (and inherently Alternative 4.2.3) may pose risk to the stocks due to the limited amount of current commercial fishery information about stock composition in the area that would be newly opened under the action alternative (i.e., the area between Horse Mountain and 40º 10' N lat.). The risks of concern apply both to directly managed stocks such as SRFC and KRFC and ESA-listed stocks. Relative to SRFC, the KRFC stock has historically been a significant conservation concern and constraint on ocean fisheries. Since SRFC and KRFC stocks are carefully monitored and managed, any noticeable change would result in future management adjustments that would ensure stock conservation but reduce fishing opportunity and economic benefits until the stock recovered. If on the whole the consequences of either of the action alternatives are determined to be adverse, the management line could be returned to its original position and the stock recovered. Any reductions in stocks resulting from movement of the line are not expected to be irretrievable over the long term.

During years of low KRFC abundance forecasts, Alternative 4.2.3 would provide an opportunity to close the proposed 5 nmi FB area extension as a conservation zone. For low abundance years this would trade any short-term benefits from the line movement (discussed in the following section) for a more precautionary conservation approach that would reduce the probability that stock recovery needs would require future harvest reductions and the attendant reduction in socio-economic benefits.

The three ESA-listed ESUs of concern are California coastal Chinook, SONCC coho, and Central California coast coho. Overall, the biological analysis projects negligible potential biological impacts from the action alternative management boundary change. In the low probability case that adverse impacts for these ESA-listed stocks were to occur, it could result in future increased management constraints and associated adverse economic effects. As with KRFC, the conservation zone provision of Alternative 4.2.3 may reduce the risk to some of these stocks—again, trading off short-term socio-economic benefits to reduce the small possibility that over the longerterm such future benefits would be adversely affected by a need for more stringent conservation measures.

Short-Term Commercial and Recreational Fishery Opportunity

The biological analysis supports an assumption that the proposed movement of the management line alone is not likely to result in a noticeable increase or decrease in total commercial or recreational effort. At the same time, the commercial stakeholders' interest in this boundary change indicates that industry expects some benefit. Under the action alternatives, this benefit could accrue through direct reduction of operating costs and/or increases in revenue or reduction in costs through a higher CPUE. Operating costs might be directly reduced in two ways. First, industry has indicated that when they are fishing along the current management line, the course they need to take to reverse direction is sometimes problematic from a safety perspective. Making the turn in a safe manner may require more time and fuel under the current management regime. Second, if there are vessels fishing in the area that leave from ports in Humboldt Bay (approximately 41 nm north of the current management line),[6] the five-nautical mile northward move in the management line would reduce the travel distance to the area by 12 percent (measured from the Humboldt South Jetty), thereby reducing the one-way travel time by 40 min (assuming

[6] There are no other commercial ports between those in Humboldt Bay and the 40º 05' N lat. line at Horse Mountain.

7.5 knots) and saving about 4 gallons of fuel (assuming 6 gallons per hour)[7]. After taking into account differences for steaming under load compared to steaming empty, this savings may be more than doubled for vessels that leave from and deliver back to Humboldt Bay. Efficiency may also be increased if there are times when the CPUE is higher in the newly opened area, reducing costs for a given amount of fish caught.

Salmon vessels most likely to be affected by the proposed action are those with landings in the Fort Bragg port area of which there were an average of 156 from 2014 to 2019. Shelter Cover is the port closest to the current management line, located less than 5 nmi south of 40º 05' N. lat., the action alternatives would add 5 nmi to the northern extent of the fishing area available within the FB management area. On average 9 vessels landed salmon in Shelter Cove each year during 2014-2019. With respect to vessels fishing out of the Eureka area that might benefit from a movement of the Horse Mountain line five nautical miles to the north, 47 vessels on average landed salmon during 2014-2019 in the Eureka port area, for which the closest point of ocean access to the FB area is the Humboldt Bay south jetty (approximately 41 nmi north of Horse Mt.). Given that the primary economic impact of the action alternatives is expected to be on fishing costs rather than total catch or exvessel revenues, it is unlikely that fish buyers would be substantially affected by a move of the management line.

With respect to the recreational fishery, movement of the management line 5 nmi north would expand the extent of the FB management area, currently approximately 67.5 nmi long, by approximately 7 percent. Regarding angler trips for which an enlarged FB area might make a difference, that difference would likely relate to the quality of the trip, e.g., if there are times that higher angler success rates occur in areas north of the current management line. There are no substantial recreational launch points between the current management line at Horse Mountain and 40º 10' N lat. Therefore, there do not appear to be opportunities for recreational vessels to substantially reduce travel time or distance in order to access the 5 nmi area that would be newly added to the northern end of the FB area (although the vast majority of anglers accessing the expanded area would likely launch from Shelter Cove).

Movement of the management line 5 nmi to the north would increase fishing area for vessels in the FB area during times when the FB area is open for recreational fishing but the KC area closed (i.e., non-overlapping days). The potential effect of this movement in the line can be considered in the context of past seasons and effort patterns. On average, for 44 to 49 percent of FB season-days the KC area was closed to recreational fishing (annual average for 2010-2019, range based on whether 2017 is excluded or included, respectively; Table 9.2a). Days when seasons in the two areas did not overlap tend to be lower effort days, such that FB area effort on non-overlapping days was only 20 to 28 percent of the 2010-2019 annual average of 12,200 FB area salmon trips[8]. Since only those trips taken in the vicinity of the northern management line would likely be affected by the new opportunity, the number of trips potentially benefitting would likely have been substantially less than 20 to 28 percent.

[7]Average salmon troller steaming speed and fuel consumption based on Lian (2012).
[8] If 2017 is included the total the annual average number of trips for Fort Bragg is 12,151.

Table 9.2.a. Recreational season-days in the Fort Bragg area that do not overlap with season-days in the KC area and estimated Fort Bragg area effort on those days (2010-2019).

	Non-Overlapping Season Days		Estimated[a/] Salmon Effort for Non-Overlapping Days (angler trips)	
	Total	As Percent of Fort Bragg Season	Total	As Percent of Fort Bragg Salmon Effort
2010	56	36%	2,380	36%
2011	55	32%	2,640	18%
2012	87	40%	2,463	17%
2013	88	40%	1,690	10%
2014	98	45%	1,883	11%
2015	89	41%	1,474	13%
2016	158	70%	5,151	54%
2017[b/]	151	100%	4,676	100%
2018	58	42%	420	4%
2019	91	49%	1,037	14%
2010-2019 Average	93	49%	2,381	28%
2010-2019 Average (Excluding 2017)	87	44%	2,126	20%

a/ Estimated effort based on average effort per open day in the non-overlapping month.
b/ KC area was completely closed in 2017.

For recreational vessels fishing in the KC area during times when the FB area is closed and the KC area is open, movement of the management line 5 nmi to the north might decrease the fishing area for these vessels. However, during 2010-2019 there was only one month when the KC area was open and the FB area was not. In that month (June of 2018) there were 16 more days of opportunity in the KC area than in the FB area (representing 17 percent of the total KC area season in 2018). For context, the KC area was open for 987 season-days over the course of 43 months during 2010-2019. The affected area is distant and relatively isolated from recreational launch points in the KC area, such as Humboldt Bay. While movement of the line 5 nmi to the north may diminish recreational fishing opportunity in the KC area in months when the KC area is open but the FB area is closed, recreational vessels launching from ports such as Shelter Cove would still be able to transit the additional 5 nm north to participate in the KC area fishery.

As discussed in the section “Future Opportunity”, above, whatever economic benefits that are provided under Alternative 4.2.2 might not occur under Alternative 4.2.3 in years in which the option to close the 5 nmi area as a conservation zone is exercised due to low KRFC abundance. Alternative 4.2.3 would therefore likely function like the no action alternative in those low abundance years since the KC area would likely be closed to commercial fishing. However, while this may be true for the commercial fishery, it is not necessarily true for the recreational fishery which has much lower contact rates for KRFC than the commercial fishery, allowing the sport fishery often to still occur in years of low KRFC abundance.

In addition to these effects on fishing activity, there may be some benefit from alignment of the salmon management and groundfish management lines, since groundfish may be encountered on salmon trips and there are a number of groundfish species for which management regulations differ north and south of 40º 10' N lat. Although the benefits of this concurrence may be limited to the recreational fishery since commercial salmon trollers can’t fish at all between 40º 05' and 40º 10' N lat. under No Action, and current groundfish bycatch regulations are consistent across the entire

FB area and also across the portion of the KC area that trollers can access. If nothing else, the simplification may lead to less confusion regarding regulations controlling seasons, timing, and areas open for fishing in the KC and FB management areas.

Socio-economic Impact Summary
A summary of the socio-economic impacts described above is provided in Table 9.2.b

Table 9.2.b. Summary of socio-economic impacts.

Potential Impact Areas	Alternative 4.2.1	Alternative 4.2.2	Alternative 4.2.3
Long Term Harvest Opportunity	Similar to baseline described in Section 8.2	Minimal chance of adverse impacts to stocks (not likely to be irretrievable). Adverse impacts to stocks might result in reduced opportunity in future years.	Lower risk than Alternative 4.2.2
Commercial Fishery		Possibility of some reduction in operating costs and opportunity to fish at a higher CPUE. [a/] Regulatory simplification by using same management line for groundfish and salmon.	Benefits anticipated under Alternative 4.2.2 would not occur in years that the 5 nmi conservation zone is closed.
Recreational Fishery		Possibility of some opportunity to fish at a higher angler success rate.[a/] Regulatory simplification by using same management line for groundfish and salmon.	Benefits anticipated under Alternative 4.2.2 would not occur in years that the 5 nmi conservation zone is closed.

a/ The size of the Fort Bragg area fishing grounds would be increased by about 6 percent at the northern end. If a hotspot were to appear just north of the current boundary extending to the north, the proposed change would provide harvesters with increased opportunity to fish in that hotspot with the attendant socio-economic benefits associated with higher CPUE.

10.0 Workload and Timeline

The Council, guided by COP #11, generally requires three Council meetings to adopt an FMP amendment; these meetings need not be sequential. Once the Council transmits its recommendation for an FMP amendment to NMFS, there is an approval process prior to implementation.

Council workload planning

- November 2019
    - Council approved the general scope of FMP Amendment 20 (A20). This included the proposed change to preseason schedule, proposed change to the southern KMZ boundary, and minor housekeeping items.
    - Council approved purpose and need, scope of action and range of alternatives for proposed change to preseason schedule.
- June 2020
    - Project Team provides report outlining proposed changes and range of alternatives
    - Approve schedule to complete project.

    - Identify a preliminary range of alternatives.
        - Provide guidance for additional or modified alternatives.
        - Consider adopting preliminary preferred alternatives for both topics.

- September 2020
    - Project Team provides analytical documents, as necessary.
    - Project Team presents draft A20 FMP document.
    - Council adopts final preferred alternatives for A20.
    - Council transmits recommendation to NMFS.

11.0 References

Bellinger, M.R., Borgerson, L.A., Crandall, E.D., Garza, J.C., Kormos, B.J., Lawson, P.W., and Palmer-Zwahlen, M.L. 2014. Use of genetic stock identification data for comparison of the ocean spatial distribution, size-at-age, and fishery exposure of Klamath River versus California Coastal Chinook salmon. Transactions of the American Fisheries Society 143:117-133.

Lian, C.E. 2012. West Coast open access groundfish and salmon troller survey: Protocol and results for 2005 and 2006. U.S. Dept. Commer., NOAA Tech. Memo. NMFSNWFSC-116, 52 p.

NMFS. 1999. NMFS. 1999. Endangered Species Act- Section 7 Consultation Supplemental Biological Opinion and Incidental Take Statement. The Pacific Coast Salmon Plan and Amendment 13 to the Plan. NMFS Protected Resources Division. April 28, 1999.

NMFS. 2000. Endangered Species Act- Reinitiated Section 7 Consultation Biological Opinion. Effects of The Pacific Coast Salmon Plan on California Central Valley Spring-Run Chinook, and California Coastal Chinook Salmon. NMFS Protected Resources Division. April 28, 2000.

NMFS. 2018. Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat (EFH) Response: Effects of the Pacific Coast Salmon Plan Fisheries on the Sacramento River Winter-run Chinook salmon Evolutionarily Significant Unit. NMFS Consultation Number: WCR-2017-8012.

NMFS. 2019. Proposal for Refinement of the Pacific Fishery Management Council's Salmon Preseason Schedule. PFMC Briefing Book for September 2019. Available at https://www.pcouncil.org/documents/2019/09/agenda-item-f-4-a-nmfs-report-1.pdf/. Retrieved from website August 3, 2020.

O'Farrell, M. and A. Letvin. 2019. Potential implications of moving the California Klamath Management Zone/Fort Bragg salmon fishery management line from Horse Mountain north to latitude 40°10′. PFMC Briefing Book for November 2019. Available at https://www.pcouncil.org/documents/2019/10/agenda-item-e-2-attachment-1-potential-implications-of-moving-the-california-klamath-management-zone-fort-bragg-salmon-

fishery-management-line-from-horse-mountain-north-to-latitude-40-10.pdf/. Retrieved from website August 4, 2020.

O'Farrell, M., M. Mohr, M. Palmer-Zwahlen, and A. Grover. 2013. The Sacramento Index (SI). U.S. Department of Commerce, NOAA Technical Memorandum. NOAA-TM-NMFS-SWFSC-512, 41 pages. Available at https://swfsc-publications.fisheries.noaa.gov/publications/TM/SWFSC/NOAA-TM-NMFS-SWFSC-512.pdf. Retrieved from website August 6, 2020.

PFMC and NMFS. 2019. Draft Workplan for Proposed Changes to the Preseason Schedule in the Pacific Salmon Fishery Management Plan. PFMC Briefing Book for November 2019. Available at https://www.pcouncil.org/documents/2019/10/agenda-item-e-3-attachment-2-draft-work-plan-for-proposed-changes-to-the-preseason-schedule-in-the-pacific-salmon-fishery-management-plan.pdf/. Retrieved from website August 4, 2020.

PFMC and NMFS. in prep. Klamath River fall-run Chinook Salmon Rebuilding Plan, Final Environmental Assessment.

Satterthwaite WH, Mohr M, O'Farrell MR, Anderson EC, Banks MA, Bates SJ, Bellinger MR, Borgerson LA, Crandall ED, Garza JC, Kormos BJ, Lawson PW, and Palmer-Zwahlen ML. 2014. Use of genetic stock identification data for comparison of the ocean spatial distribution, size at age, and fishery exposure of an untagged stock and its indicator: California Coastal versus Klamath River Chinook salmon. Transactions of the American Fisheries Society 143:117-133.

Appendix A. Geographic Locations

Geographical landmarks used in Council-area salmon management and those referenced in this document are at the following locations:

Cape Flattery, WA.....48°23′00″ N. lat.
Cape Alava, WA.....48°10′00″ N. lat.
Queets River, WA.....47°31′42″ N. lat.
Leadbetter Point, WA.....46°38′10″ N. lat.
Cape Falcon, OR.....45°46′00″ N. lat.
Florence South Jetty, OR.....44°00′54″ N. lat.
Cape Arago, OR…….43°18′20″ N. lat.
Orford Reef Red Buoy……...42°47′11″ N. lat.
Humbug Mountain, OR.....42°40′30″ N. lat.
Mattole River mouth……..40°18' N. lat.
Punta Gorda, CA……40°15' N. lat.
Oregon-California Border.....42°00′00″ N. lat.
Humboldt South Jetty, CA.....40°45′53″ N. lat.
Horse Mountain, CA.....40°05′00″ N. lat.
Point Arena, CA.....38°57′30″ N. lat.
Point Reyes, CA.....37°59′44″ N. lat.
Point San Pedro, CA.....37°35′40″ N. lat.
Pigeon Point, CA.....37°11′00″ N. lat.
Point Sur, CA.....36°18′00″ N. lat.
Point Conception, CA.....34°27′00″ N. lat.