Agenda Item F.2.a
Supplemental Workgroup Presentation 1
November 2020

Photo: Holly Fearnbach, SR3,
SeaLife Response, Rehabilitation and Research

Southern Resident Killer Whale Workgroup

Co-Chair, PFMC Ad Hoc SRKW Workgroup
Jeromy Jording
November 2020

Council goals for today

- Review SRKW Workgroup Report 1 - Range of management alternatives adopted for public review in September 2020
- Consider SRKW Workgroup Report 2 – updated list of responses
- Discuss SRKW Workgroup Report 3 on forecast accuracy
- Adopt final preferred alternatives for recommendation to NMFS

Overview

In September 2020, the SRKW workgroup provided a range of alternatives and recommendations for Council consideration. The Council adopted preliminary preferred alternatives for public review.

For the November 2020 Council meeting, the Council asked the Workgroup provide additional information on:

1. The implementation aspects of the list of responses (Workgroup Report 2)
2. An assessment of forecasting performance (Workgroup Report 3)

SRKW Workgroup Report 1

E.3.a Workgroup Report 1: compare to H.3.a Workgroup Report 1from September 2020

- Section 1: Introduction (no change)
- Section 2: National Environmental Policy Act (no change)
- Section 3: Recommendations for Action (updated)
  - Recommendation 1 – Management strategy alternatives
    - Section 3.1.2.e strikeout*
  - Recommendation 2 – Re-evaluate conservation objectives for Chinook stocks (no change)
  - Recommendation 3 – Improve stock assessment analytical methods (no change)
- Section 4: References (no change)

*replace section 3.1.2.e with Workgroup Report 2

Council Adopted Range of Alternatives:

Photo: Makah Indians paddle away from the rising sun as they head from Neah Bay, Washington, Photo: AP

Recommendation 1: Management strategy alternatives (pg 4)

Alternative 3.1.1 – no action (pg 4)

Alternative 3.1.2 – action based on single year; threshold based with 4 subgroups (pg 9)

Alternative 3.1.3 – action, based on multiple years; threshold based with 2 subgroups (pg 15)

Alternative 3.1.4 – action, threshold based; tiered responses (pg 15)

Recommendation 2: Re-evaluate conservation objectives for Chinook stocks (pg 15)

Alternative 3.2.1 – Sacramento River fall Chinook (SRFC) (pg 15)

Alternative 3.2.2 – Klamath River fall Chinook (KRFC) (pg 16)

Recommendation 3: Improve stock assessment analytic methods (pg 16)

Alternative 3.3 –

Develop an age structured stock assessment for SRFC using cohort reconstruction methods (pg 16)

Alternative 3.1.1: No Action – Status Quo FMP Implementation

Overview

- Continue to use existing harvest control rules and reference points as defined in the FMP on an annual basis.

- Continue to manage fisheries consistent with proposed actions described in biological opinions, reasonable and prudent alternatives, and terms and conditions addressing the effects of the fisheries on ESA-listed salmon.

- Continue to comply with accountability measures for stocks managed under regional agreements, and international agreements in which the U.S. participates such as the Pacific Salmon Treaty
  - ❖ Weak stock management – protections for weaker stack often allow healthier stock to remain unharvested
  - ❖ Resulting North of Falcon (NOF) quotas – low Chinook abundance = low Chinook quotas NOF

Alternative 3.1.2: Establish a threshold for low Chinook abundance in NOF below which some management action would be triggered


Photo: J Pod, J. Ford and S. Steven.

Under this concept (pg 4):

- Council area ocean salmon fisheries would incorporate a responsive action designed to account for the endangered and declining status of the SRKW population.
- Intuitively at some (unknown) low Chinook abundance level, the prey available to SRKWs will not be sufficient to allow for successful foraging, leading to adverse health effects.
- A threshold or floor, for low forecasted pre-fishing Chinook salmon abundance(from FRAM using Timestep 1 [TS1] starting abundance) in the NOF area below which some management action would be triggered, requiring a suite of responses to be implemented when structuring that year's specific management measure recommendations.

Alternative 3.1.2: *continued*

Variations of this alternative:

- **3.1.2.a (pg 9) –** Threshold based on the year with the lowest modeled abundance (1994); result: approximately 813,000 adult Chinook salmon (could adjust for forecast error)

- **3.1.2.b (pg 10)** - Threshold based on arithmetic mean of lowest three abundance years; result: approximately 874,000 adult Chinook salmon (could adjust for forecast error)

- **3.1.2.c (pg 10)** - Threshold based on 2020 NMFS guidance(the arithmetic mean of the seven lowest years of abundance 1994 – 1996, 1998 – 2000 and 2007); result: approximately 966,000 adult Chinook salmon

- **3.1.2.d (pg 10)** - Threshold based on the maximum abundance during the mid to late 90s (1995, 1996, 1997, 1998, 1999, 2000); result: approximately 1,144,000 adult Chinook salmon (could adjust for forecast error)

Alternative 3.1.2: *continued*

Summary of Alternatives for NOF Chinook salmon abundance TS1 thresholds:

Alternative	Brief Description	Result	If adjusted for error	Comment
3.1.2.a	lowest year	813,000	968,000	1994
3.1.2.b	arithmetic mean of three lowest years	874,000	1,040,000	1994, 1998, and 2007
3.1.2.c	2020 NMFS guidance	966,000	N/A	the arithmetic mean of the seven lowest years of abundance (1994-1996, 1998-2000, and 2007)
3.1.2.d	Maximum of mid-90s	1,144,000	1,362,000	the max abundance from 1995 through 2000 occurred in 1997

**Note: These values represent the current combined outputs from the FRAM and Shelton et al. models, and are subject to change whenever recalibrating these models, but the methodology determining each value would remain fixed as described in this report.*

Alternative 3.1.3: Establish a threshold and responses and compare to a multi-year metric to determine if TS1 abundance projection is below the threshold


Photo: J. Watson, WDFW.

Threshold triggered based on a range of years:

- **Alternative 3.1.3.a** – running 2-year geometric mean of forecasted abundances
- Alternative 3.1.3.b – running 3-year geometric mean of forecasted abundances
- These may decrease how often responses may be triggered; however, a single year low abundance would affect the geo.-mean for multiple years – which would increase the chance that the responses would remain in place for multiple years if triggered.
- This type of approach allows for consideration of multiple years that are likely important for reproductive success of the SRKWs.

Alternative 3.1.4: Establish a threshold and if triggered in a single year select a subset of responses, if triggered in a second consecutive year add (an) additional response measure(s)


Photo: NOAA

Tiered response:

- This option considers similar rationale to either Alternative 3.1.3.a or 3.1.3.b in that a single year below the threshold is a concern, but consecutive years below the threshold are deemed an even greater concern.
- Therefore a second consecutive year below a triggered threshold would include the subset of responses from the prior year, plus at least one additional response.

3.2 Recommendation 2: Re-evaluate conservation objectives for Chinook stocks

Review escapement objectives for major Chinook stocks in California

- **Alternative 3.2.1:** Sacramento River Fall Chinook.
    - Current range 122,000 – 180,000 hatchery and natural-area adult spawners

- **Alternative 3.2.2:** Klamath River Fall Chinook.
    - Current goal 40,700 natural-area adult spawners

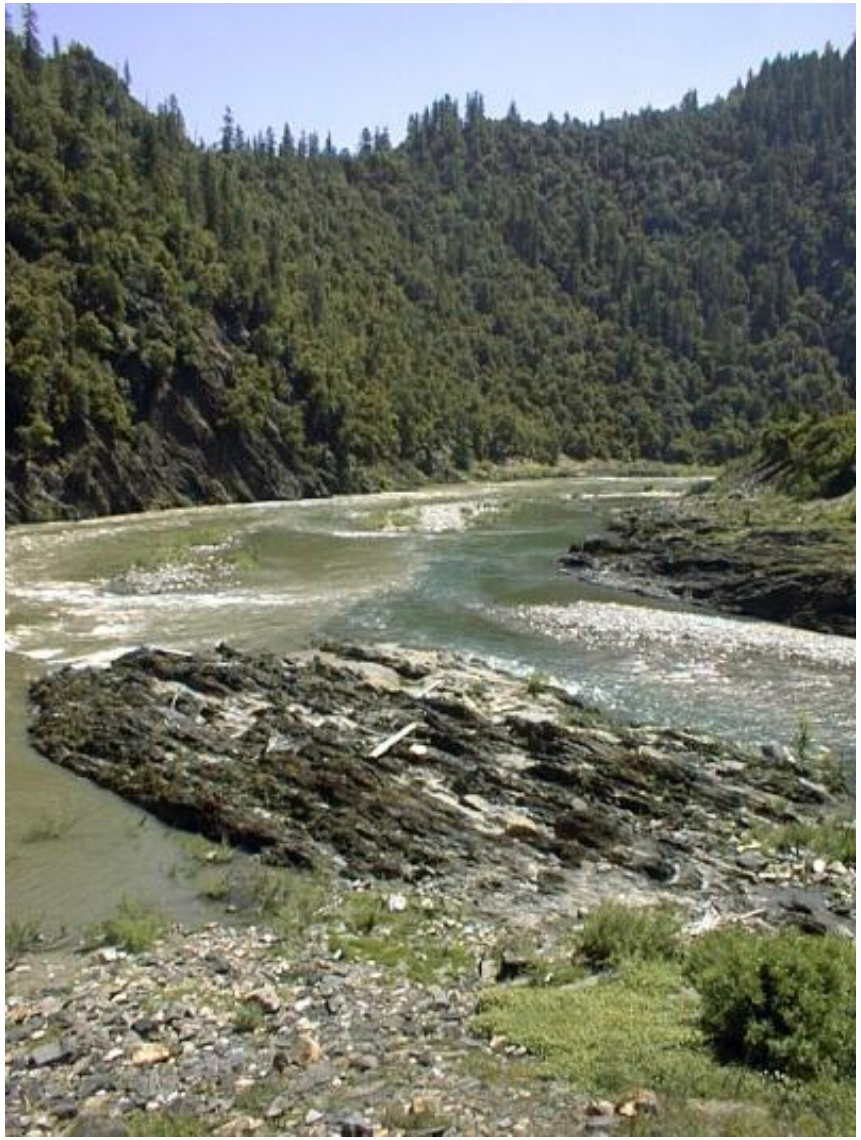


Photo by Jennifer Gilden

3.3 Recommendation 3: Improve stock assessment analytic measures

Develop an age-structured stock assessment for SRFC

- Use cohort reconstruction methods
- Provide fishery managers an improved estimate of Chinook ocean abundance during the winter period
- Tool for evaluating Chinook prey availability for SRKWs
- Better evaluate effect of ocean salmon fisheries SOF

Photo by Jill /Blue Moonbeam Studio

SRKW Workgroup Report 2

Agenda Item F.2.a
Workgroup Report 2
November 2020

SOUTHERN RESIDENT KILLER WHALE WORKGROUP REPORT 2:
UPDATED LIST OF POTENTIAL RESPONSES

At the September 2020 Pacific Fishery Management Council (Council) meeting, the Southern Resident Killer Whale (SRKW) Workgroup (Workgroup) provided a draft range of alternatives and recommendations for Council consideration. The Council directed the Workgroup to provide additional information at the November 2020 Council meeting. The following is an update to Section 3.1.2.e of that report which described a list of potential responses if a Chinook abundance fell below a certain threshold. The updates in this report provide clarity on implementing the responses.

The Workgroup recommends replacing language that is struck in Agenda Item F.2.a SRKW Workgroup Report 1, currently beginning on page 11 and ending on page 14 with the following:

Workgroup Report 2: Updated list of Potential Responses


Photo: L41, C. Emmons

3.1.2.e (see Workgroup Report 2) : List of potential responses if a year's preseason projection fell below the threshold:

- The goal of management response(s) would be to benefit SRKWs while still providing some fishing opportunity in years when Chinook abundance is deemed low by surpassing a defined threshold (see Section 3.1.2 of Workgroup Report 1)
- During year(s) when Chinook abundance fall below a defined threshold, the following measures would apply, and override prior language in the FMP where differences may occur. Responses could include one or more of the following six categories and items.

1. NOF non-treaty fisheries: Chinook quotas not to exceed the point estimate generated by a regression analysis

- **Option 1A**: In the area north of Cape Falcon, Oregon (NOF) for all non-treaty ocean salmon fisheries: Reduce Chinook quotas as needed to not exceed the point estimate of catch generated by a regression analysis given pre-season modeled abundance and based on the historical relationship between time-step 1 NOF abundance Chinook and non-treaty Chinook quotas.

- At abundances that project quota values of less than zero based on that regression, the quota will be zero.

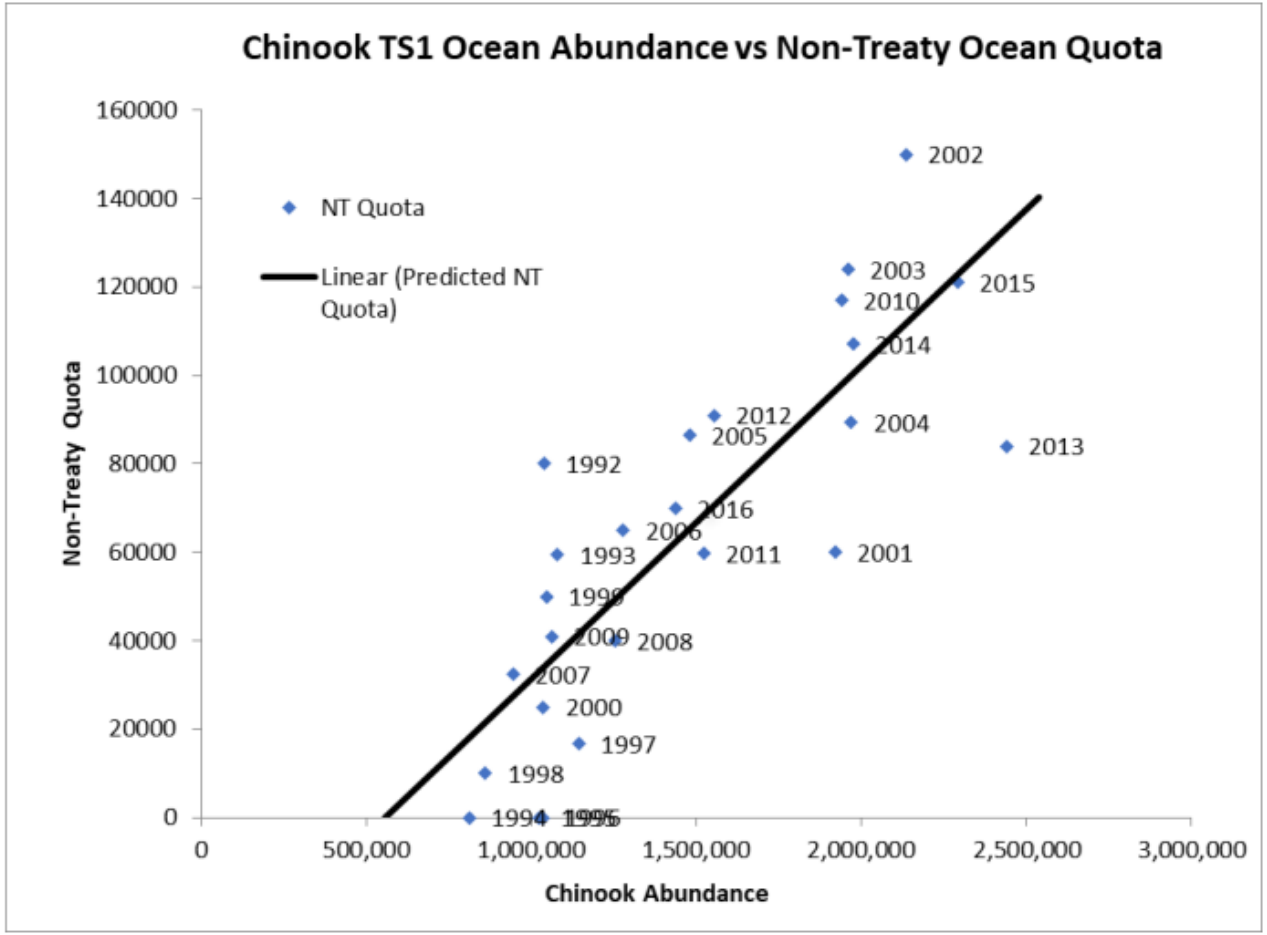


Figure 1: Chinook abundance and non-Treaty Chinook quota regression output. The fitted line intercepts zero at an abundance of 557,128 Chinook.

2. In the area NOF: Attain the non-treaty commercial troll quota incrementally over time (spring/summer split)

- **Option 2A**: 50 percent cap – Spring period assigned 50 percent (or less) of the NT troll quota
- **Option 2B**: 61 percent cap – Spring period assigned no more than 61 percent (equivalent to the 10-year geometric mean)
- **Option 2C**: implement additional subarea caps north of Leadbetter Point during the Spring period

Year	Spring Quota	Percent of Total Annual Quota	Spring Quota if limited by proposed 50 percent cap
2010	42,000	75%	28,000
2011	20,600	67%	15,450
2012	31,700	67%	23,750
2013	29,300	67%	22,000
2014	37,900	67%	28,450
2015	40,200	60%	33,500
2016	14,000	40%	17,500
2017	27,000	60%	22,500
2018	16,500	60%	13,750
2019	13,200	50%	13,125
10-yr Mean	**27,240**	**61%**	

3. In the area NOF adjust the time and/or area of control zones (CZ) used in non-treaty ocean salmon fisheries

- **Option 3A**: Increase the area of the Columbia River CZ from the start of non-treaty ocean salmon fisheries until June 15. The extended area is described as a line running northeast/southwest between Lighted Bell Buoy#1 (46-13-23.933N, 124-10-59.921W) and Lighted Whistle Buoy #2 (46-12-45.840N 124-08-03.462W).
- **Option 3B**: Close the Grays Harbor CZ to salmon retention from the start of non-treaty ocean salmon fisheries until June 15.

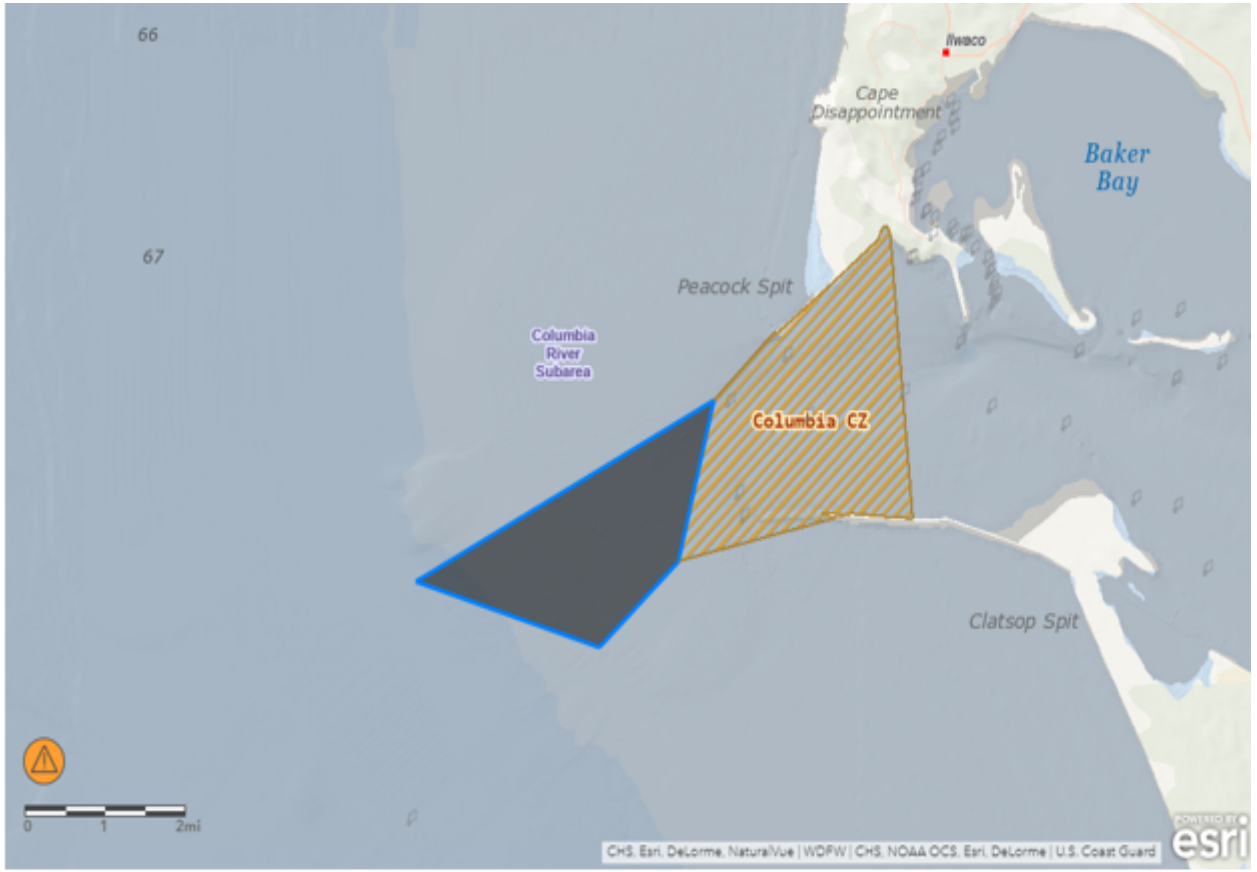


Figure 3. Detailed map of the Columbia River Control Zone with proposed change under Option 3A. The diagonally shaded area represents the current Control zone, and the solid dark shaded area represents the proposed expanded area.

4. NOF non-treaty start/end time adjustments

- **Option 4A**: In the area North of Cape Falcon, the start of non-treaty ocean salmon fisheries will be delayed until June 1.
- **Option 4B**: In the area North of Cape Falcon, the start of non-treaty ocean salmon fisheries will be delayed until June 15.

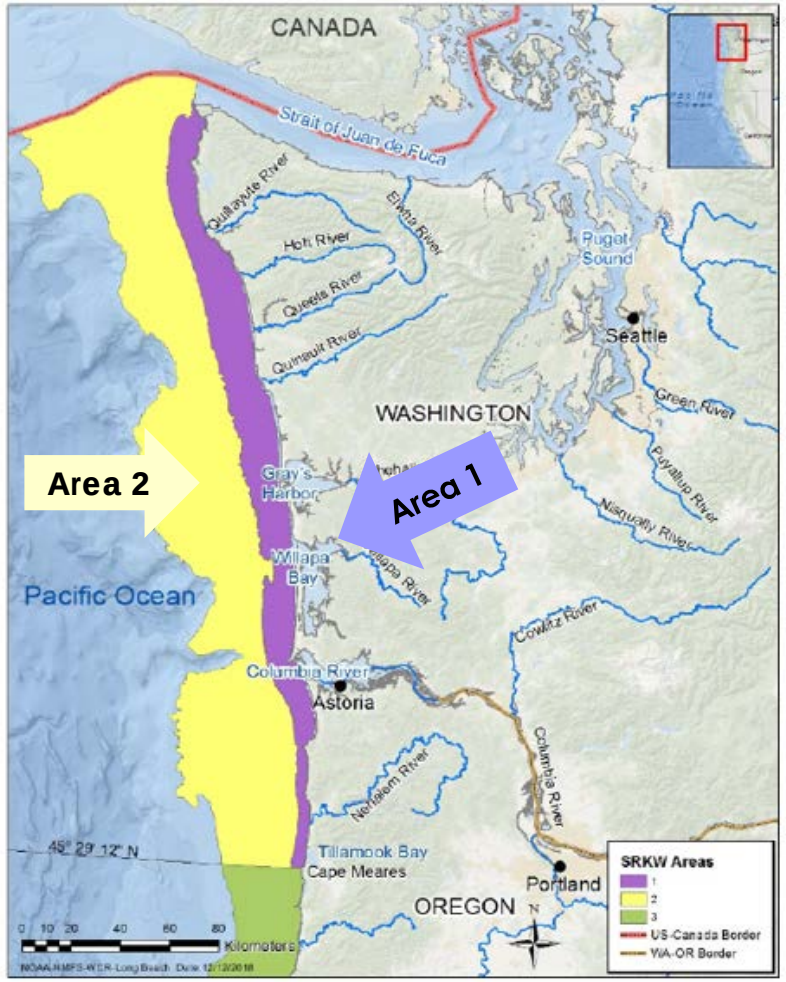
5. South of Cape Falcon (SOF) in Oregon coastal waters

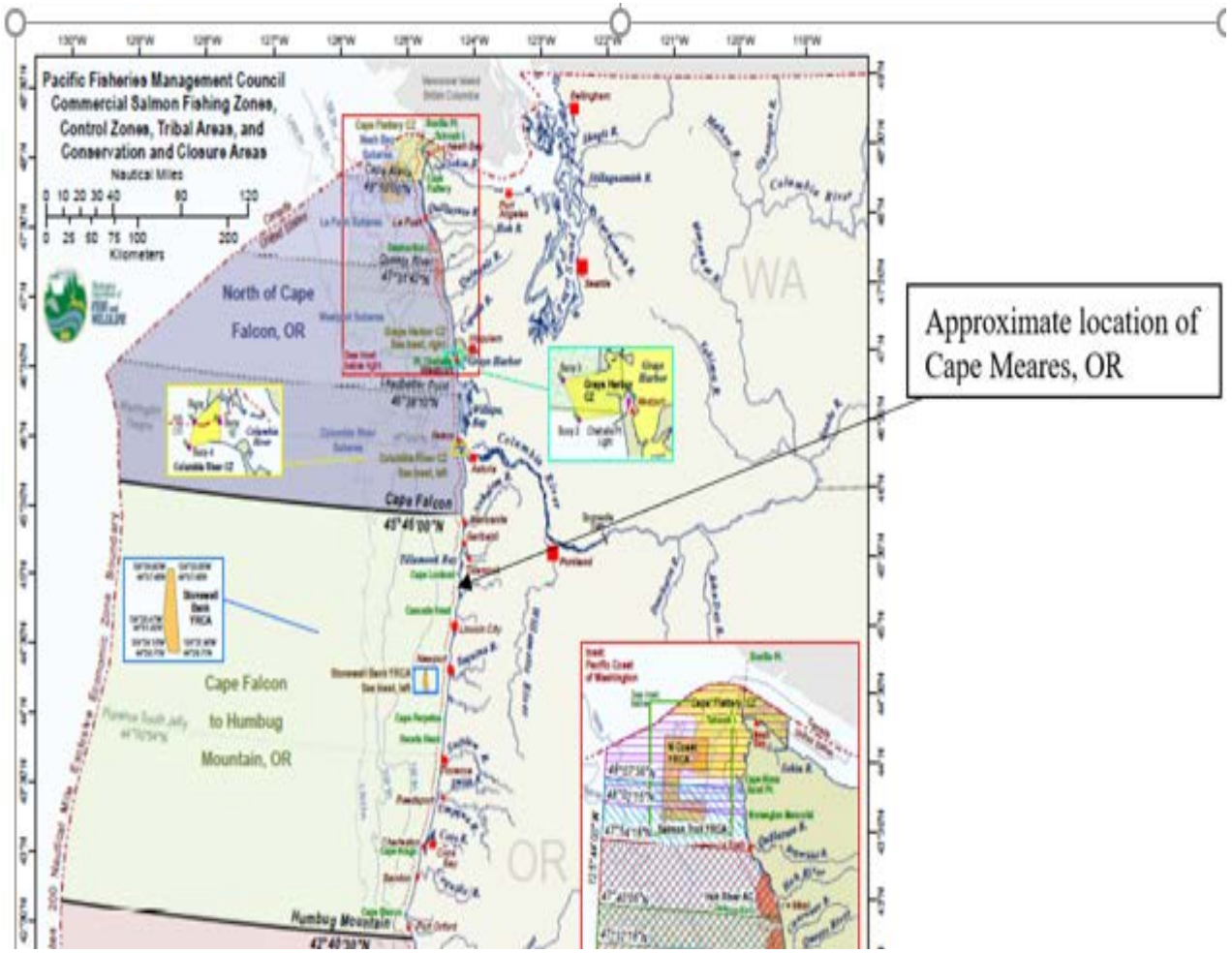
- **Option 5A**: In the area between Cape Falcon and the Oregon/California border delay the start of the commercial salmon troll fishery until April 1.
- **Option 5B**: In the Oregon KMZ: close commercial and recreational fisheries beginning October 1 through March 31 of the following year, only when the California (CA) KMZ is concurrently closed (see Option 6B)
- **Option 5C**: In the area between Cape Falcon and Cape Meares consistent with the proposed SRKW Critical Habitat Area 1: delay ocean salmon fisheries until June 1. This management response is intended to be implemented in concert with option 4A.
- **Option 5D**: In the area between Cape Falcon and Cape Meares consistent with the proposed SRKW Critical Habitat Area 1: delay ocean salmon fisheries until June 15. This management response is intended to be implemented in concert with option 4B.
- **Workgroup note**: A delay of fisheries in the entire area between Cape Falcon and Cape Meares may ultimately be easier for compliance and enforcement (5C and 5D).

6. In California coastal waters,

- **Option 6A:** Beginning October 1 through March 31 of the following year close commercial and recreational fisheries in the Monterey fishing area.
- **Option 6B:** Beginning October 1 through March 31 of the following year close commercial and recreational fisheries in the California waters of the KMZ.
- **Option 6C:** increase the duration of the Klamath Control Zone area expansion beginning September 1 through March 31 the following year.
- **Option 6D:** Maintain 2020 status quo for control zones in California state waters

Map of SRKW Critical Habitat Areas 1 and 2





F.2.a Workgroup Report 1: Summarized Recommendations/Alternatives

Alternative	Brief Description	Result	If adjusted for error	Comment
3.1.1	No action	--	--	Status quo
3.1.2.a	Lowest year	813,000	878,000	1994
3.1.2.b	Arithmetic mean of three lowest years	874,000	944,000	1994, 1998, and 2007
3.1.2.c	2020 NMFS guidance	966,000	N/A	the arithmetic mean of the seven lowest years of abundance (1994-1996, 1998-2000, and 2007)
3.1.2.d	Maximum of mid-90s	1,144,000	1,235,000	the max abundance from 1995 through 2000 occurred in 1997
3.1.3.a	Use 2-yr geo mean of TS1 projected abundance.	--	--	running multi-year TS1 rather than annual value
3.1.3.b	Use 3-yr geo mean of TS1 projected abundundance	--	--	running multi-year TS1 rather than annual value
3.1.4	Number of responses increased if below threshold in second consecutive year	--	--	year 1 has a subset of responses, year 2 has subset plus at least 1 more item
3.2.1	Re-evaluate conservation objectives for SRFC	--	--	current range 122,000-180,000 hatchery and natural-area adult spawners
3.2.2	Re-evaluate conservation objectives for KRFC	--	--	Current goal 40,700 natural area adult spawners
3.3	Improve stock assessment analytical methods	--	--	SRFC age-based stock assessment using cohort reconstruction methods

F.2.a Workgroup Report 2: Summarized List of Responses

F.2.a SRKW Report 2 - Updated list of Responses - Summarized

1A	NOF: Reduce quotas based on regression analysis
2A	NOF: 50% cap on spring/summer Chinook quota for troll
2B	NOF: 61% cap on spring/summer Chinook quota for troll (equivalent to 10-year arithmatic mean)
2C	NOF: Implement additional subarea caps for troll in the spring north of Leadbetter Point
3A	NOF: Increase the area of the Col. R CZ from season start through June 15
3B	NOF: Close the Grays Harbor CZ from season start through June 15
4A	NOF: Delay start of season until June 1 (coincides with 5C)
4B	NOF: Delay start of season until June 15 (coincides with 5D)
5A	SOF in OR: Delay start of troll fishery until April 1
5B	OR KMZ: Close salmon fishing Oct. 1- Mar. 31 when CA KMZ is also closed (coincides with 6B)
5C	SOF in OR waters of draft SRKW CHD Area 1: Delay start of season until June 1 (coincides with 4A)
5D	SOF in OR waters of draft SRKW CHD Area 1: Delay start of season until June 15 (coincides with 4B)
5C/5D	*Workgroup comment: Consider closing the entire area between Cape Falcon and Cape Meares, rather than just the draft SRKW CHD Area 1*
6A	CA coastal waters: Close Monterey fishing area Oct. 1 - Mar. 31
6B	CA KMZ: Close salmon fishing Oct. 1- Mar. 31 when OR KMZ is also closed (coincides with 5B)
6C	CA KCZ: Klamath Control Zone increased area closure Sept.1 - Mar. 31
6D	CA inland waters: Maintain 2020 status quo for CZ in CA state waters

SRKW Workgroup Report 3

Agenda Item F.2.a
Workgroup Report 3
November 2020

SOUTHERN RESIDENT KILLER WHALE WORKGROUP REPORT 3:
FORECASTING BIAS ASSESSMENT[1]

At the September 2020 Pacific Fishery Management Council (Council) meeting, the Southern Resident Killer Whale (SRKW) Workgroup (Workgroup) provided a draft range of alternatives and recommendations for Council consideration. The Council directed the Workgroup to provide additional information at the November 2020 Council meeting. The following report details the Workgroup's updated consideration and recommendations of using a forecasting bias if the Council selects a threshold (Options 3.1.2.a through 3.1.2d in the draft range of alternatives) as part of the preferred alternative.

Summary of report

(see Workgroup Report 3)

- **Technical summary**: Two analyses used to assess bias which produced similar results using the best information available. We note the small sample size limitations
- **Considerations (either or both of the following):**
  - If Council decides an adjustment to a particular threshold is necessary to address forecast bias: the Workgroup suggests an adjustment of **1.08** (based on Analysis 2, which is smaller than our original estimate of 1.19 based on discovering some errors in the original analysis)
  - Consider periodic reviews to assess if a fundamental change to the forecast bias has occurred over time


QUESTIONS?
THANK YOU