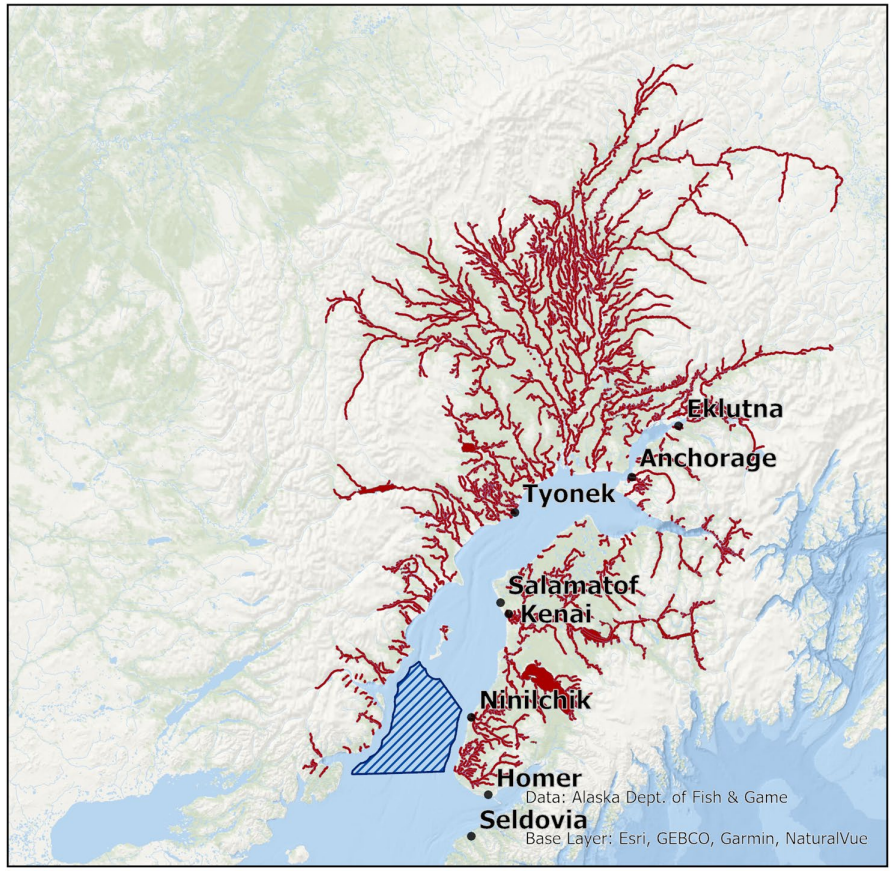
2025 COOK INLET SALMON STOCK ASSESSMENT & FISHERY EVALUATION REPORT

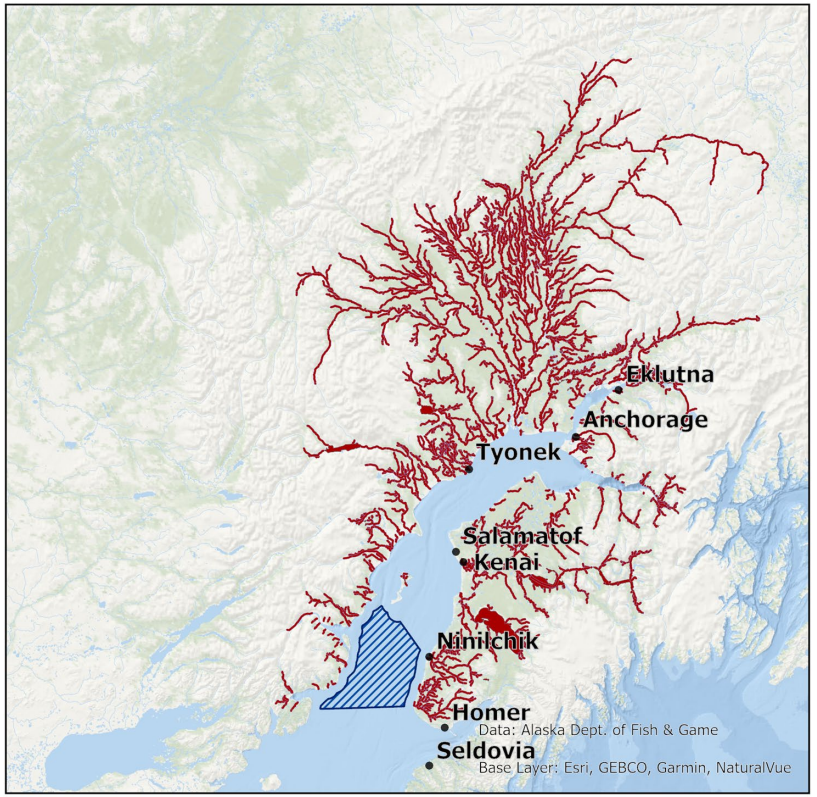
February 2025 SSC

- Rich Brenner NMFS AKRO
- Aaron Lambert NMFS AKRO
- Lukas DeFilippo NMFS AFSC
- Doug Duncan NMFS AKRO
- Josh Russell NMFS AFSC
- Gretchen Harrington ARA NMFS AKR
- Adam Zaleski NMFS AKRO
- Bridget Ferriss AFSC
- Tristan Sebens AKRO



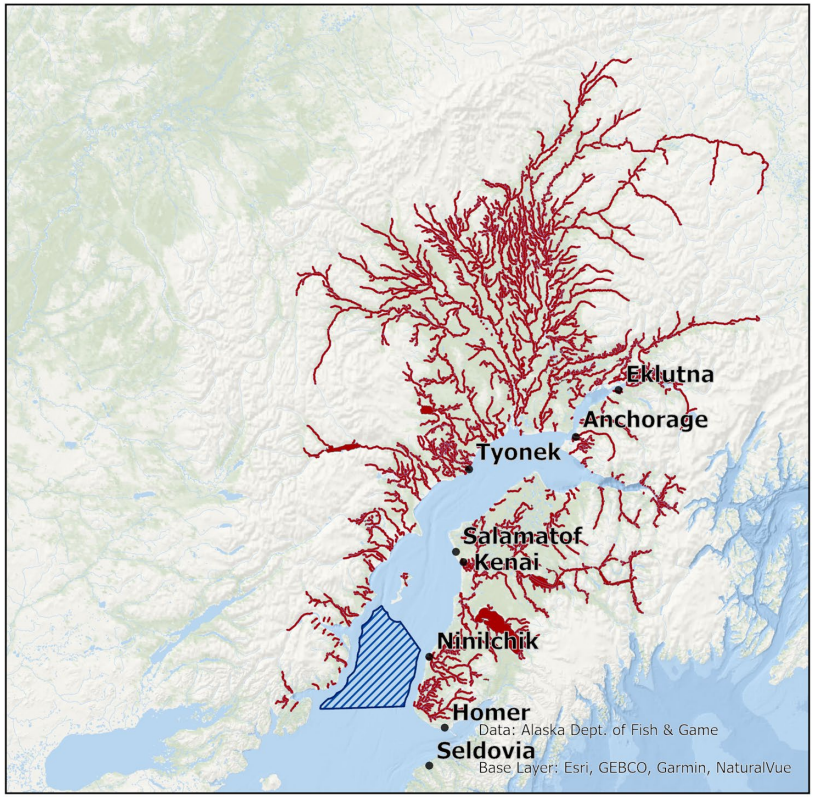
PRESENTATION OUTLINE

1. 2024 Cook Inlet (CI) EEZ Fishery & Postseason Stock Status
2. 2024 SSC Recommendations
3. 2025 Assessments for each stock
4. 2025 Summary of NMFS SAFE Team recommendations
5. 2026 Proposed Bayesian Tier 1 OFL model
6. Tribal Fishery Update
7. Considerations for 2026 SAFE and future FMP changes



FEDERAL COOK INLET STOCKS AND STOCK COMPLEXES IN SALMON FMP

- Kenai Late Run Sockeye Salmon (KNSOCK)
- Kasilof Sockeye Salmon (KASOCK)
- Aggregate “Other” Sockeye Salmon Stock Complex (AOSOCK)
- Aggregate Chinook Salmon Stock Complex (ACHIN)
- Aggregate Coho Salmon Stock Complex (COHO)
- Aggregate Chum Salmon Stock Complex (CHUM)
- Aggregate Pink Salmon Stock Complex (PINK)



2024 COOK INLET EEZ FISHERY SDC & SAFE Recommendation:

No overfishing and No stocks overfished Table 3. SAFE Report (page 7)

		Tier 1 Overfishing SDC		Tier 1-3 Overfished SDC		Tier 3 Overfishing SDC				
Stock	**Tier**	**MFMT**	**F_{EEZ}**	**MSST (000's)**	**Cum. Esc. (000's)**	**OFL (000's)**	**Cum. Harv. (000's)**	**OFL_{PRE}**	**TAC**	**Catch**
KNSOCK	1	0.204	0.072	3,030	8,258	NA	NA	901,932		
KASOCK	1	0.495	0.036	555	4,008	NA	NA	541,084	492,100	324,837
AOSOCK	3	NA	NA	162.5	529.7	1,271	450	887,464		
ACHIN	3	NA	NA	44.2	70.8	3.072	0.406	2,697	240	31
COHO	3	NA	NA	38.6	24.4**	439	53	357,688	25,000	4,432
CHUM	3	NA	NA	NA	NA	561	148	441,727	99,400	28,832
PINK (EVEN)	3	NA	NA	NA	NA	300	36	270,435	121,700	6,249

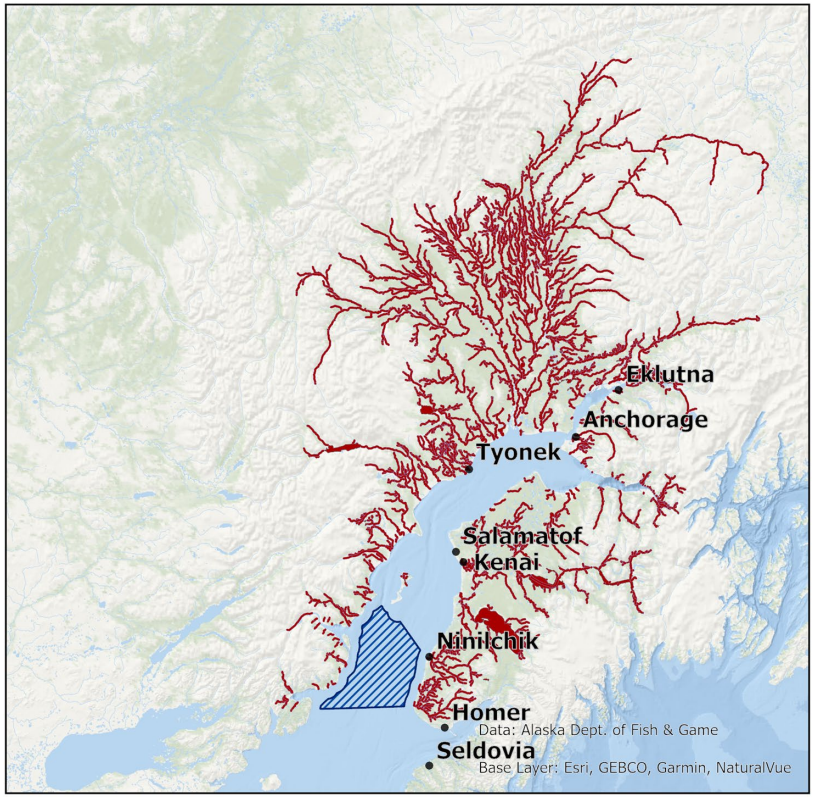
2024 COOK INLET EEZ FISHERY: HARVEST SPECIFICATION VS. CATCH

Table 4. SAFE Report (page 7)

Stock	Tier	OFL_{PRE}	ABC/ ACL	TAC	Catch	Sockeye Catch
KNSOCK	1	901,932	431,123	492,100	**324,837**	189,380
KASOCK	1	541,084	375,512			77,960
AOSOCK	3	887,464	177,493			57,496
ACHIN	3	2,697	270	240	**31**	NA
COHO	3	357,688	35,769	25,000	**4,432**	NA
CHUM	3	441,727	110,432	99,400	**28,832**	NA
PINK-EVEN	3	270,435	135,218	121,700	**6,249**	NA

SSC RECOMMENDATIONS & CHANGES FROM 2024 TO 2025 SAFE

- 2024 was first year of **known** EEZ harvest
- 2024 Tier 1 SDC calculated using $S_{MSY\text{-}POINT}$
- 2025 SDC: we recommend using the lower bound of escapement goal range
- 2025 Buffers represent relative reduction from the OFL_{PRE} to ABC (1-b)
- 2025 Tier 1 buffer to reduce OFL_{PRE} to ABC
  - Positive errors only (i.e. overforecasting)
- FMP specification for OFL_{PRE} as a single season value based on total run size
- 2025 Tier 3 OFL and preseason OFL_{PRE}
  - OFL = max rolling sum of catch for a generation (1999 – 2024)
  - OFL_{PRE} = average catch of OFL
- 2026 Risk Tables
- 2026 Proposed Tier 1 Bayesian forecast framework



2025 TIER 1 SDC USING $S_{MSY\text{-}POINT}$

Table 1. SAFE Report (page 3)

$S_{MSY\text{-}POINT}$

Stock	Tier	MFMT	MSST	OFL	OFL_{PRE}	Buffer (%)	ABC/ACL	Sockeye Total
KNSOCK	1	0.196	3,030,000	NA	514,761	67.3%	**168,485**	**453,334**
KASOCK	1	0.511	555,000	NA	664,294	80.3%	**130,701**	
AOSOCK	3	NA	163,000	906,757	181,351	15%	**154,148**	

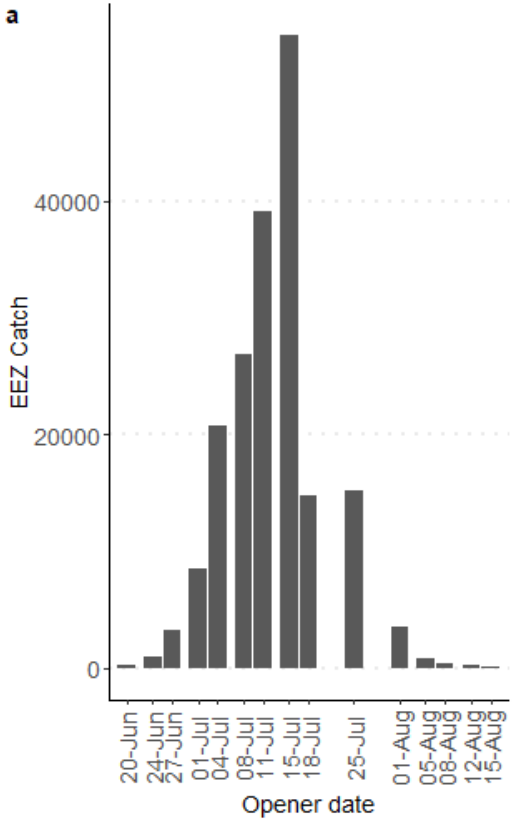
2025 NMFS SAFE TEAM TIER 1 RECOMMENDED SDC: USING LOWER BOUND OF TIER 1 GOAL RANGE

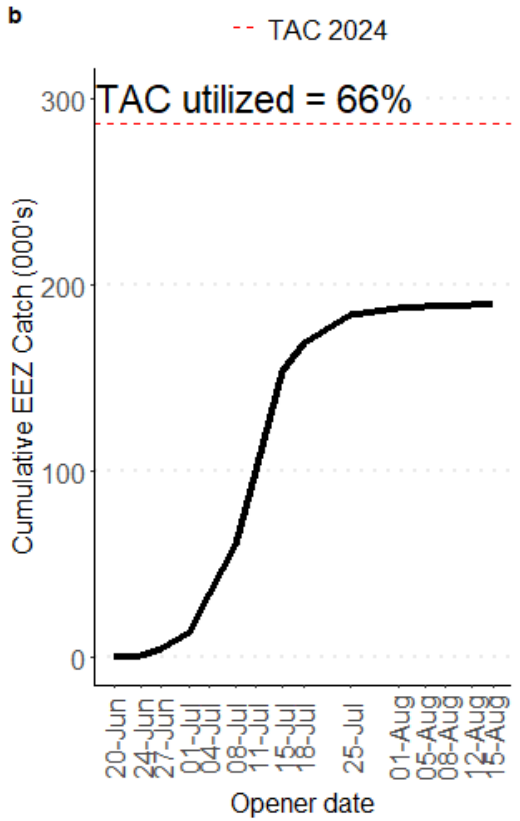
Table 2. SAFE Report (page 3)

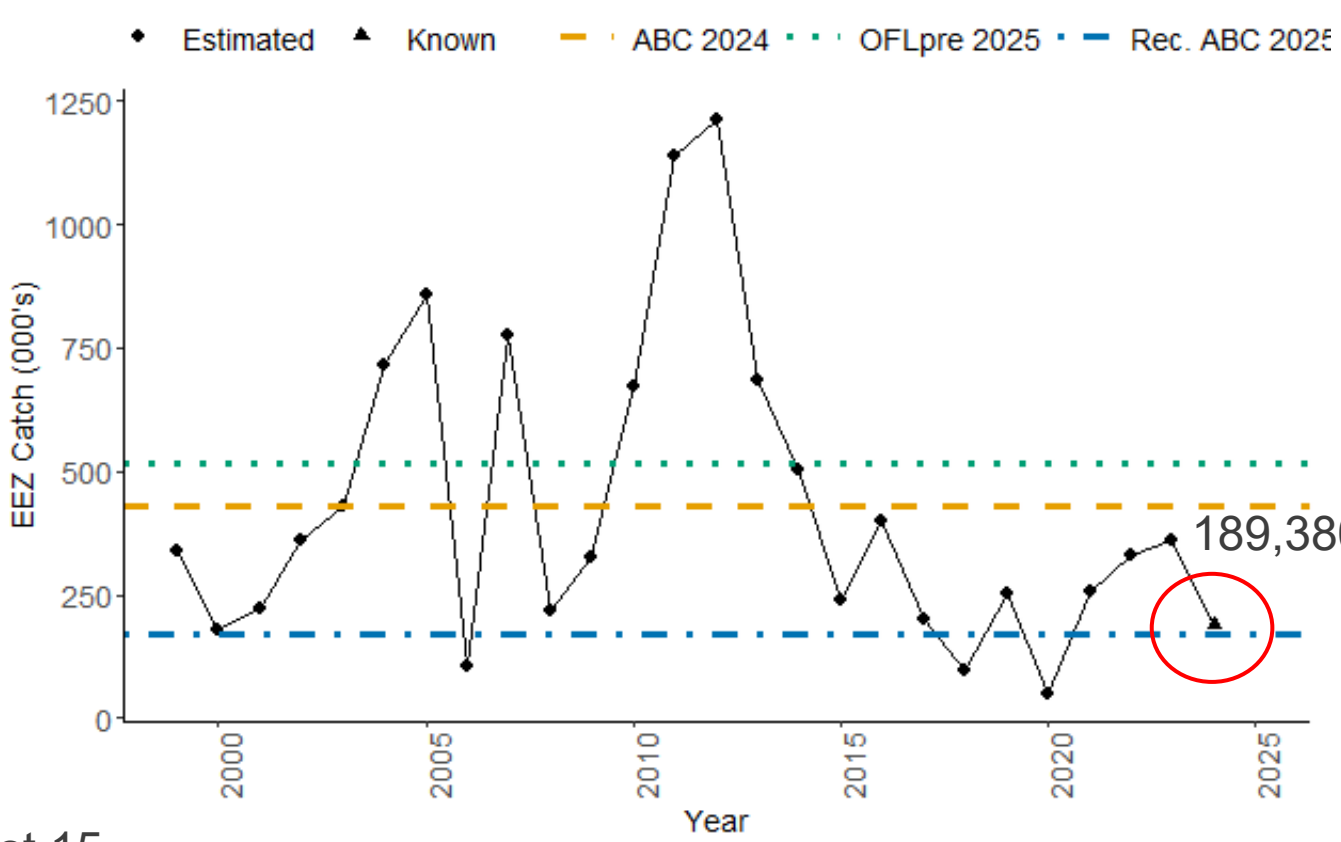
Lower Bound

Stock	Tier	MFMT	MSST	OFL	OFL_{PRE}	Buffer (%)	ABC/ACL	Sockeye Total
KNSOCK	1	0.327	1,875,000	NA	976,761	27.3%	**709,954**	**1.185M**
KASOCK	1	0.572	350,000	NA	746,294	57.0%	**320,841**	
AOSOCK	3	NA	163,000	906,757	181,351	15%	**154,148**	

KENAI LATE RUN SOCKEYE SALMON (KNSOCK) 2024 CI EEZ FISHERY (Section 7.2)



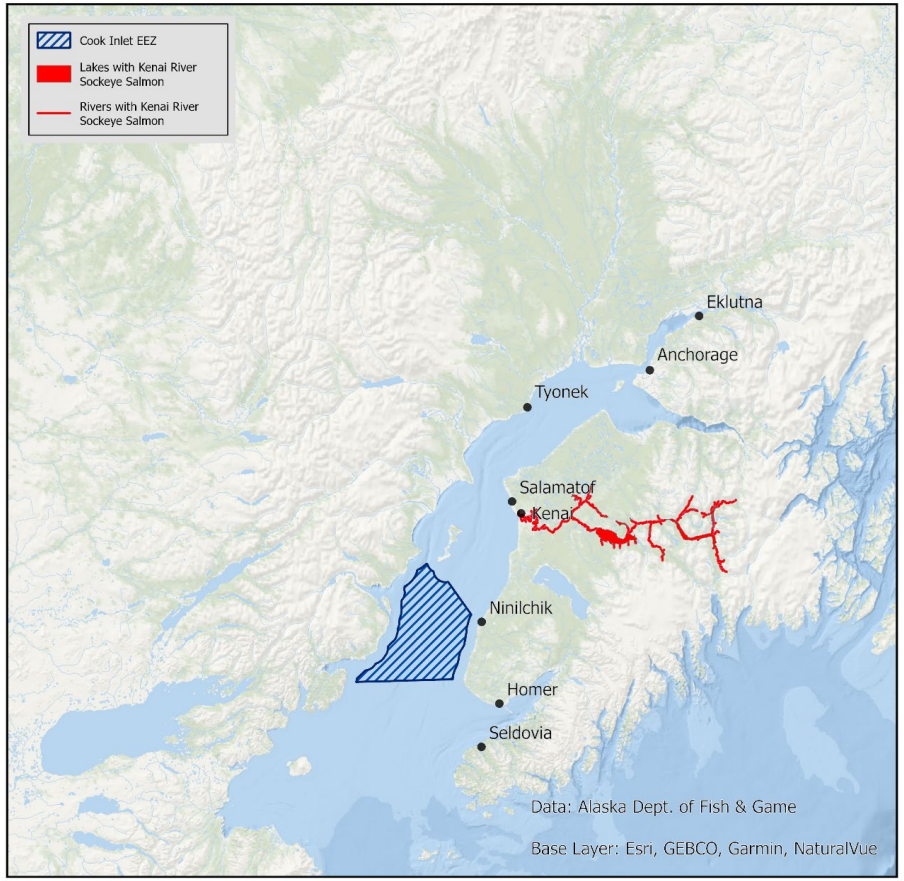




- Fishery opened June 20, closed August 15
- Max sockeye catch July 15
- 189,380 KNSOCK harvested

KENAI LATE RUN SOCKEYE SALMON (KNSOCK) 2024 CI EEZ FISHERY (Section 7.2)

- 2024 NMFS preseason forecast was 3.485M
- 2024 ADF&G total run size estimate is 3.724 M (difference of 239K)
- State escapement goal range = 750K - 1.3M
- $S_{MSY\text{-}POINT}$ = 1.212M (close to the upper bound of range)
- 2024 escapement = ~1.6M (estimated using 5-year avg inriver harvest)
- 2024 projected State harvest rate ($\hat{F}_{STATE}$) = 39.4%
- 2024 realized State harvest rate (F_{STATE})= 53%



2025 TIER 1 SDC (SAFE SECTIONS 4 - 6): Defining Overfished

- Sockeye salmon generation time (T) = 5 years
  - Average time: egg → fry → smolt → adult → spawn
- State harvest rate (F_{STATE})
  - Includes catch in all State waters (comm., recreational, etc.)
- Minimum Stock Size Threshold (MSST)
  - Used postseason to determine **overfished status**
  - (Escapement Target x Generation Time)/ 2
  - Compared to the sum of the most recent observed escapement over a generation time (cumulative escapements)

Overfished?

$$MSST > \sum_{i=t-T+1}^{t} Escapement_i = YES$$

$$MSST < \sum_{i=t-T+1}^{t} Escapement_i = NO$$

2025 TIER 1 SDC (SAFE SECTIONS 4 - 6): Defining Overfishing

- Maximum Fishing Mortality Threshold (MFMT)
  - Postseason to make **overfishing determination**
  - MFMT = (sum of the realized potential yield in EEZ for the recent generation) / (sum of the total run size for the most recent generation)
  - MFMT compared to EEZ harvest rate, F_{EEZ}
  - Overfishing?
    - F_{EEZ} > MFMT = Yes
    - F_{EEZ} < MFMT = No

$$y_t = \max(0, R_t - G_t - C_{STATE,t})$$

$$MFMT = \sum_{i=t-T+1}^{t} \frac{y_i}{R_i}$$

$$F_{EEZ} = \sum_{i=t-T+1}^{t} \frac{C_{i,EEZ}}{R_i}$$

$T = generation\ time$

$y = realized\ potential\ yield$

$R = total\ run\ size$

$G = escapement\ target$

$C = catch$

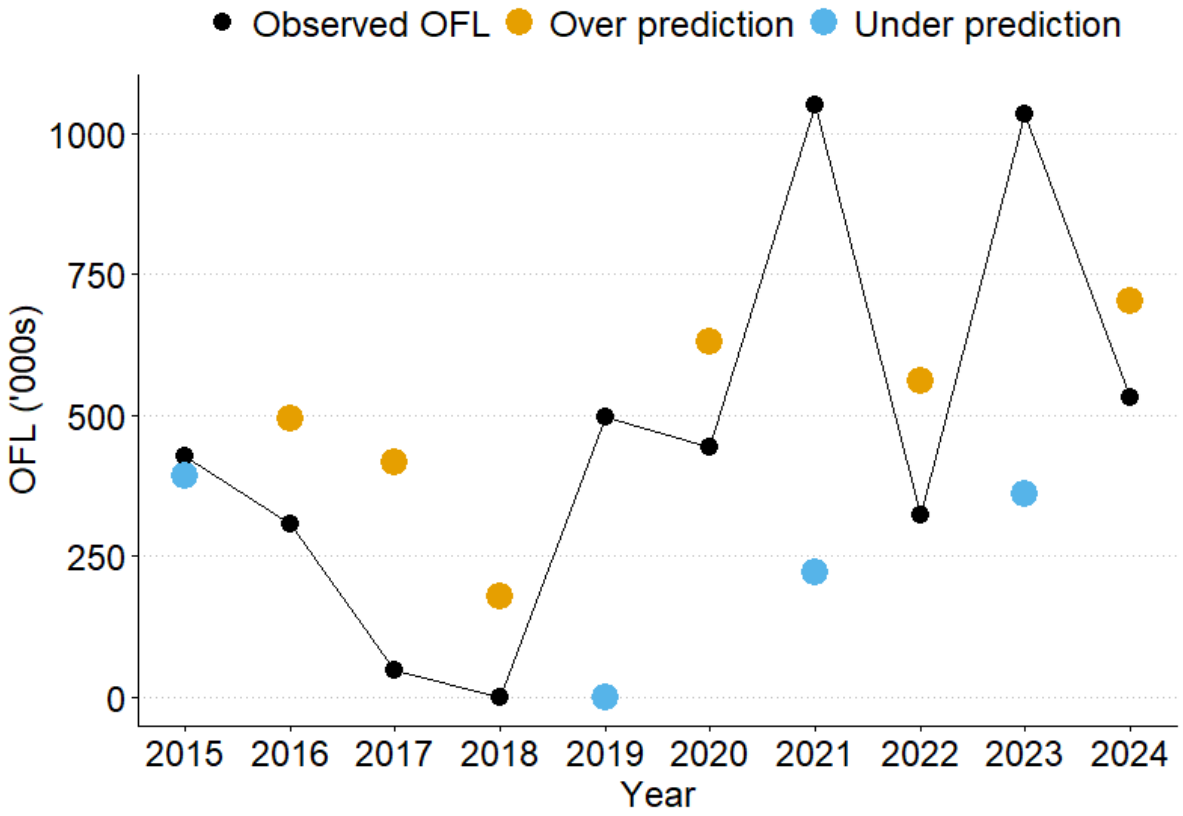
2025 TIER 1 SDC (SAFE SECTIONS 4 - 6): Defining OFL & ABC

- **Preseason** overfishing limit (OFL_{PRE})
  - The predicted max EEZ harvest after escapement target and projected State harvest
  - $OFL_{PRE} = \hat{R} - G - (\hat{R} * \hat{F}_{STATE}))$
  - Simplified: OFL_{PRE} = (Forecasted total run size)−(Escapement target)−(Projected State harvests)

- Acceptable biological catch (ABC)
  - OFL_{PRE} x Buffer that accounts for uncertainty to ensure that OFL_{PRE} is not exceeded

2025 TIER 1 SDC (SAFE SECTIONS 4 - 6): Defining Tier 1 Buffer

- ABC Buffer (scientific uncertainty)
  - Uses retrospective error in one-step ahead out of sample preseason predictions of OFL (2015 - 2024).
  - Integrates forecasted run size and State harvest rate error.
  - NEW! Positive errors only (overforecasting)
  - Retrospective percent error using median symmetric accuracy (Morley et. al., 2018)
    - Describes the *relative error*



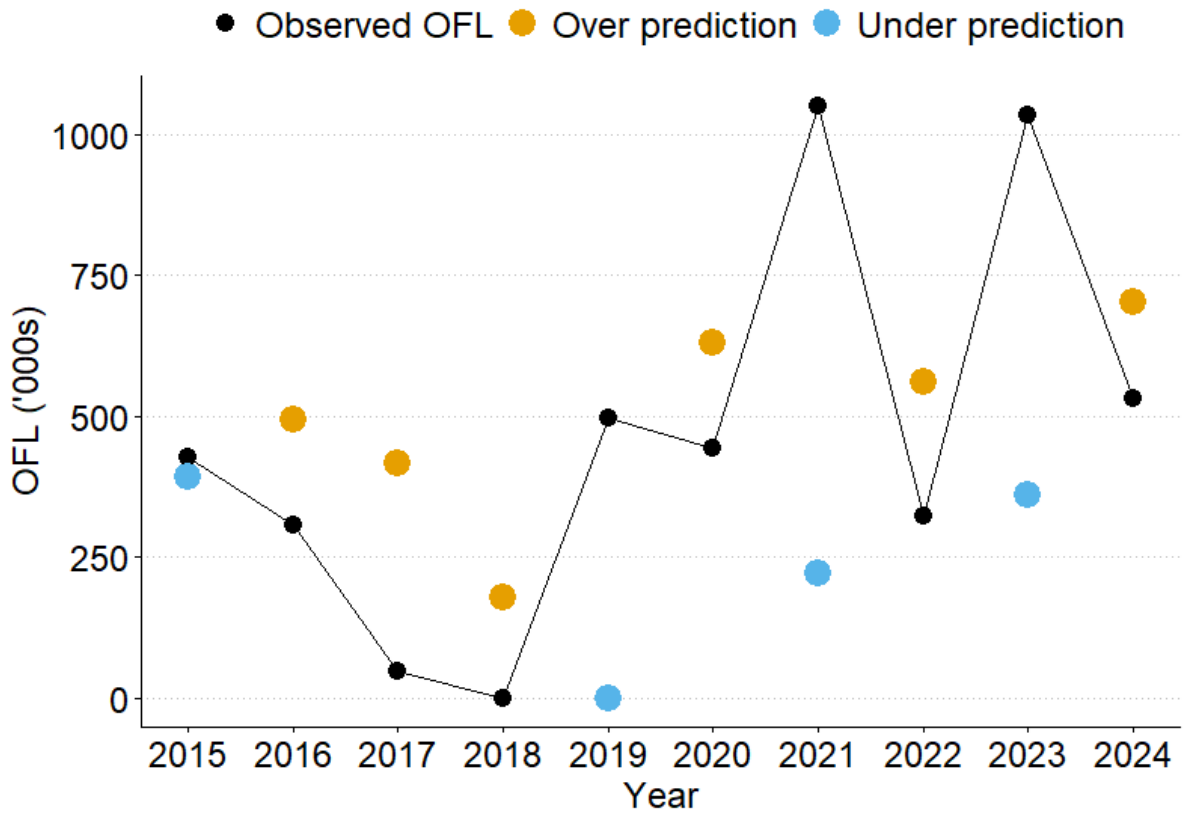
2025 TIER 1 SDC (SAFE SECTIONS 4 - 6): Defining Tier 1 Buffer - Median Symmetric Accuracy

$$MSA = Median\ Symmetric\ Accuracy$$

$$MSA = 100\left(e^{median\left(\left|\log\left(\frac{OFL_{PRE}}{OFL_{POST}}\right)\right|\right)} - 1\right)$$

$$Buffer = min\left(\frac{MSA}{100}, 0.9\right)$$

$$ABC = OFL_{PRE} * (1 - Buffer)$$



2025 TIER 1 SDC (SAFE SECTIONS 4 - 6): Forecast Methodology

- Preseason run size forecast and projected State harvest (F_{STATE})
  - Generated using autoregressive models; arima(p,q)
    - p = auto-regressive(AR) component and q = moving average (MA) component

$$\eta_t = \phi_1 \eta_{t-1} + e_t + \theta_1 e_{t-1}$$

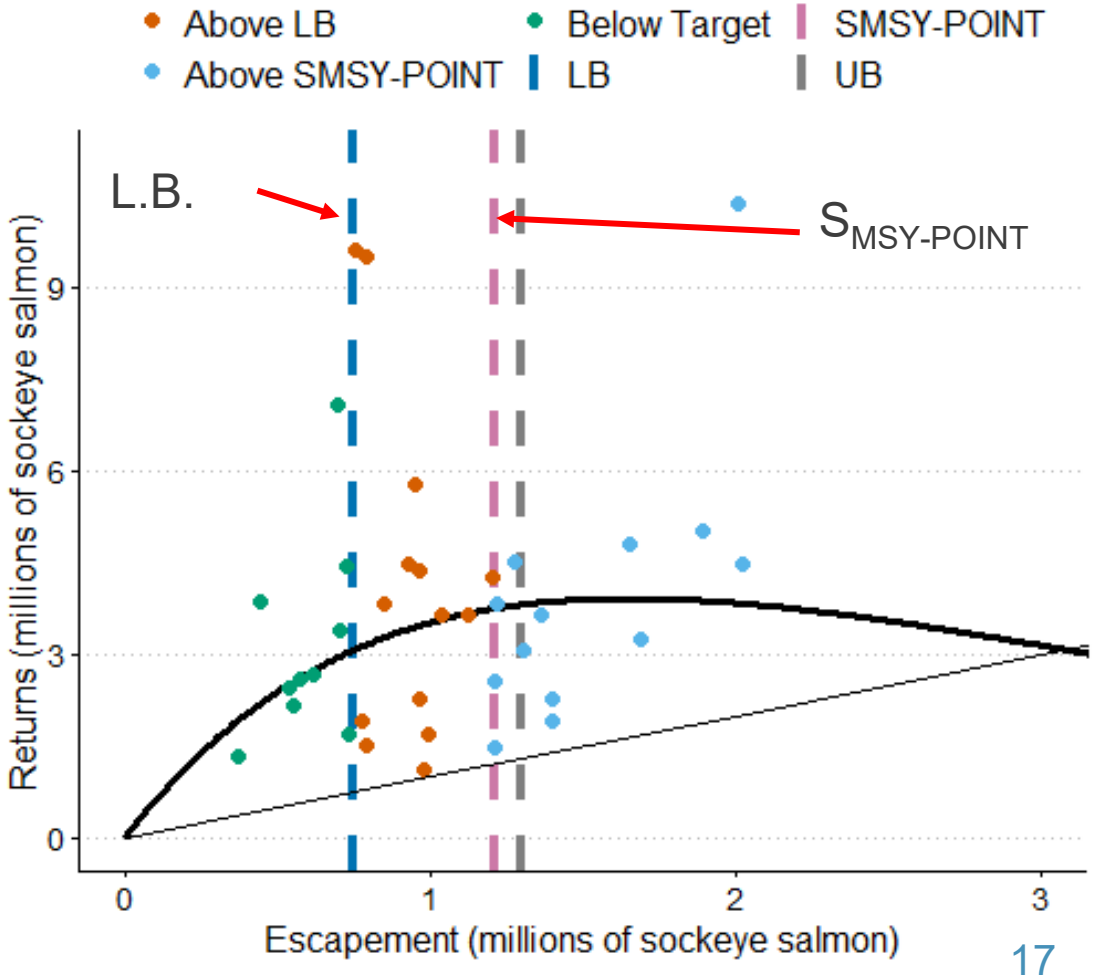
Current year value; AR coefficient; White noise error; MA coefficient

  - Fit in R using the auto.arima() function from the forecast package
    - Function selects the optimal forecast model using AIC
    - Uses the Hyndman-Khandakar algorithm

$$F_{State} = \frac{C_{total} - C_{EEZ}}{Run\ Size}$$

KENAI LATE RUN SOCKEYE SALMON (KNSOCK) SPAWNER-RECRUITMENT CHARACTERISTICS

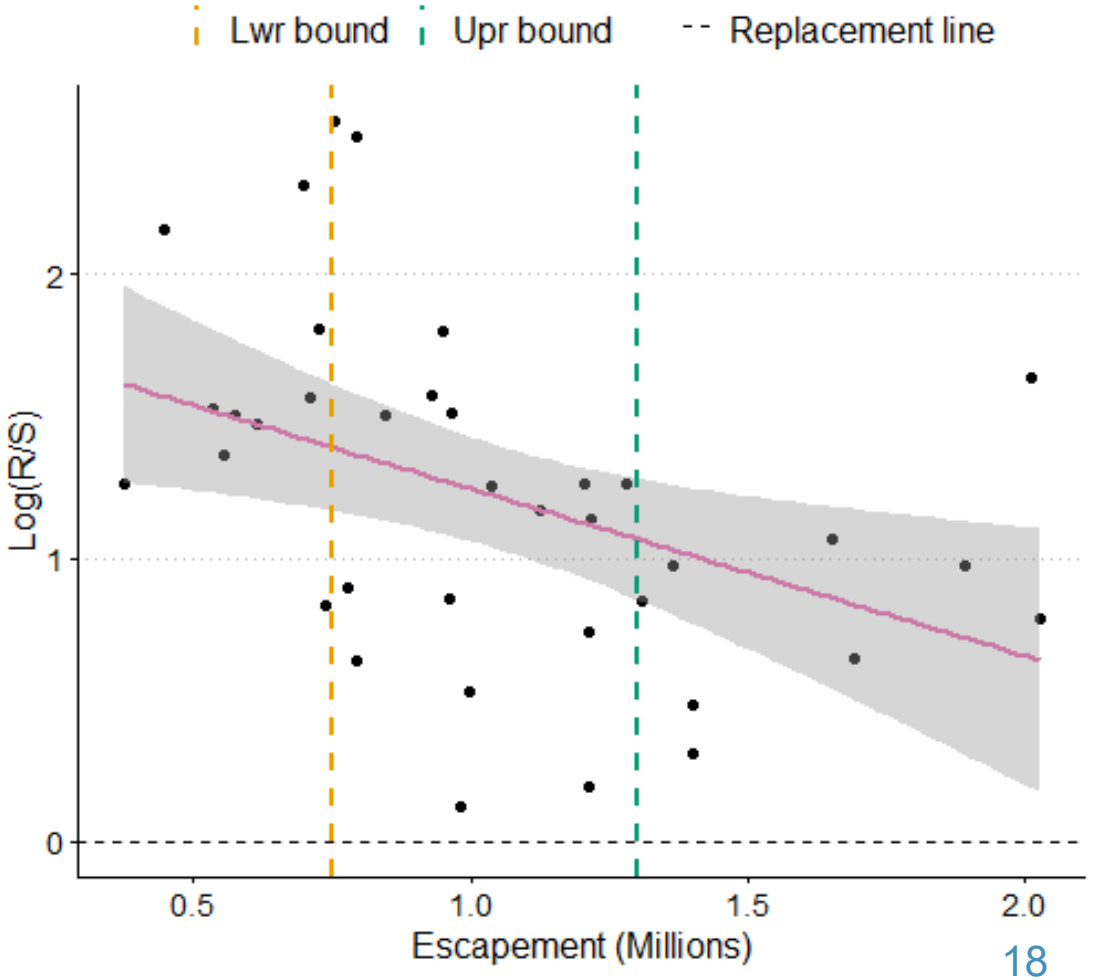
- Kenai sockeye salmon escapements have:
  - always produced harvestable yield (R/S >1, returns in excess of spawners) for all escapements
  - produced large returns (>5 million fish) and high yields across a wide range of escapements



KENAI LATE RUN SOCKEYE SALMON (KNSOCK): PRODUCTIVITY

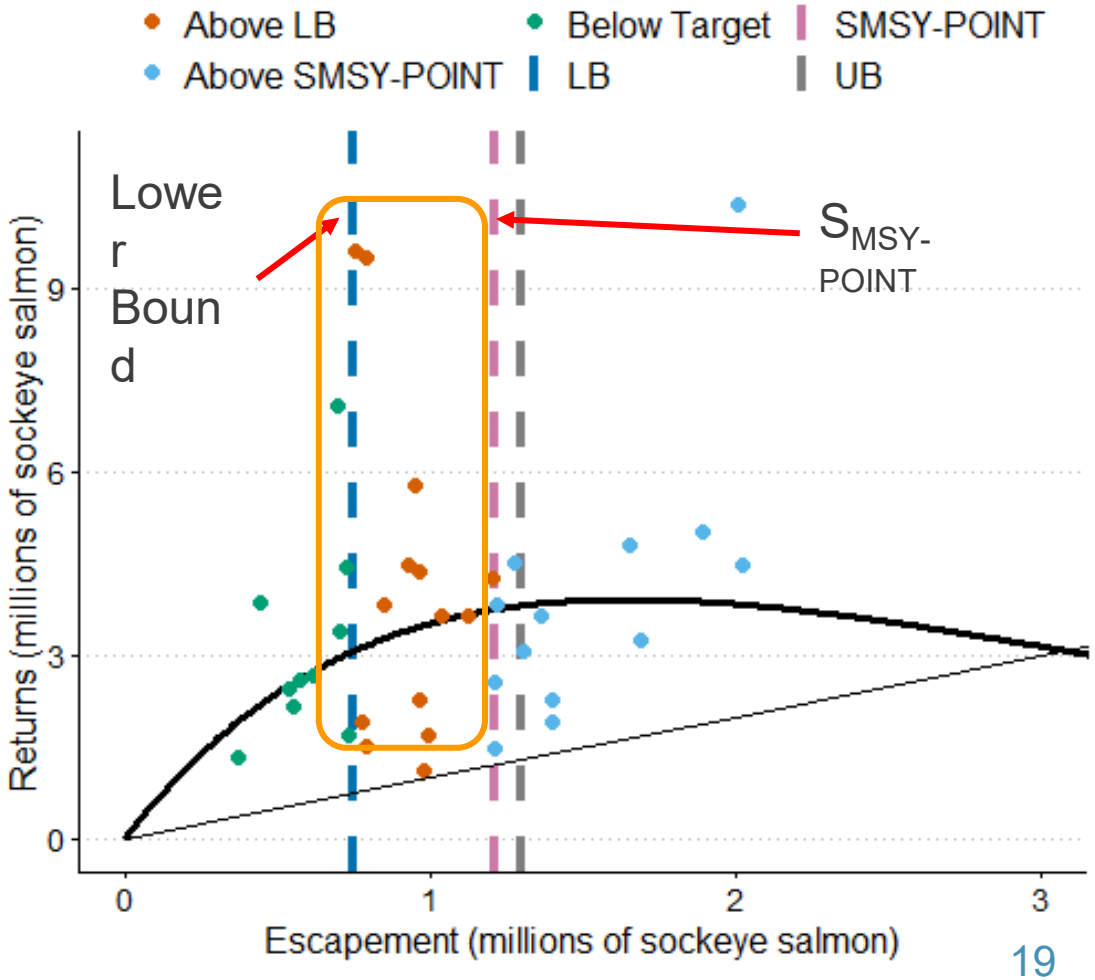
Goal ranges balance productivity and spawners to maximize yield

- < lower bound: highest productivity, but too few spawners to result in max yield.
- > upper bound: many spawners, but lowest productivity
- >> upper bound: stock fails to replace itself (yield ≤ 0)



KENAI LATE RUN SOCKEYE SALMON (KNSOCK)
SDC REFERENCE POINTS: lower bound of range

- Lower Bound (750,000)
- Highest yields in the timeseries
- Area of high productivity (R/S)
- No evidence of overfishing
  - All escapements have produced harvestable yield
- Consistent with Amendment 16 assessment (EA/RIR)
- Consistent with AK Salmon FMP (East Area)
- Consistent with West Coast Salmon FMP
- Consistent with N.S. 1 Guidelines as S_{MSY}/MSY proxy
- Consistent with State Escapement Goals

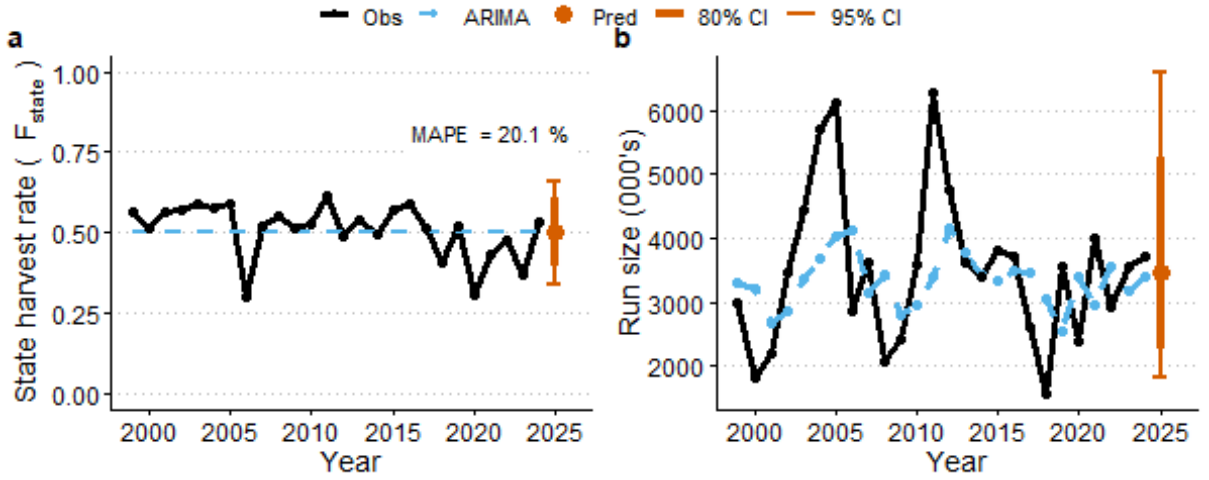


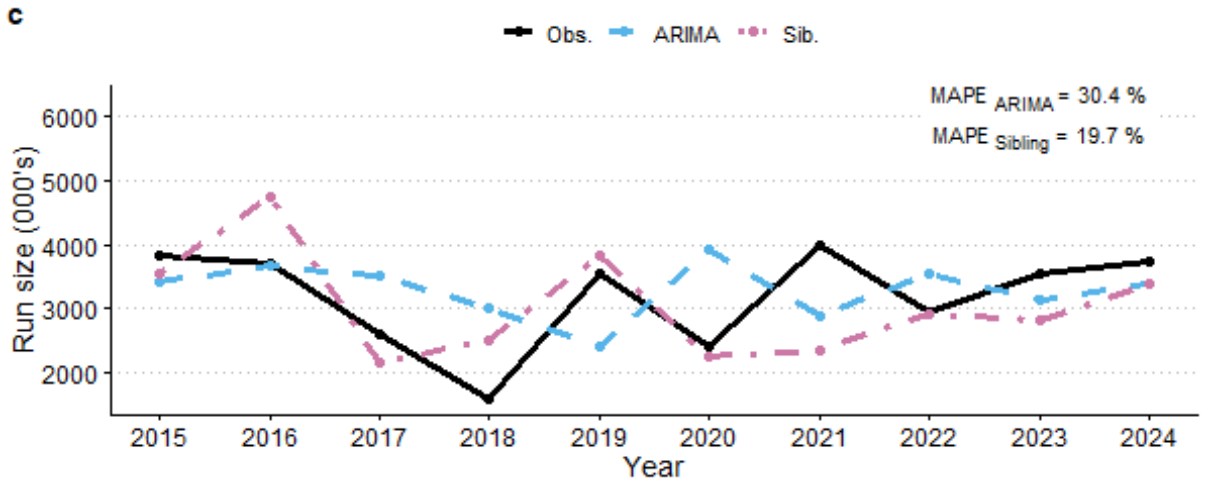
ESCAPEMENT REFERENCE POINT: $S_{MSY\text{-}POINT}$ & LOWER BOUND

- NMFS SAFE Team is not advocating for a particular management approach.
- NMFS SAFE Team suggests that the SSC's recommendations include SDC and ABC based on spawning escapement ranges that produced the highest yields while preventing overfishing or the best proxy for those.

KENAI LATE RUN SOCKEYE SALMON (KNSOCK) FORECASTING RESULTS (Section 7.2)

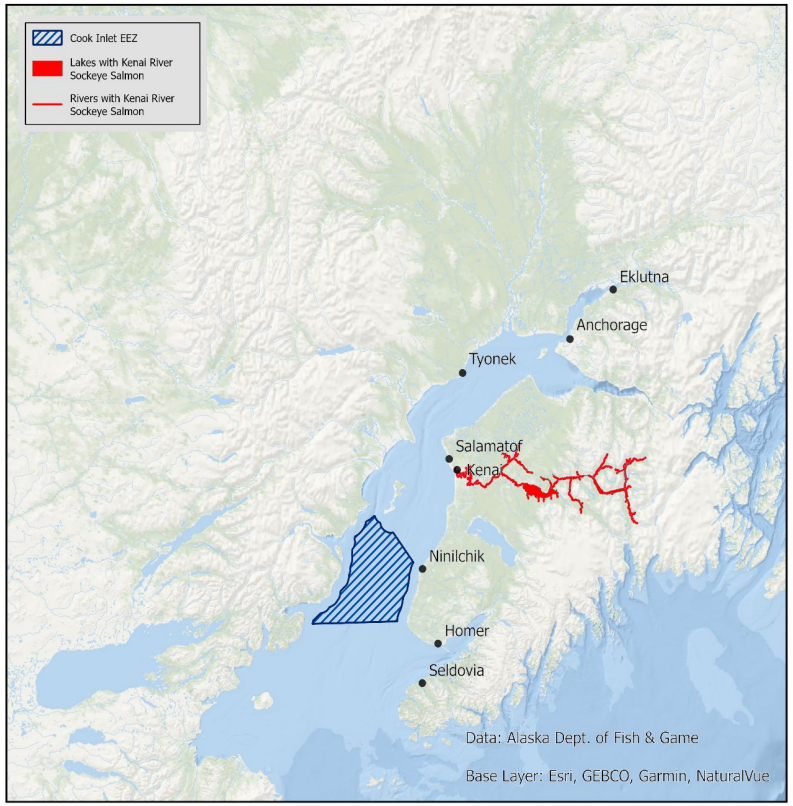
- 2025 forecasted run size = 3.453M (b)
  - AR(1)
- 2025 forecasted F_{STATE} = 50% (a)
  - White noise model - AR(0,0,0)
- Comparison of forecast models (c)
  - State vs Federal run size forecast
  - State sib model MAPE = 19.7%
  - Federal AR1 MAPE = 30.4%
  - State forecast 4.19M (ensemble forecast)





KENAI LATE RUN SOCKEYE SALMON (KNSOCK) STOCK SUMMARY (Section 7.2)

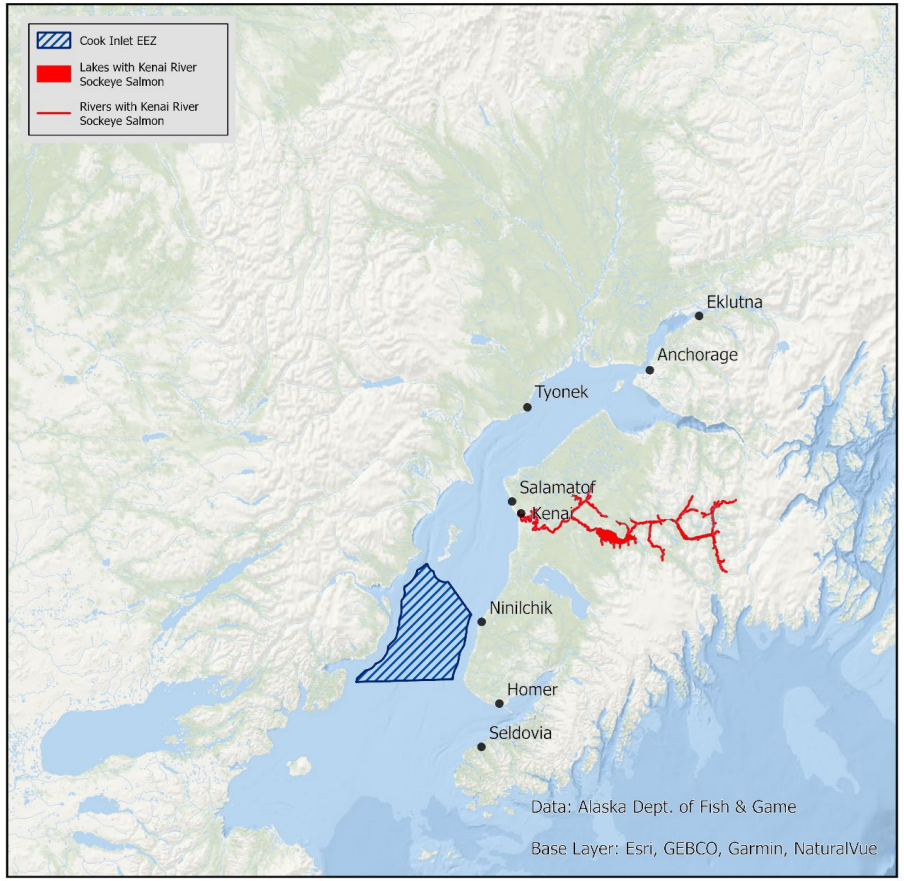
- Not overfished in 2024:
  - MSST (3.03M) << Cumulative Escapement (8.26M)
- No overfishing in 2024:
  - F_{EEZ} (0.072) << MFMT (0.204)
- Substantial potential yield in EEZ
  - Amount depending on escapement target ($S_{MSY\text{-}POINT}$ vs L.B.)



KENAI LATE RUN SOCKEYE SALMON (KNSOCK) TIER 1 ABC/ACL RECOMMENDATIONS (Section 7.2)

Recommendations:

- Tier……1
- MFMT (EEZ overfishing rate)…….0.327
- MSST (overfished value)……..1,875,000 fish
- OFL_{PRE}……976,761 fish
- Buffer……27.3%
- ABC ……709,954
- ACL = ABC

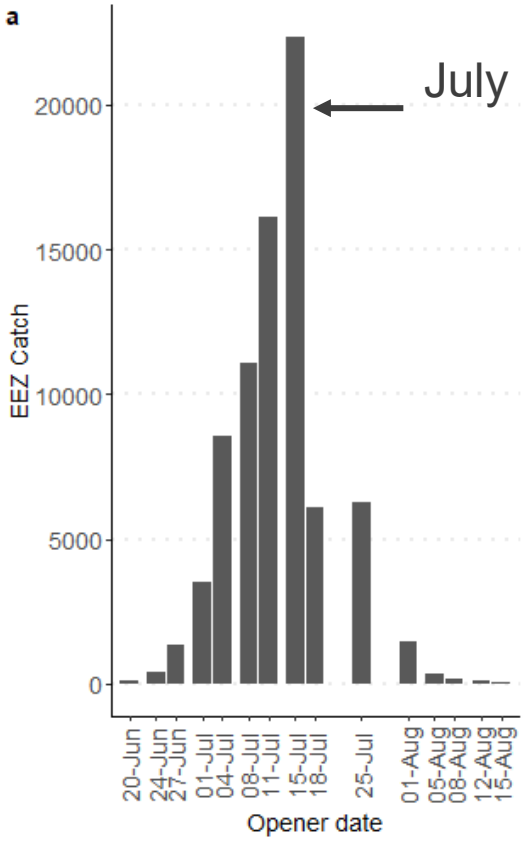


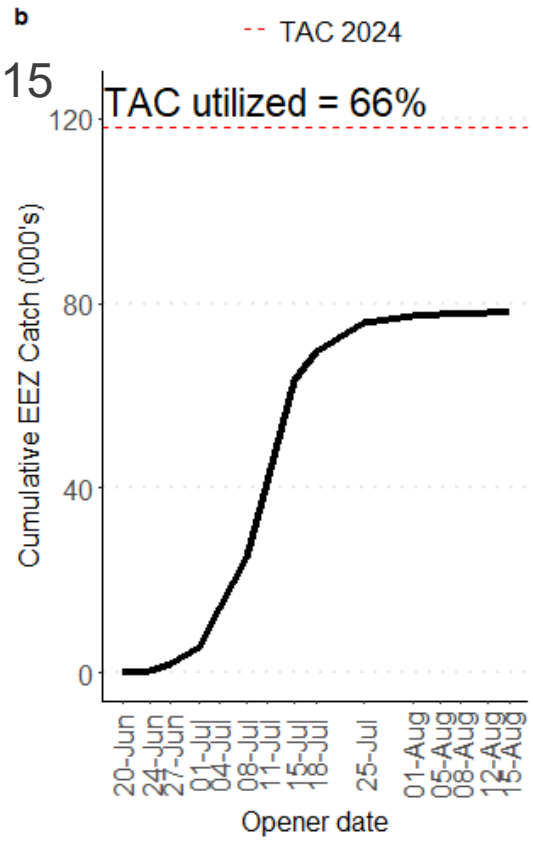
Why is the buffer smaller for Lower Bound vs. S_{MSY-PT}?

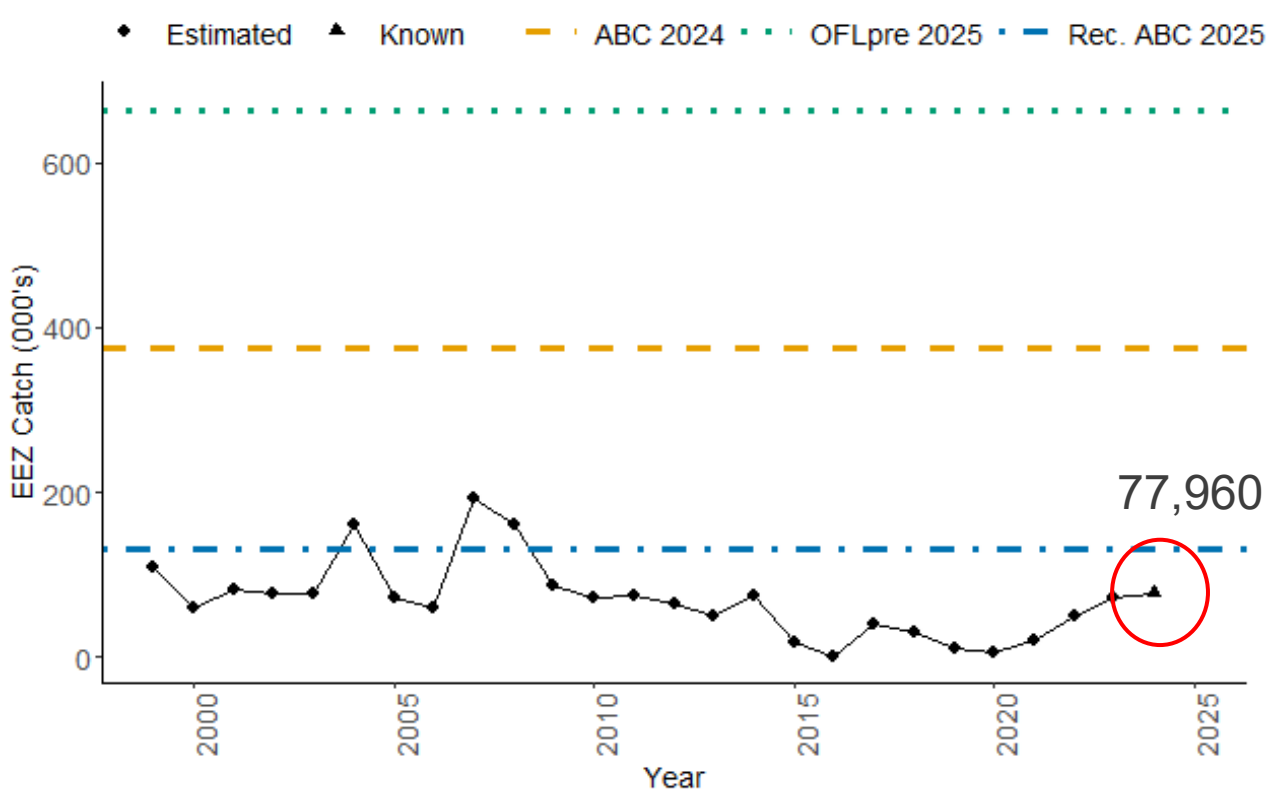
- Buffer is calculated using *relative* error
- When using $S_{MSY-POINT}$
  - Subtracting more fish from the run size (R - **G** - C_{STATE})
- If the $OFL_{(Pre- or Post-season)}$ < 0, then it defaults to zero
- Error may be smaller in magnitude, but the log ratio will be larger, resulting in a bigger buffer
  - Example: forecasting a run of 101,000 when the true run size is 100,000 is "better" than forecasting 2,000 and the true run size is 1,000
  - Both forecasts are off by 1000 fish

2018 OFL Errors	$S_{MSY-POINT}$	Lwr. Bound
$OFL_{PRE-SEASON}$	179K	641K
$OFL_{POST-SEASON}$	max(-284K, 0) = 0	178K
Error (OFL_{PRE} – OFL_{POST})	179K	463K
Log ratio	**9.79**	**1.28**

KASILOF SOCKEYE SALMON (KASOCK)
2024 CI EEZ FISHERY (Section 7.3)

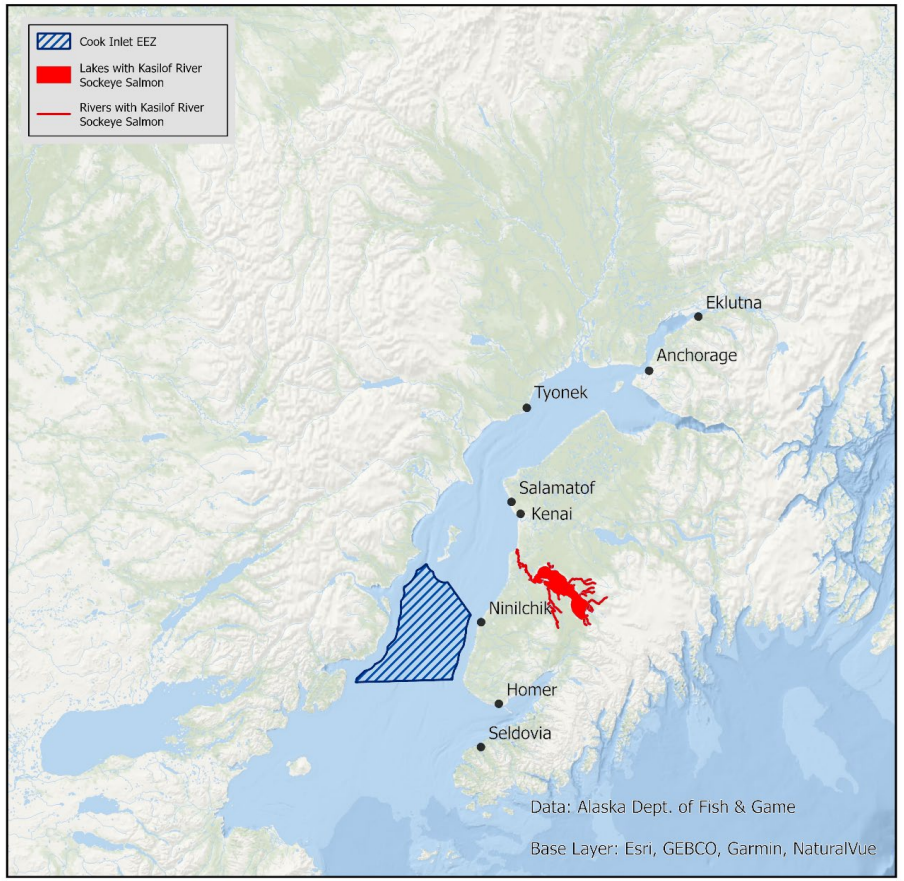






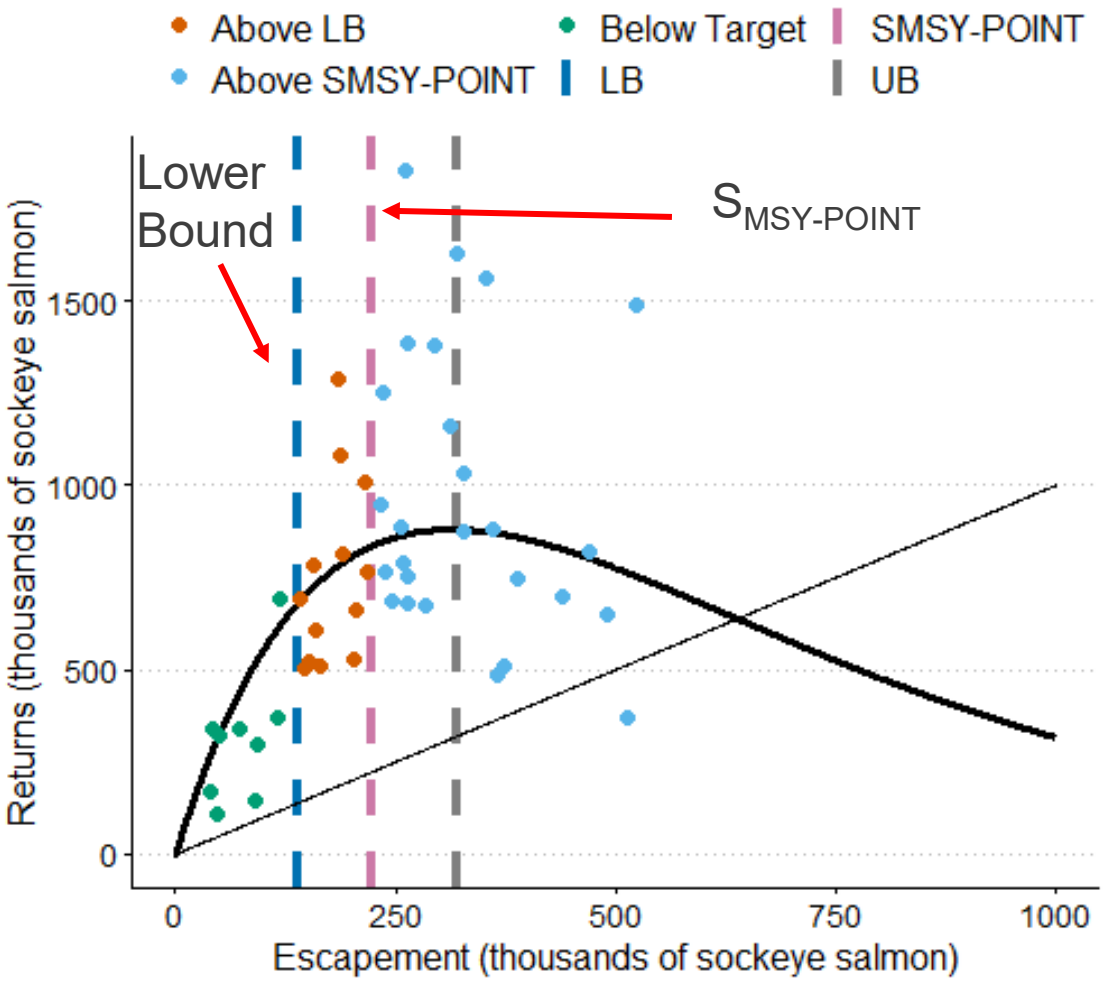
KASILOF SOCKEYE SALMON (KASOCK)
2024 CI EEZ FISHERY (Section 7.3)

- 2024 NMFS preseason forecast was 1.125M
- 2024 total run size estimate is 1.787M (difference of ~66K)
- State escapement goal range = 140K - 370K
- $S_{MSY\text{-}POINT}$ = 222K
- 2024 escapement = ~1.04M
- 2024 projected State harvest rate ($\widehat{F}_{STATE}$) = 32.2%
- 2024 realized State harvest rate (F_{STATE})= 36.9%



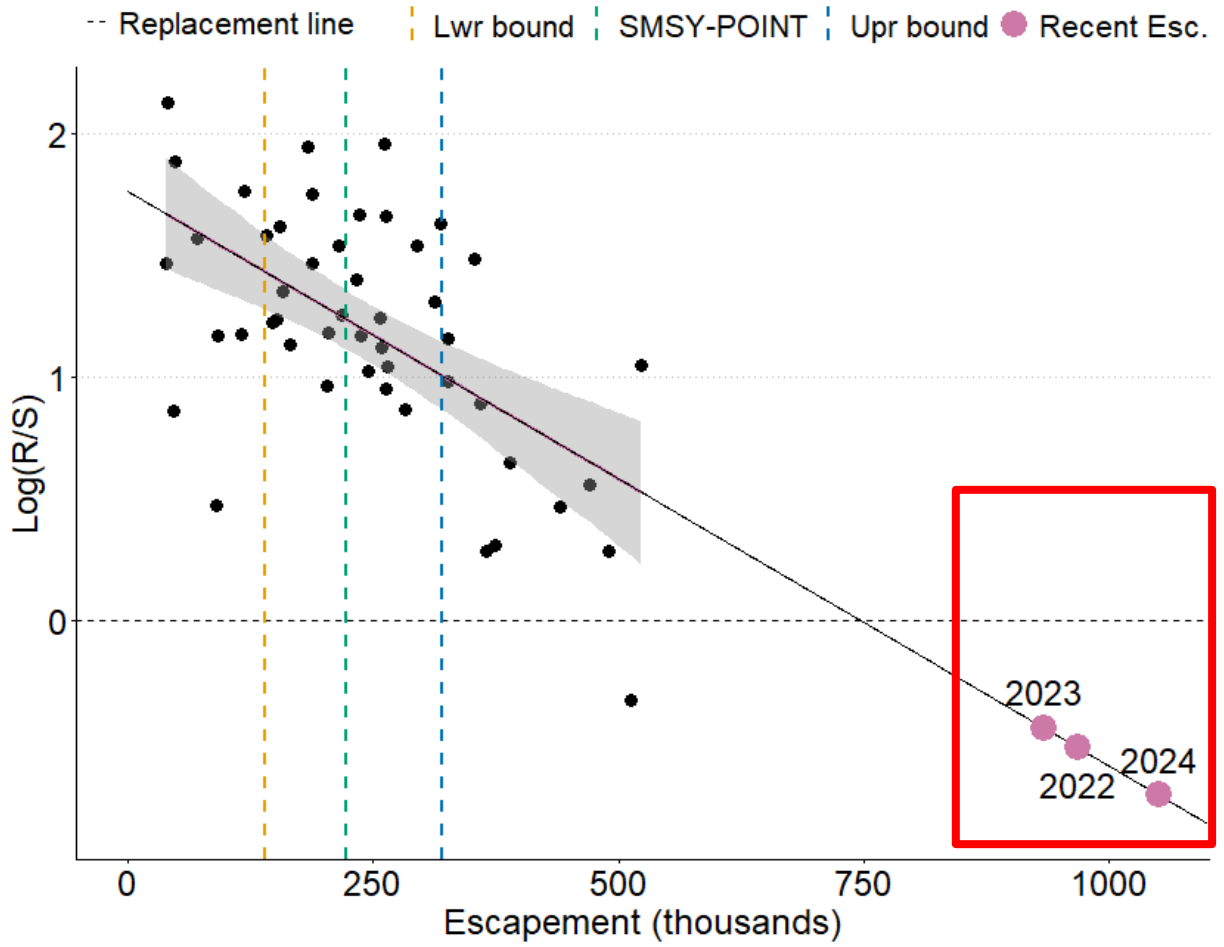
KASILOF SOCKEYE SALMON (KASOCK) SPAWNER-RECRUITMENT CHARACTERISTICS

- Escapement goal range brackets highest yields
- All escapements in the range have replaced themselves and produced harvestable surplus in future years (i.e., no indications of overfishing).



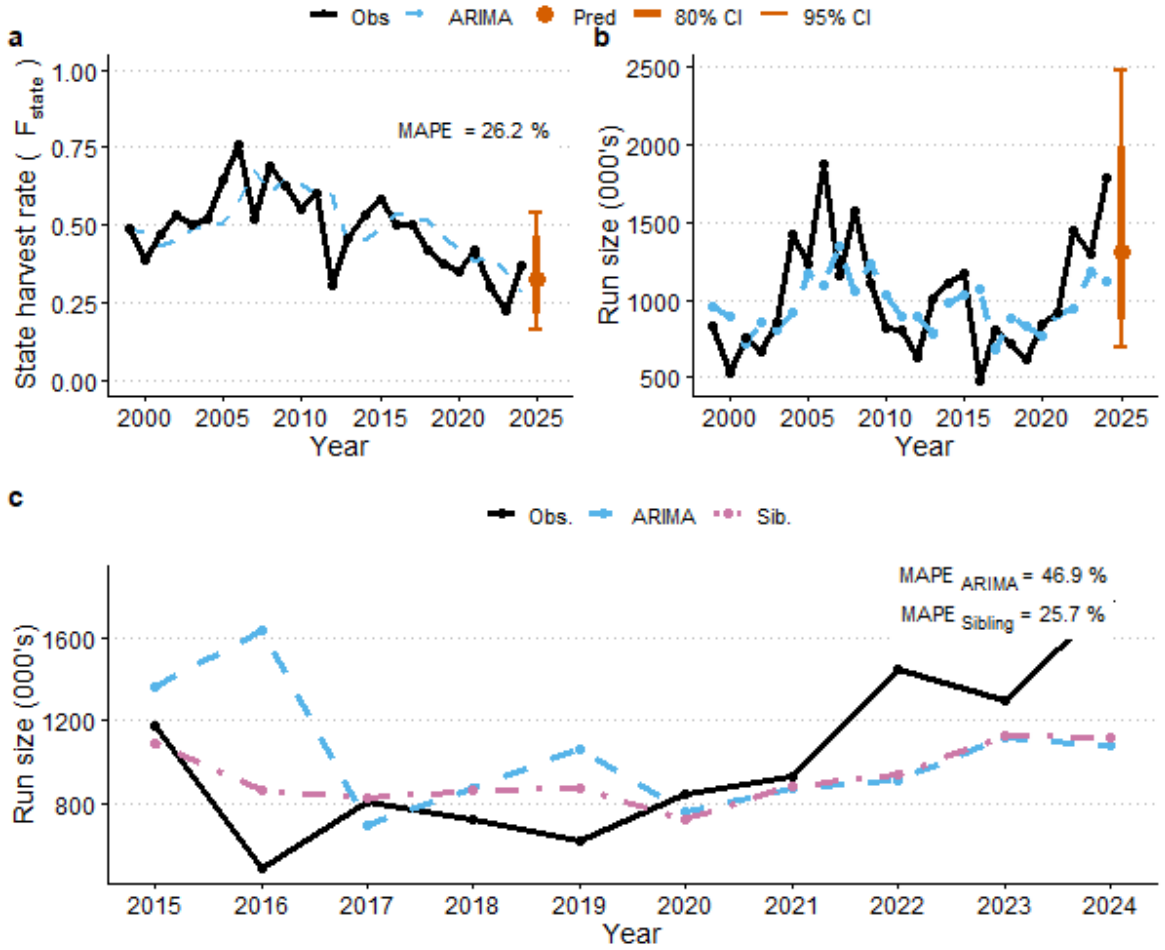
KASILOF SOCKEYE SALMON (KASOCK) SPAWNER-RECRUITMENT CHARACTERISTICS: PRODUCTIVITY

- Declining productivity
- Recent escapements are ~ 1M fish.
  - Recent escapements:
    - 2022 = 968K
    - 2023 = 933K
    - 2024 = 1.05M
  - *Potentially* below replacement



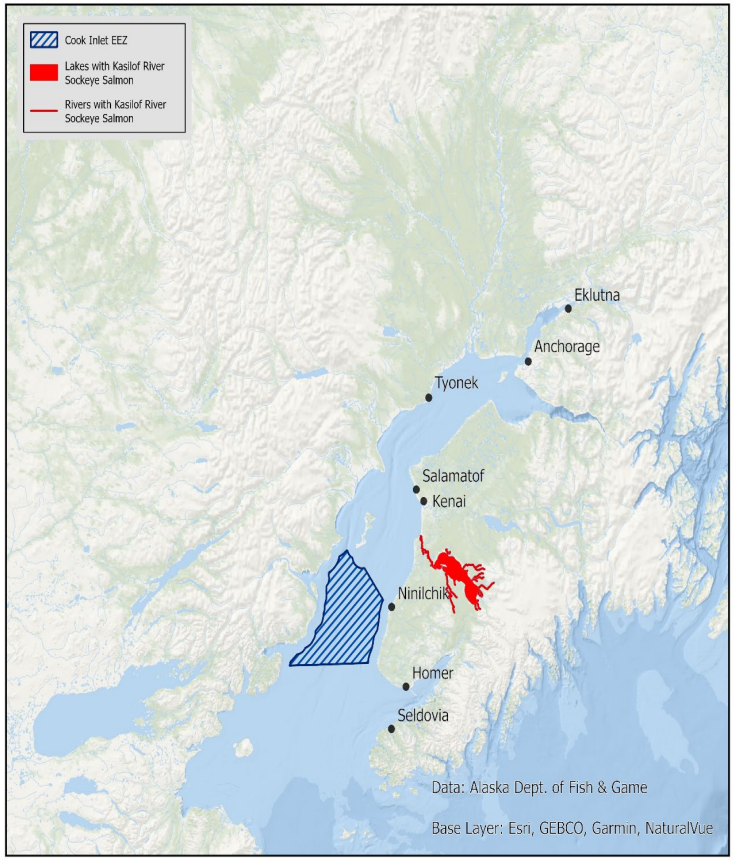
KASILOF SOCKEYE SALMON (KASOCK) FORECASTING RESULTS (Section 7.3)

- 2025 forecasted run size = 1.313M (b)
  - AR(1,0,0)
- 2025 forecasted F_{STATE} = 32.5% (a)
  - AR(0,1,1)
- Comparison of forecast models (c)
  - State vs Federal run size forecast
  - State sib model MAPE = 25.7%
  - Federal AR1 MAPE = 46.9%
  - State forecast is 1.24M



KASILOF SOCKEYE SALMON (KASOCK) STOCK SUMMARY (Section 7.3)

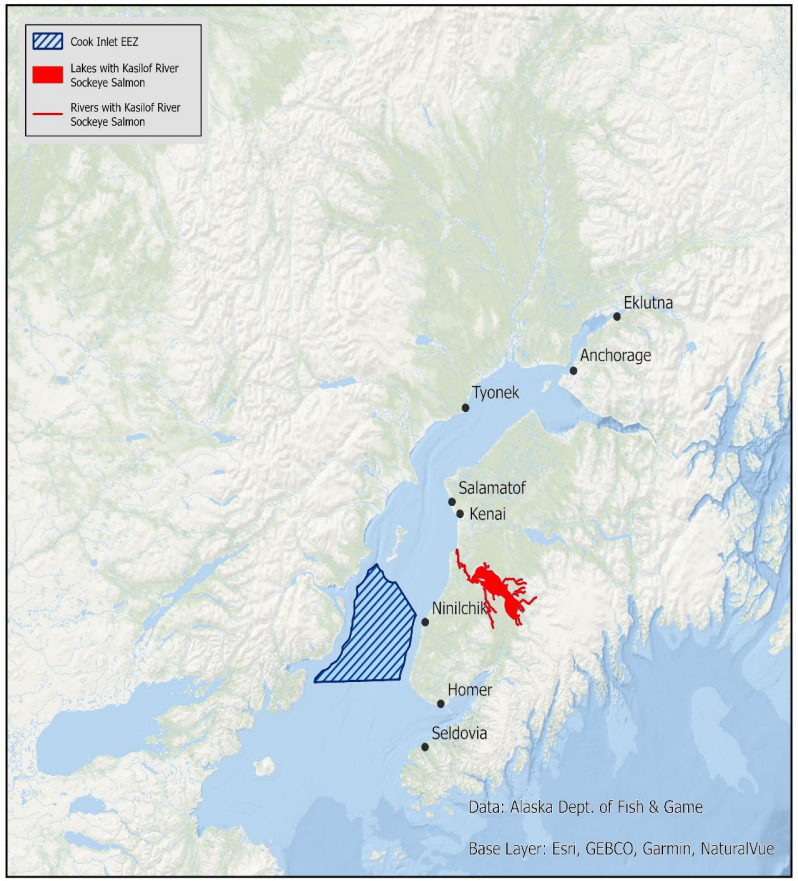
- Not overfished 2024:
  - MSST (555K) << Cumulative Escapement (4.01M)
- No overfishing in 2024:
  - F_{EEZ} (0.036)<< MFMT (0.495)
- Substantial potential yield in EEZ
  - amount depending on escapement target ($S_{MSY\text{-}POINT}$ vs L.B.)



KASILOF SOCKEYE SALMON (KNSOCK) TIER 1 RECOMMENDATIONS (Section 7.3)

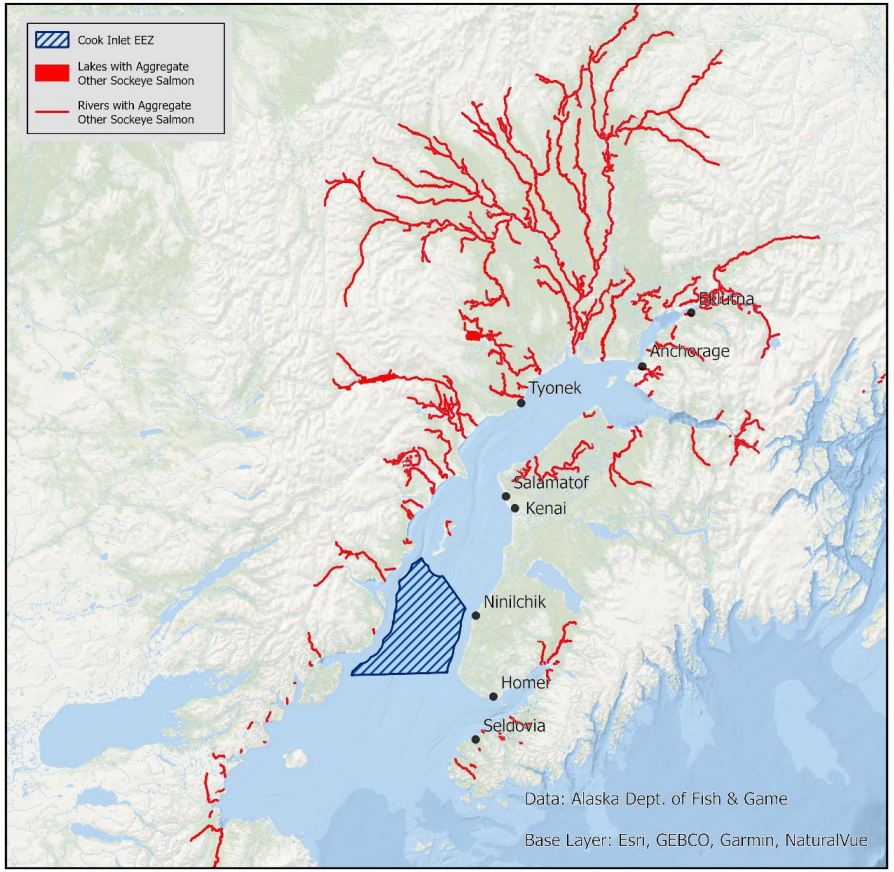
Recommendations:

- Tier……1
- MFMT……0.572
- MSST……350,000 fish
- OFL_{PRE}……746,294 fish
- Buffer……57%
- ABC ……320,841
- ACL = ABC

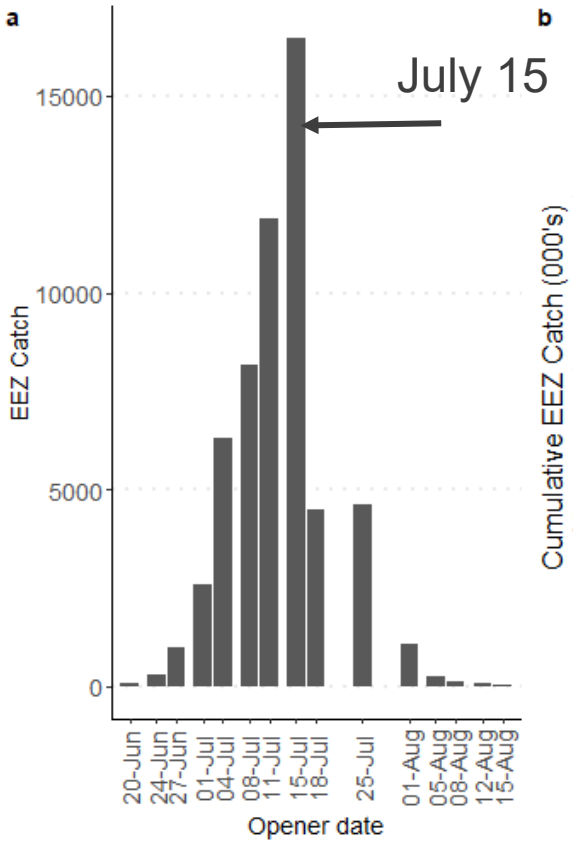


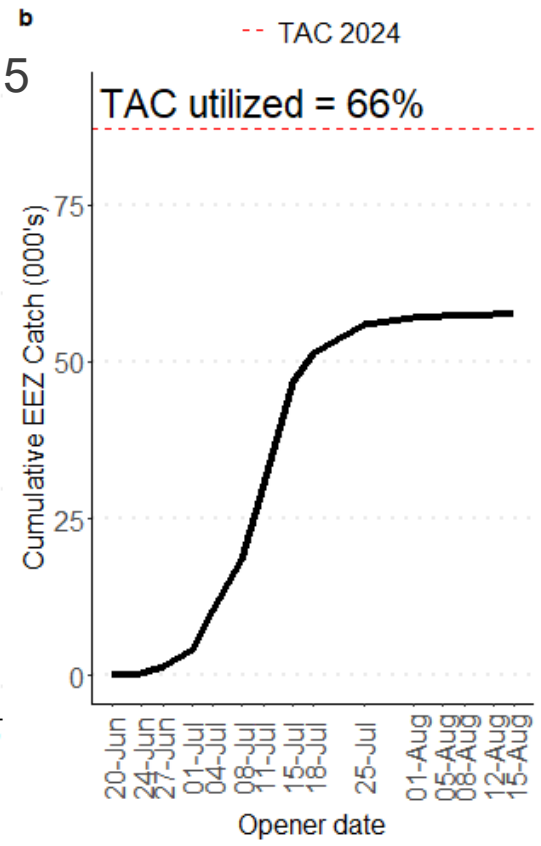
AGGREGATE "Other" SOCKEYE SALMON (AOSOCK) TIER 3 (Section 7.4)

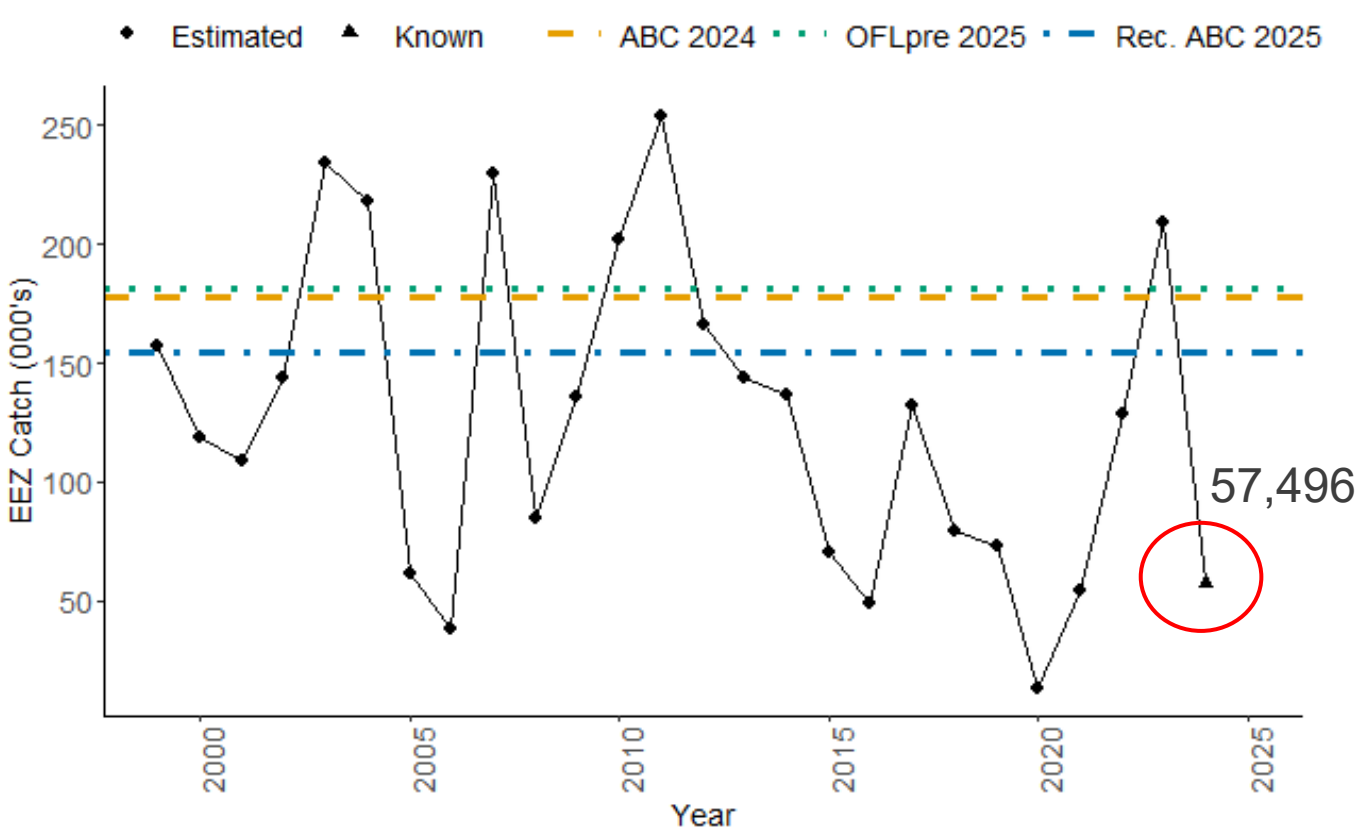
- All other UCI sockeye salmon harvested in the CI EEZ, except Kenai and Kasilof stocks.
- Four indicator stocks:
  - Fish Creek (15,000 - 45,000)
  - Chelatna Lake (20,000 - 45,000)
  - Judd Lake (15,000 - 40,000)
  - Larson Lake (15,000 - 35,000)
  - **Sum of lower bounds = 65K**
- Indicator stocks allow for making an Overfished determination (i.e., MSST vs. Cumulative Esc) for Tier 3 stocks.
  - Must have reliable indices of escapement



AGGREGATE “Other” SOCKEYE SALMON (AOSOCK) 2024 CI EEZ FISHERY (Section 7.4)





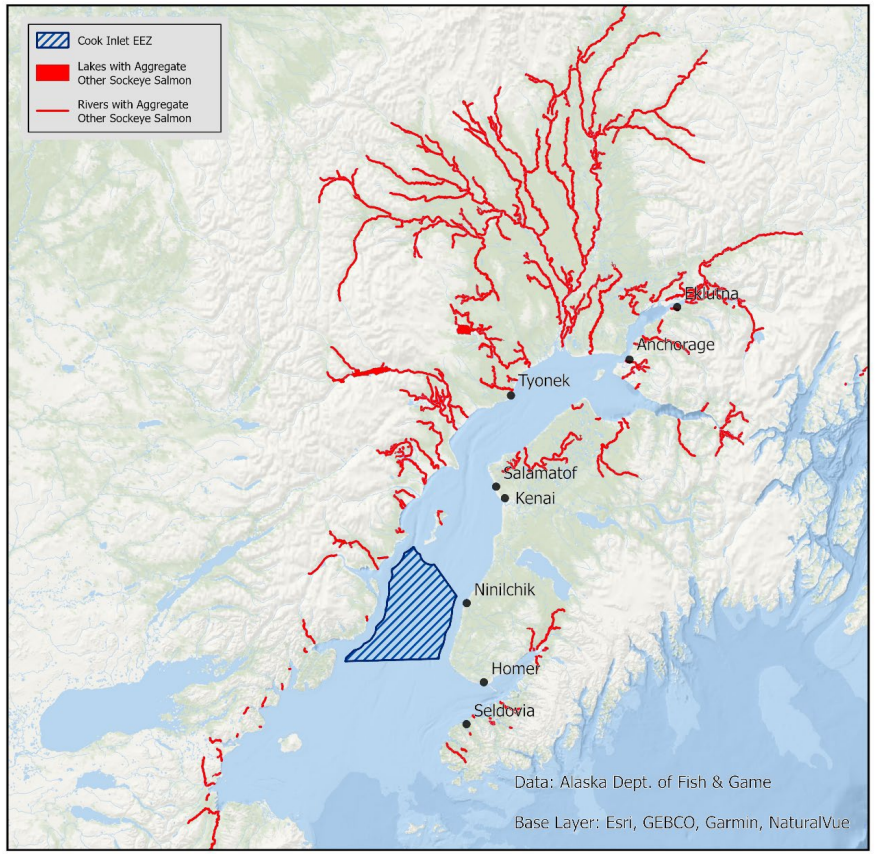


Tier 3 SDC EXPLAINED

- Tier 3 SDC dependent on historic EEZ catch estimates
- OFL = max rolling sum of CI EEZ catch over a species generation time (1999 – 2024)
- OFL_{PRE} = average EEZ catch of OFL year range(max rolling average for a generation 1999 - 2024)
- ***Overfishing*** determined postseason based on the OFL
  - OFL vs. Cumulative Harvest (summed over a generation time)
- ***Overfished*** determination for Tier 3 stocks **with** indicator systems (AOSOCK, ACHIN, COHO)
    - MSST vs. Cumulative Escapement (summed over a generation time)
- Buffer Range = 10 - 90%

AGGREGATE “Other” SOCKEYE SALMON (AOSOCK) STOCK SUMMARY (Section 7.4)

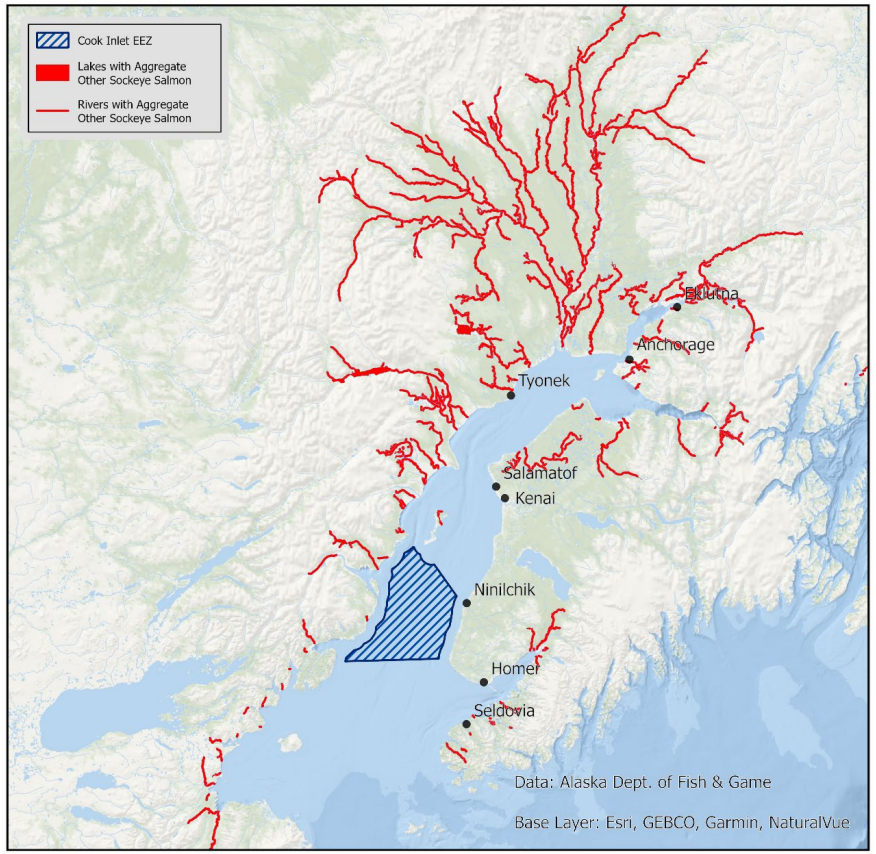
- Not overfished:
  - Cumulative Escapement (529K) >> MSST (163K)
- No overfishing in 2024:
  - Cumulative Harvest (463K) << OFL (1.271M)



AGGREGATE "Other" SOCKEYE SALMON (AOSOCK) 2025 TIER 3 ABC/ACL RECOMMENDATIONS (Section 7.4)

Recommendations:

- Tier……3
- MSST……..163,000
- OFL……906,757 fish
- OFL_{PRE}……181,351 fish
- Buffer……15%
- ABC ……154,148 fish
- ACL = ABC
- 2025 State forecast estimates: ~1.01M for total run size



AGGREGATE "Other" SOCKEYE SALMON (AOSOCK) TIER 3 ABC/ACL RECOMMENDATIONS (Section 7.4; Table 17)

Buffer justification (15%)

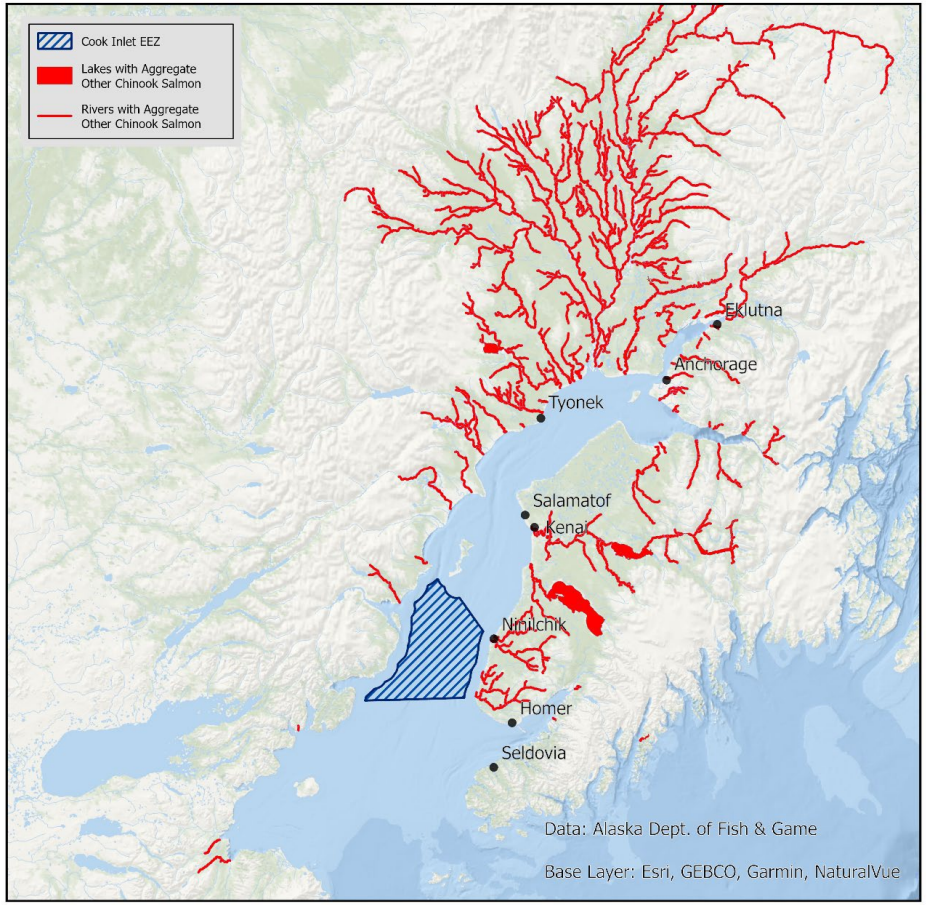
- Buffer range 10 - 90% (low concern - high concern)
- Indicator stocks have met escapement targets in recent years.
  - 2024: No Survey (NS) Chelatna or Judd Lk.
- Total run size likely comparable to KASOCK based on State publication (~1.01M for 2025)
- Buffer accounts for uncertainty in ensuring that OFL_{PRE} is not exceeded

Year	Chelatna Lk.		Judd Lk.		Larson Lk.		Fish Ck.		Sum of L.B.	Sum Esc.
	L.B	Esc.	L.B.	Esc.	L.B	Esc.	L.B.	Esc.		
2020	20	NS	15	31	15	**12**	15	64	65	108[a]
2021	20	NS	15	49	15	22	15	99	65	171[a]
2022	20	NS	15	38	15	17	15	59	65	115[a]
2023	20	NS	15	**NS**	15	38	15	45	65	83[a,b]
2024	20	NS	15	NS	15	16	15	38	65	54[a,b]

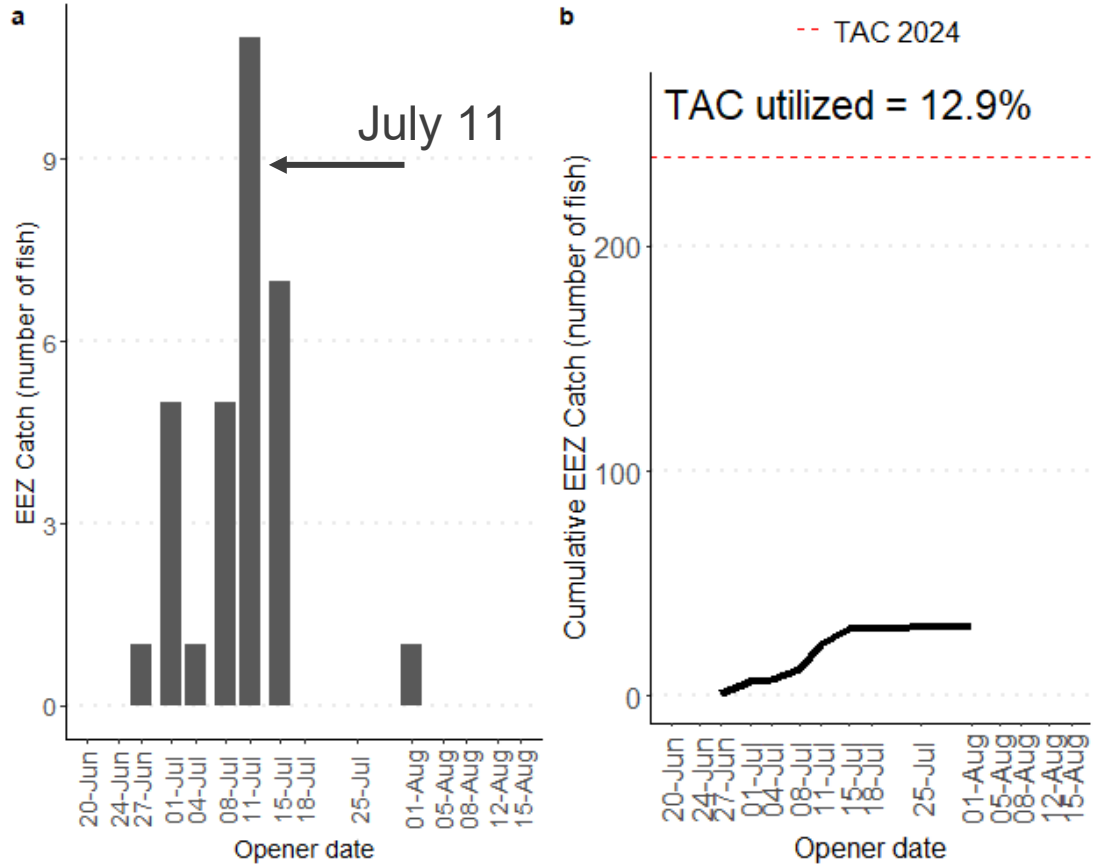
***Bolded** values indicate escapements below the lower bound of the goal.

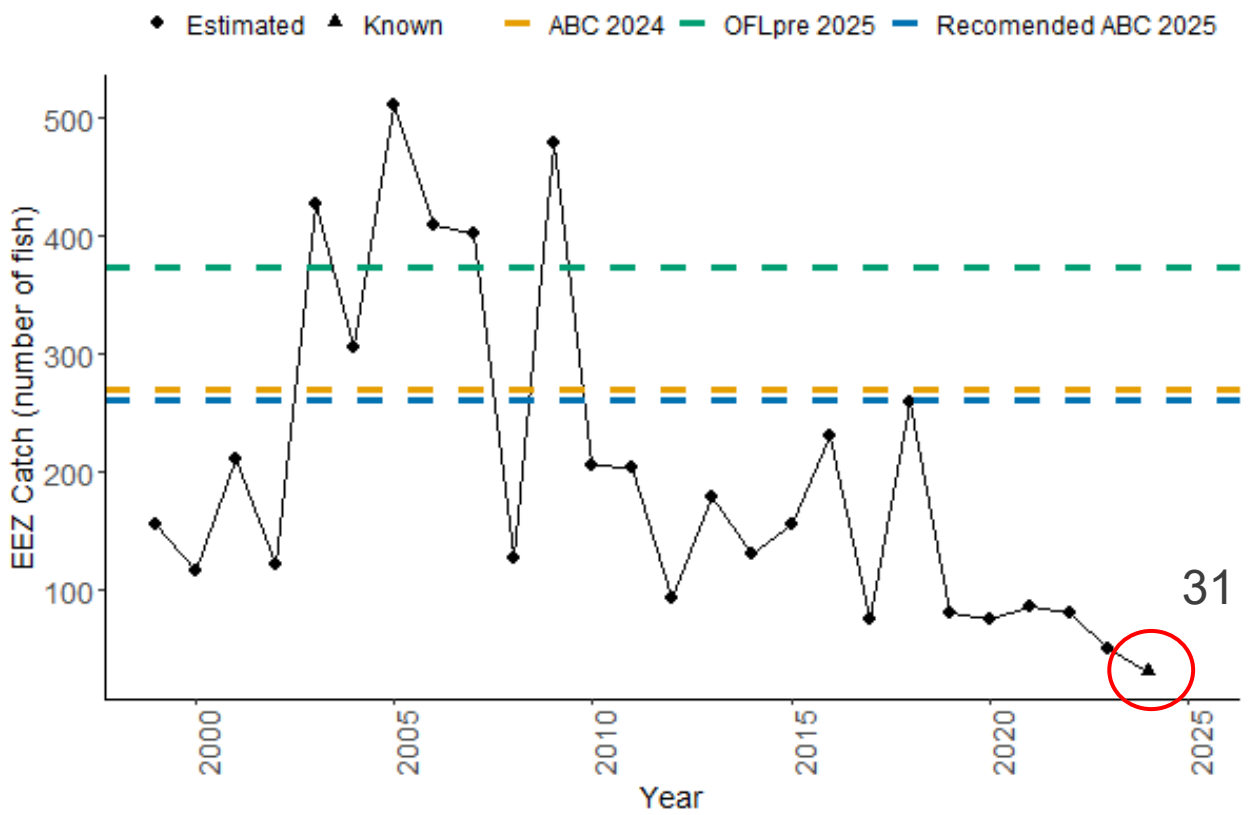
AGGREGATE CHINOOK SALMON STOCK COMPLEX (ACHIN) TIER 3 (Section 7.5)

- All UCI Chinook salmon harvested in the CI EEZ
- Generation time = 6 years
- Indicator stock:
  - Kenai River Late Large Chinook Salmon (15,000 - 30,000)
    - Only Chinook salmon >75 cm METF (~ >13 lbs.)
- Indicator stocks allow for making an Overfished determination (i.e., MSST vs. Cumulative Esc) for Tier 3 stocks.



AGGREGATE CHINOOK SALMON STOCK COMPLEX (ACHIN) 2024 CI EEZ FISHERY (Section 7.5)

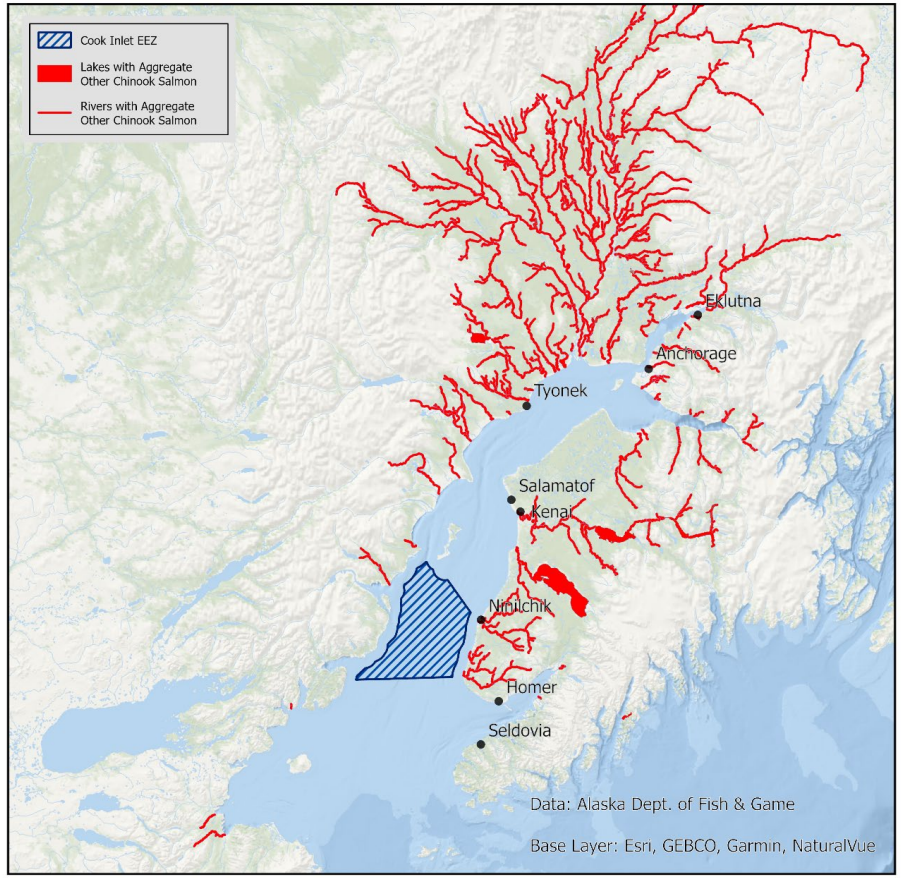




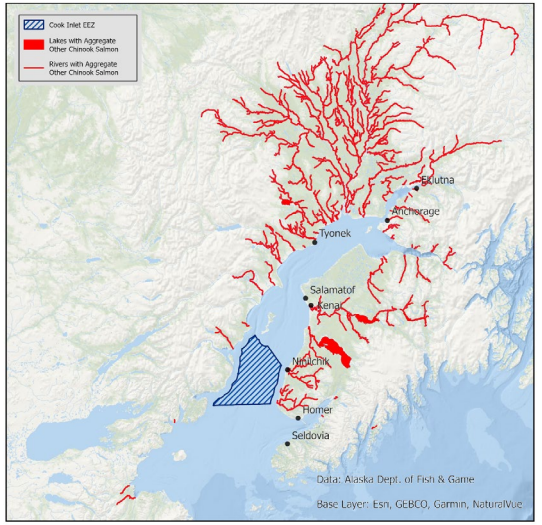
- Max sockeye catch July 15
- 31 Chinook harvested

AGGREGATE CHINOOK SALMON STOCK COMPLEX (ACHIN) STOCK SUMMARY (Section 7.5)

- Not overfished:
  - Cumulative Escapement (70.8K) > MSST (40.5K)
- No overfishing in 2024:
  - Cumulative Harvest (406) << OFL (3,072)



AGGREGATE CHINOOK SALMON STOCK COMPLEX (ACHIN) 2024 CI EEZ FISHERY (Section 7.5)

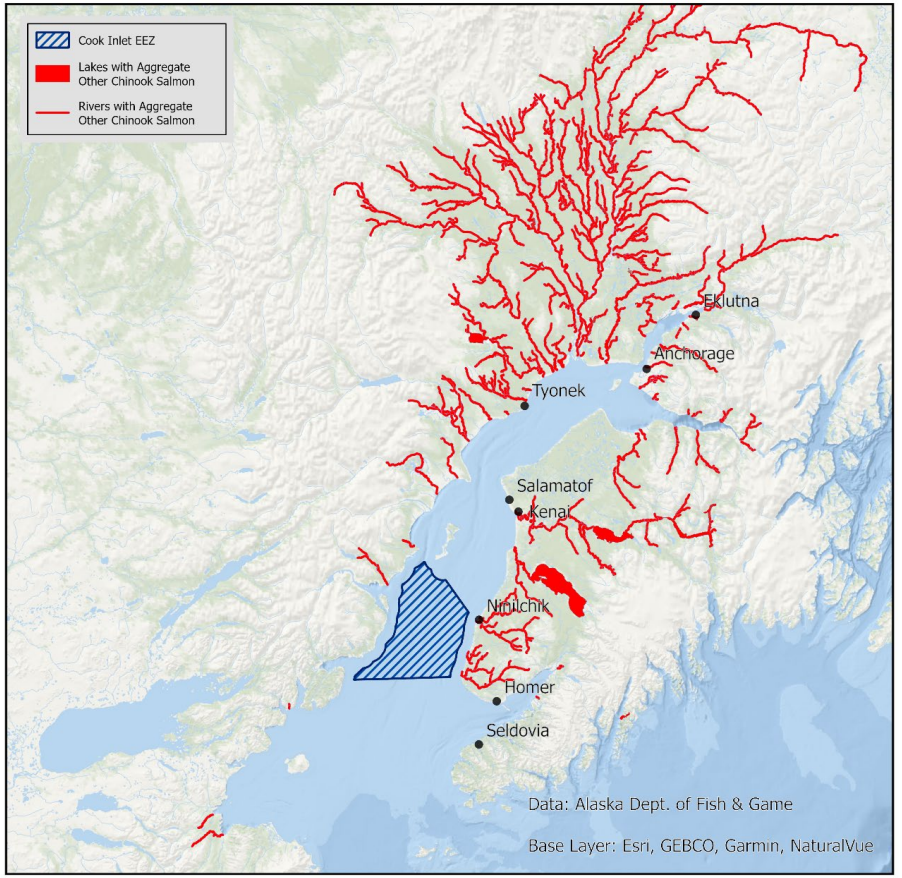


- Kenai Large Late Run Chinook Salmon (>75cm METF: > 13 lbs)
  - State lists as a State “Stock of Concern” in 2024.
  - Of the weighed 2024 EEZ harv. Chinook, only 2 were estimated to be >75cm MEFT
  - Chinook salmon caught in the CI Central Dist. 2018 - 2022:
    - Avg weight was 8.2, 9, 10.8, 7.8, 7.7 lbs., respectively
  - Genetic samples from UCI Central Dist. sport harvest in 2014 - 2018 (Schuster et al. 2021) indicate:
    - 77 - 92% of sport caught Chinook originated from *outside CI*
    - 0.3 - 12.7% were Kenai River Chinook salmon

AGGREGATE CHINOOK SALMON STOCK COMPLEX (ACHIN) TIER 3 ABC/ACL RECOMMENDATIONS (Section 7.5)

Recommendations:

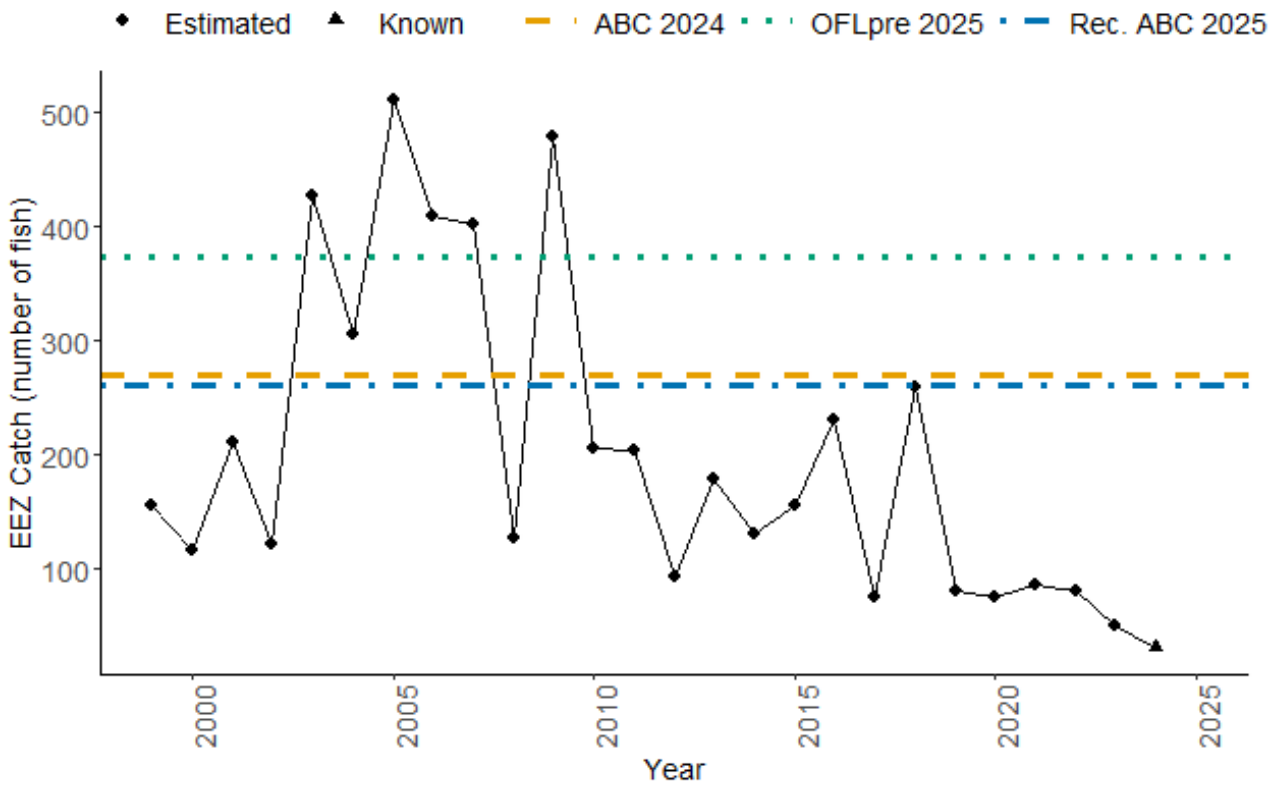
- Tier……..3
- MSST……45,000
- OFL……2,237 fish
- OFL_{PRE}……..373 fish
- Buffer……30%
- ABC ……..261 fish
- ACL = ABC



AGGREGATE CHINOOK SALMON STOCK COMPLEX (ACHIN) TIER 3 ABC/ACL RECOMMENDATIONS (Section 7.5)

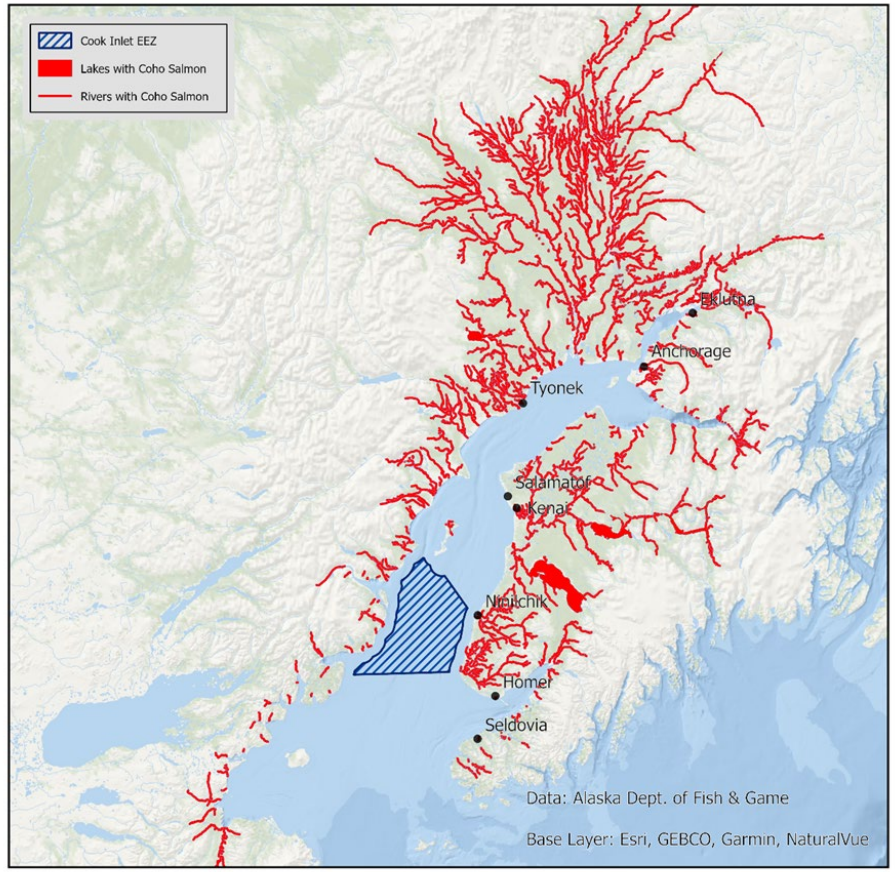
Buffer justification (30%)

- Buffer range 10 - 90% (low concern - high concern)
- Indicator stock not in, or approaching overfished
  - But is a State “Stock of Concern”
- Not thought to be targeted in CI EEZ (commercial)
- Genetics & weight indicate that Kenai R. Chinook represent a small proportion of the EEZ catch
- ABC = 261 has not been exceeded since 2009
  - Only exceeded 6 times prior to 2010
- State lists 5 CI Chinook stocks as a “Stock of Concern”

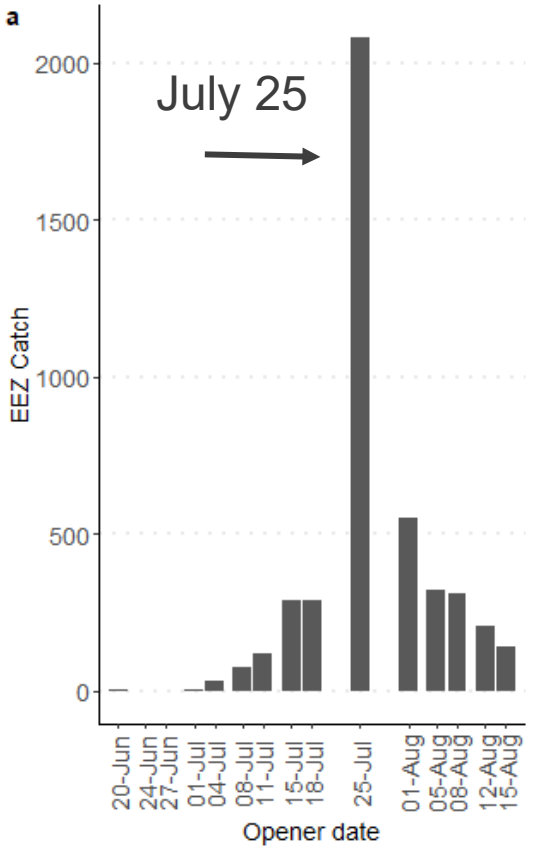


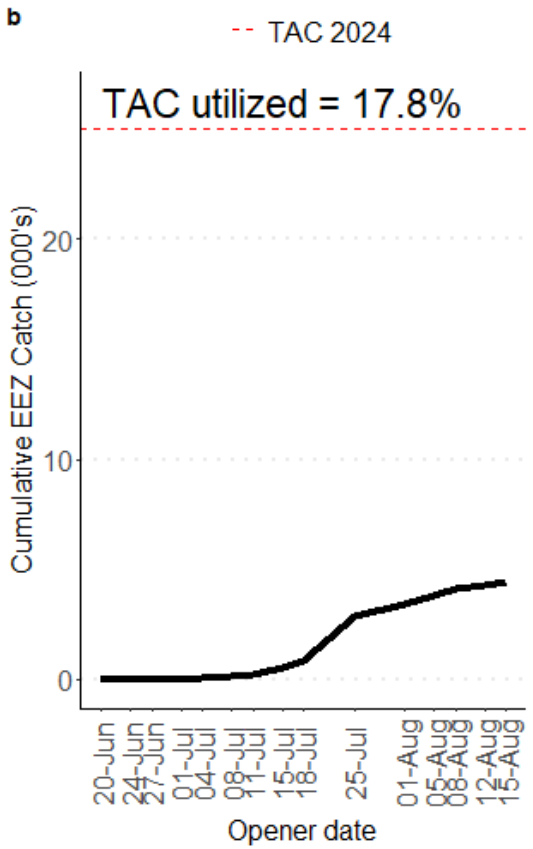
AGGREGATE COHO SALMON STOCK COMPLEX (COHO) TIER 3 (Section 7.6)

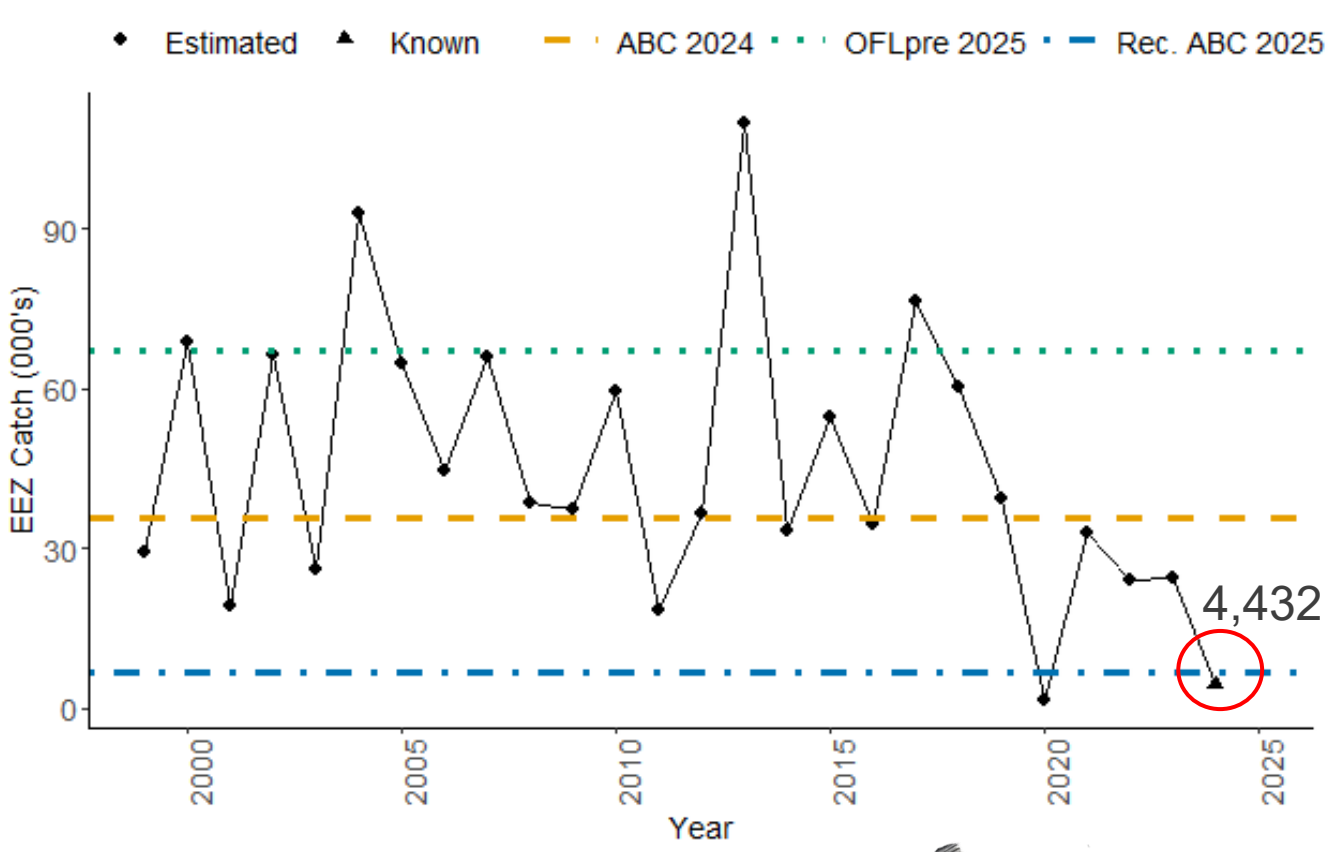
- All UCI coho salmon harvested in the CI EEZ
- Generation time = 4 years
- Indicator stocks:
  - Deshka River (10,200 - 24,100)
  - Little Susitna River (9,200 - 17,700)
- Indicator stocks allow for making an Overfished determination (i.e., MSST vs. Cumulative Esc) for Tier 3 stocks.
  - Must have reliable indices of escapement



AGGREGATE COHO SALMON STOCK COMPLEX (COHO) 2024 CI EEZ FISHERY (Section 7.6)







AGGREGATE COHO SALMON STOCK COMPLEX (COHO) STOCK SUMMARY (Section 7.6; Table 24)

- Deshka River
  - **No counts in 2020 & 2021**
  - Incomplete counts in 2023 & 2024 (Flooding)
  - Escapement assumed to **not** be met in 2023 & 2024
- Little Susitna River
  - Incomplete counts 2022 - 2024
  - Escapement assumed to be met in 2022

	Deshka R.		Little Susitna R						
Year	L.B.	Esc.	L.B.	Esc.	Total Esc.	MSST	Cum. Esc.	Total Catch	Total Run
2019	10,200	10,445	10,100	4,229[a]	14,674	40,600	106,848	273,194	287,868
2020	10,200	**NA**	9,200	10,765	10,765	38,800	100,744	226,730	237,495
2021	10,200	**NA**	9,200	10,923	10,923	38,800	57,017	277,020	287,943
2022	10,200	3,168[a]	9,200	3,162[a,b]	6,330[a]	38,800	42,692[a]	214,514	220,844
2023	10,200	1,817[a,c]	9,200	3,726[a,c]	5,543[a]	38,800	33,561[a]	196,778	202,321
2024	10,200	642[a,c]	9,200	964[a,c]	1,606	38,800	24,402[a]	135,469	137,075

[a]Incomplete weir count
[b]ADF&G considers the escapement goal met
[c]ADF&G estimates the escapement goal was not met

AGGREGATE COHO SALMON STOCK COMPLEX (COHO) STOCK SUMMARY (Section 7.6; Table 24)

- **Assuming** escapement was met in the Little Susitna in 2022, and met and monitored in Deshka in 2020 & 2021:
  - 2023 Est Cum Esc = 58,899
  - 2024 Est Cum Esc = 40,540
  - These est. do not include uncounted fish in 2022 - 2024 (a), or any fish over the Deshka escapement in 2020 & 2021.

	Deshka R.		Little Susitna R						
Year	L.B.	Esc.	L.B.	Esc.	Total Esc.	MSST	Cum. Esc.	Total Catch	Total Run
2019	10,200	10,445	10,100	4,229[a]	14,674	40,600	106,848	273,194	287,868
2020	10,200	**NA**	9,200	10,765	10,765	38,800	100,744	226,730	237,495
2021	10,200	**NA**	9,200	10,923	10,923	38,800	57,017	277,020	287,943
2022	10,200	3,168[a]	9,200	3,162[a,b]	6,330[a]	38,800	42,692[a]	214,514	220,844
2023	10,200	1,817[a,c]	9,200	3,726[a,c]	5,543[a]	38,800	**33,561[a]**	196,778	202,321
2024	10,200	642[a,c]	9,200	964[a,c]	1,606	38,800	**24,402[a]**	135,469	137,075

Recommend that COHO are **not overfished** and that future determinations to be based on indicator systems with a **complete and reliable** history of monitoring.

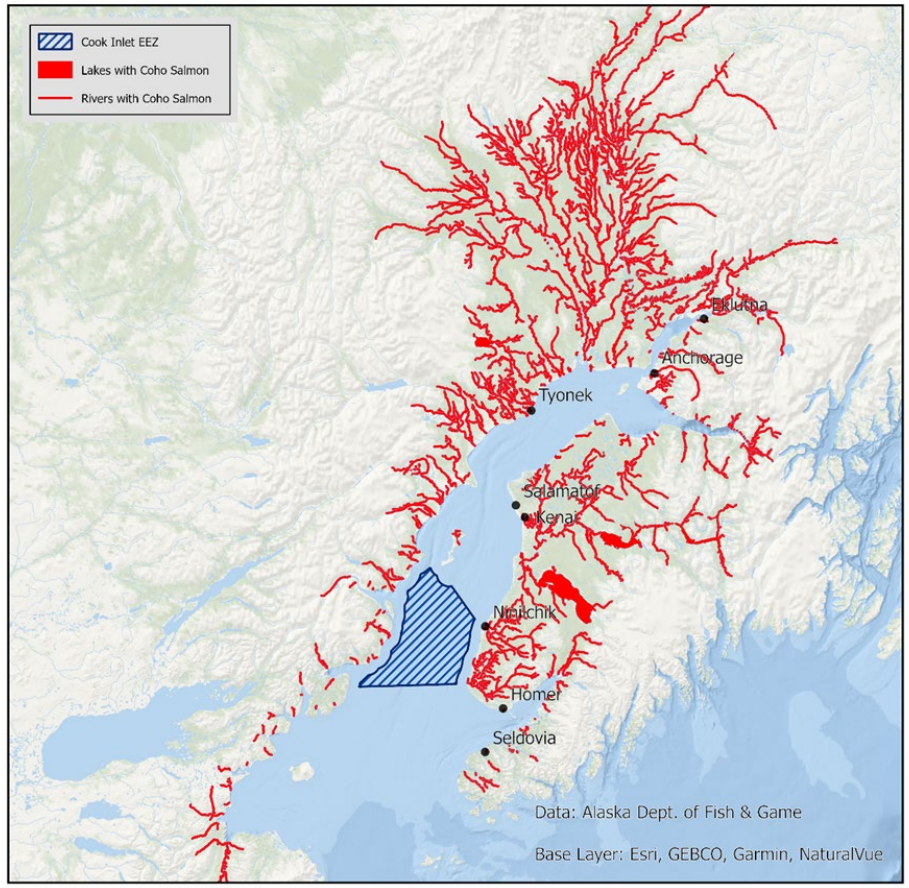
AGGREGATE COHO SALMON STOCK COMPLEX (COHO) STOCK SUMMARY (Section 7.6)

NMFS SAFE Team Recommendations regarding ***future*** COHO overfished SDC

1. (**Preferred recommendation**) Basing MSST (*overfished*) and the associated estimates of spawning escapements only on indicator stocks for which there is considered to be a complete and reliable history of monitoring
    a. (Option 1, preferred): Do not include unmonitored/incomplete stocks in the assessment.
    b. (Option 2): Use modeling approaches to estimate missing escapements for the indicator stocks
2. Similar to aggregate chum and pink salmon stock complexes, recognize a lack of reliable information to determine an overfished status
3. An SSC recommendation not considered by the NMFS SAFE Team

AGGREGATE COHO SALMON STOCK COMPLEX (COHO) STOCK SUMMARY (Section 7.6)

- No overfishing in 2024:
  - Cumulative Harvest (86K) < OFL (439K)
- Not overfished:
  - Cumulative Escapement (40.5K) > MSST (38.8K)
- Recommend that COHO are **not overfished** based on available information
- Recommend that future determinations be based on indicator systems with a **complete and reliable** history of monitoring.
- Requesting feedback from the SSC on this topic



DRAFT RISK TABLE* (Appendix A): AGGREGATE COHO SALMON STOCK COMPLEX (COHO)

Assessment-related	*Population dynamics*	*Ecosystem*	*Fishery-informed stock*
Level 2 – Increased Concern	**Level 3 – Extreme Concern**	**Level 2 – Increased Concern**	**Level 3 – Extreme Concern**
• Tier 3 Stock uses historical EEZ harvest to set SDC. • EEZ harv. prior to 2024 is estimated, resulting in uncertainty. • Elevated concern.	• Coho life history known. • COHO run size unknown. • Little escapement monitoring. • Indicator systems have incomplete monitoring. • Poor returns in 2023 & 2024.	• Short-lived warmer ocean temps in 2024. • Competition with pink salmon (PWS). • Reduced marine survival in other regions (i.e., SE AK). • Avg prey abund. • PDO in negative trend.	• Size makes them susceptible to gillnet harvest. • Total UCI and CI EEZ harvest were historically low (86% and 96% below 20-year avg.). • However, first year of known EEZ harvest.

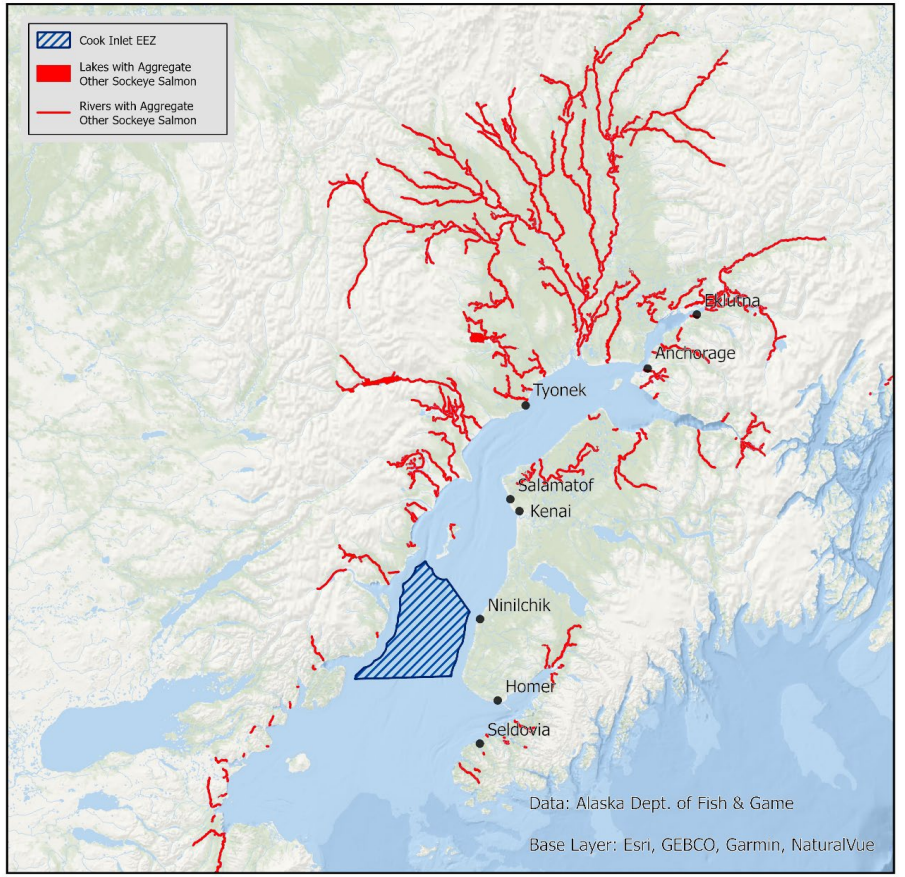
Example taken from assessments for other Federally managed species

AGGREGATE COHO SALMON STOCK COMPLEX (COHO) TIER 3 RECOMMENDATIONS (Section 7.6)

Recommendations:

- Tier……..3
- MSST…….38,800***
- OFL…….268,053 fish
- OFL_{PRE}……..67,013 fish
- Buffer……90%
- ABC ……....6,701 fish
- ACL = ABC

*** Recommend that COHO are **not overfished** and that future determinations to be based on indicator systems with a **complete and reliable** history of monitoring.



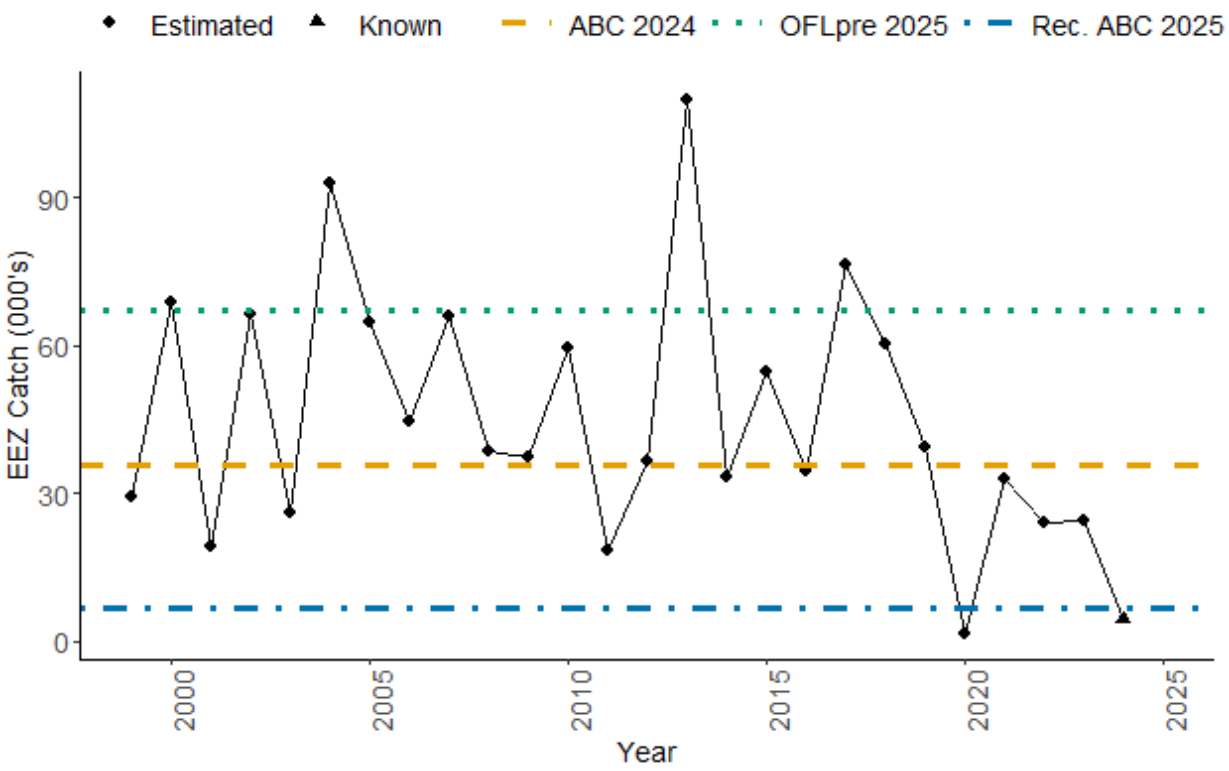
AGGREGATE COHO SALMON STOCK COMPLEX (COHO) TIER 3 ABC/ACL RECOMMENDATIONS (Section 7.6)

Buffer justification (90%)

- Buffer range 10 - 90% (low concern - high concern)
- Indicator Stocks have unreliable monitoring, but assumed that escapement not met in 2023 & 2024
- Size makes coho susceptible to gillnets
- Important prey for CI Beluga Whales
- Risk Table indicates elevated concern

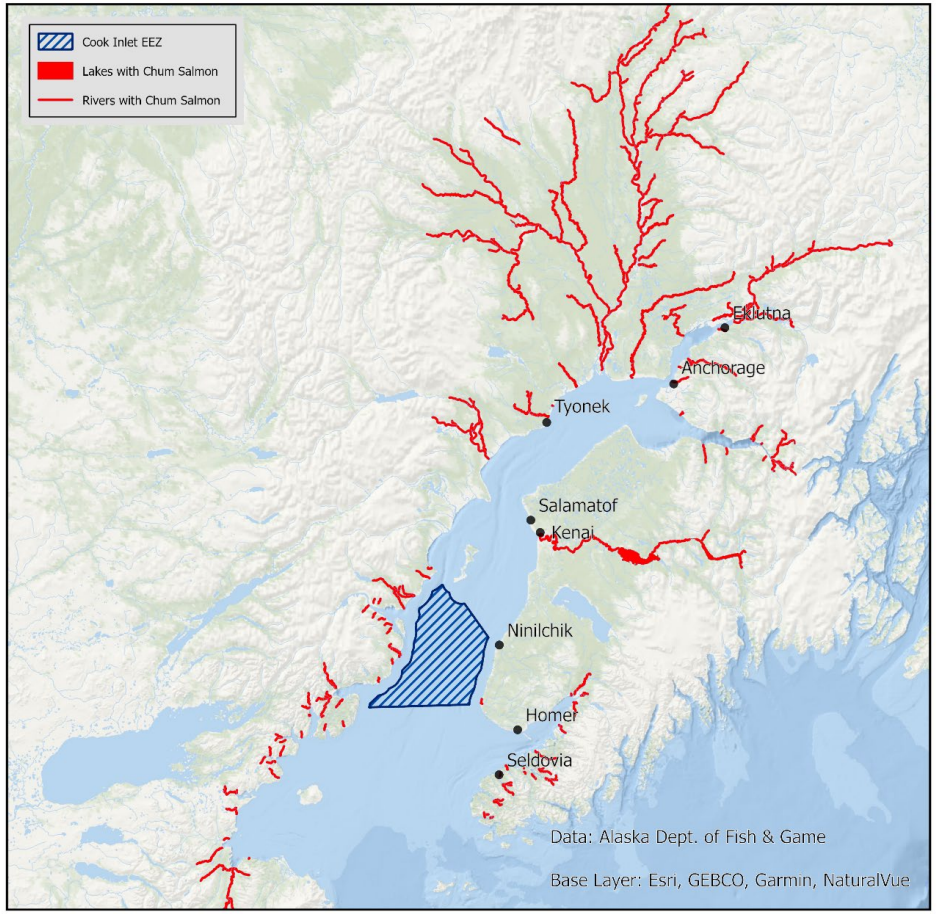
ABC = 6,701 < EEZ harvest in all years except 2020 & 2024.

- Mean EEZ Harvest (1999 - 2021) = 45K
- Min EEZ Harvest (excluding 2020) = 4,434 (2024)
- Max EEZ Harvest = 110K (2013)

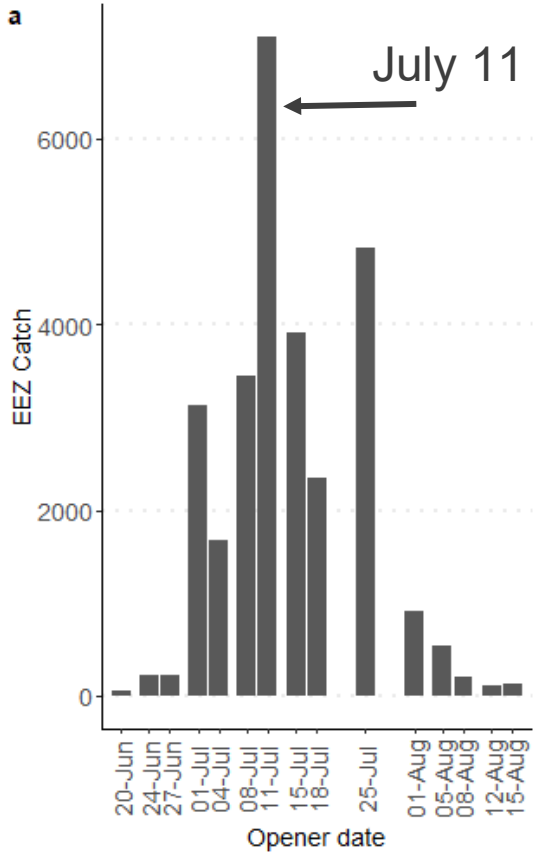


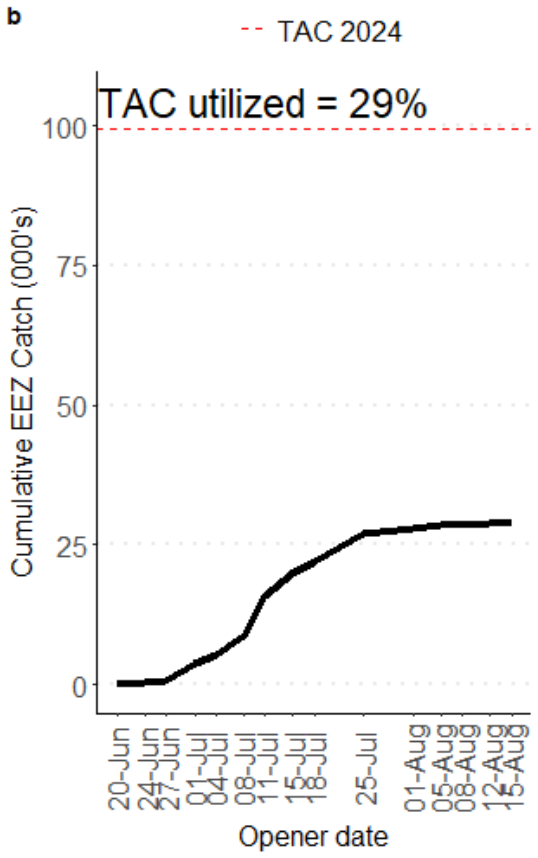
AGGREGATE CHUM SALMON STOCK COMPLEX (CHUM) TIER 3 (Section 7.7)

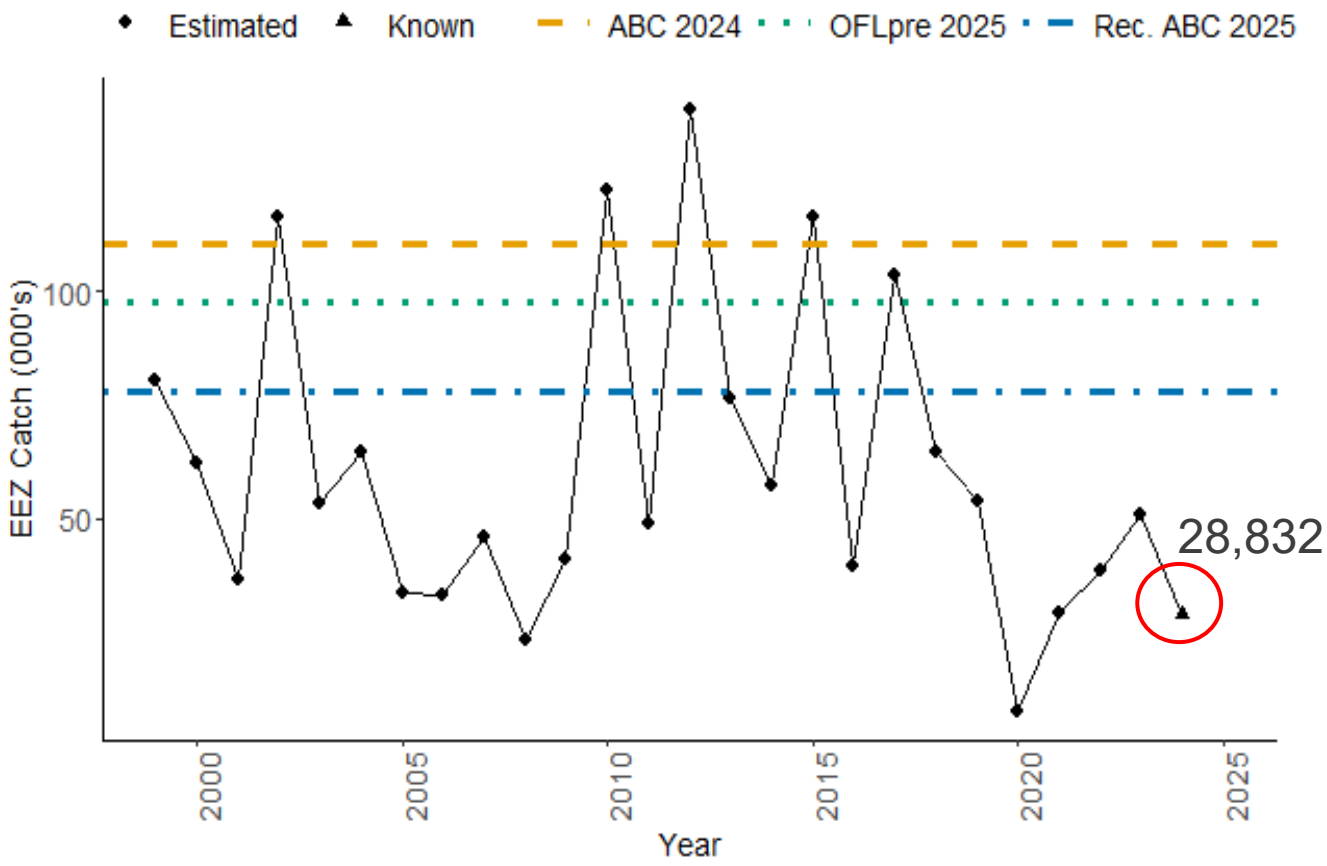
- All UCI chum salmon harvested in the CI EEZ
- Generation time = 4 years
- No Indicator stocks



AGGREGATE CHUM SALMON STOCK COMPLEX (CHUM) 2024 CI EEZ FISHERY (Section 7.7)

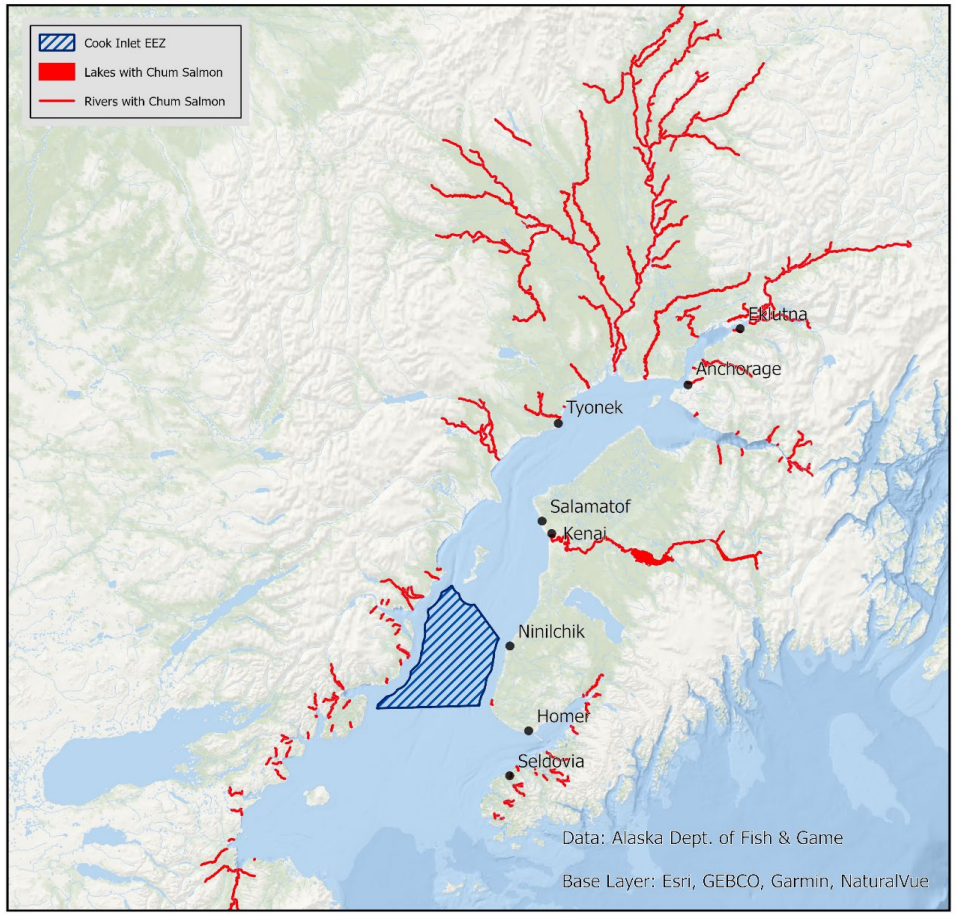






AGGREGATE CHUM SALMON STOCK COMPLEX (CHUM) STOCK SUMMARY (Section 7.7)

- No overfishing in 2024:
  - Cumulative Harvest (148K) < OFL (561K)



AGGREGATE CHUM SALMON STOCK COMPLEX (CHUM) TIER 3 ABC/ACL RECOMMENDATIONS (Section 7.7)

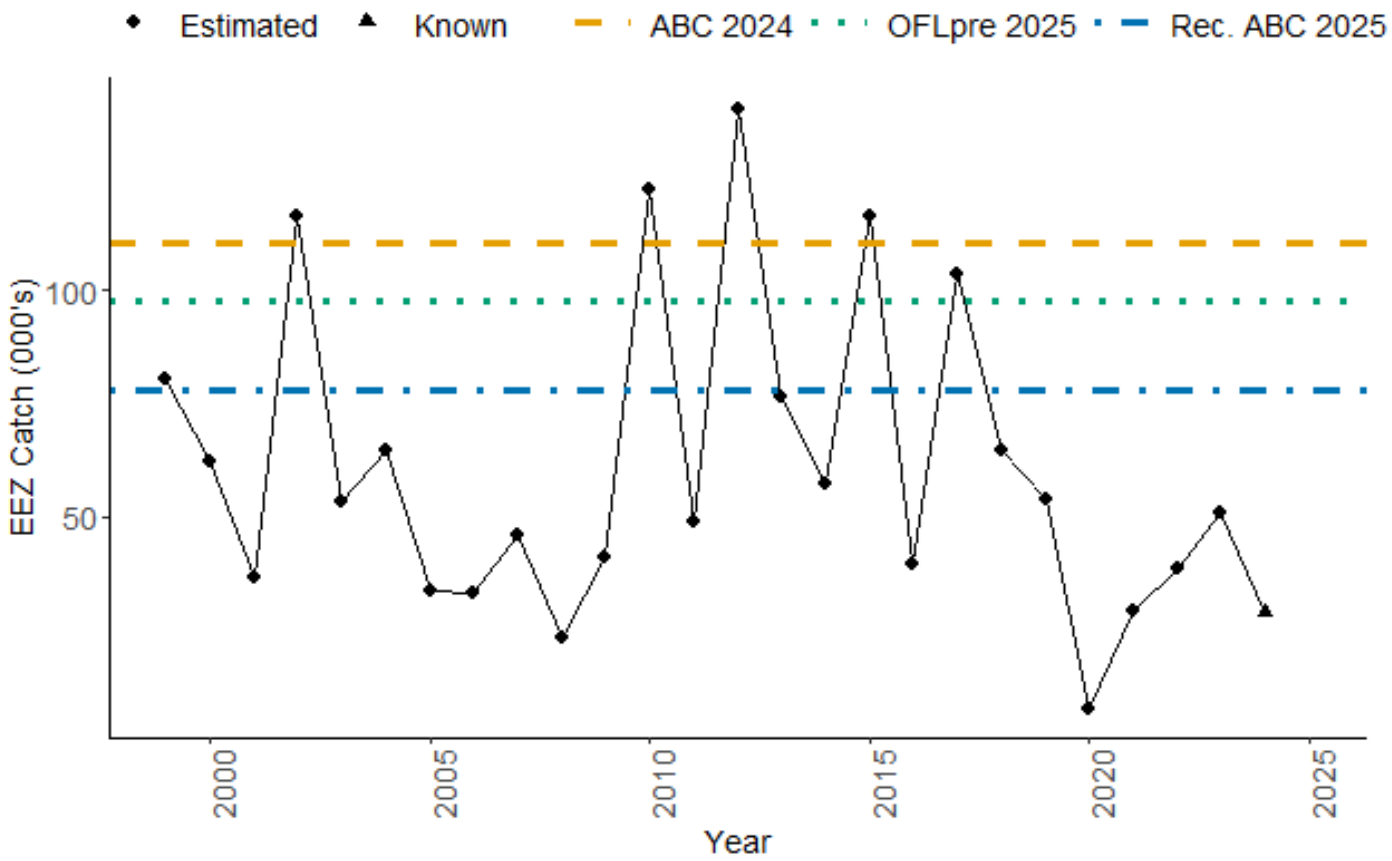
Recommendations:

- Tier……..3
- OFL…….390,030 fish
- OFL_{PRE}……..97,508 fish
- Buffer……20%
- ABC ……....78,006 fish
- ACL = ABC

AGGREGATE CHUM SALMON STOCK COMPLEX (CHUM) TIER 3 ABC/ACL RECOMMENDATIONS (Section 7.7)

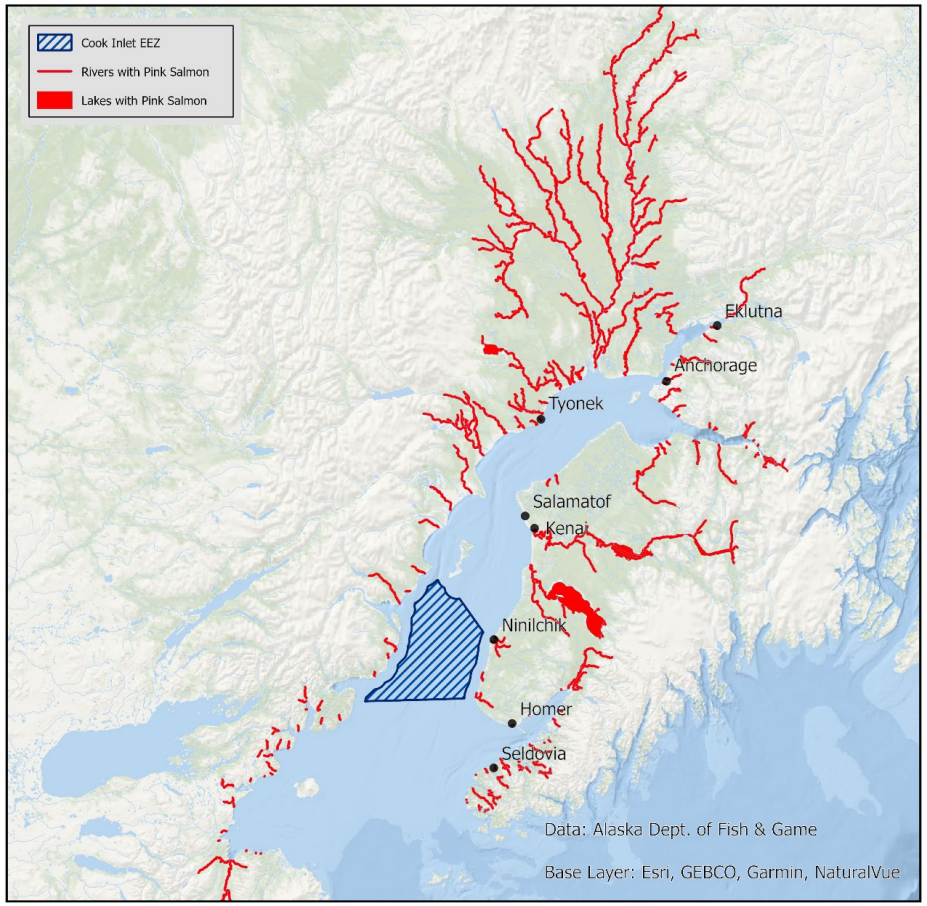
Buffer justification (20%)

- Buffer range 10 - 90% (low concern - high concern)
- Size makes chum susceptible to gillnets
- Historic catch is assumed to be incidental
- Few CHUM watersheds vs. other CI stocks
- ABC = 78K is:
  - ~47K more than the recent 5-year avg.
  - 3 - 62K less than harvest in 1999, 2002, 2010, 2012, 2015 & 2017

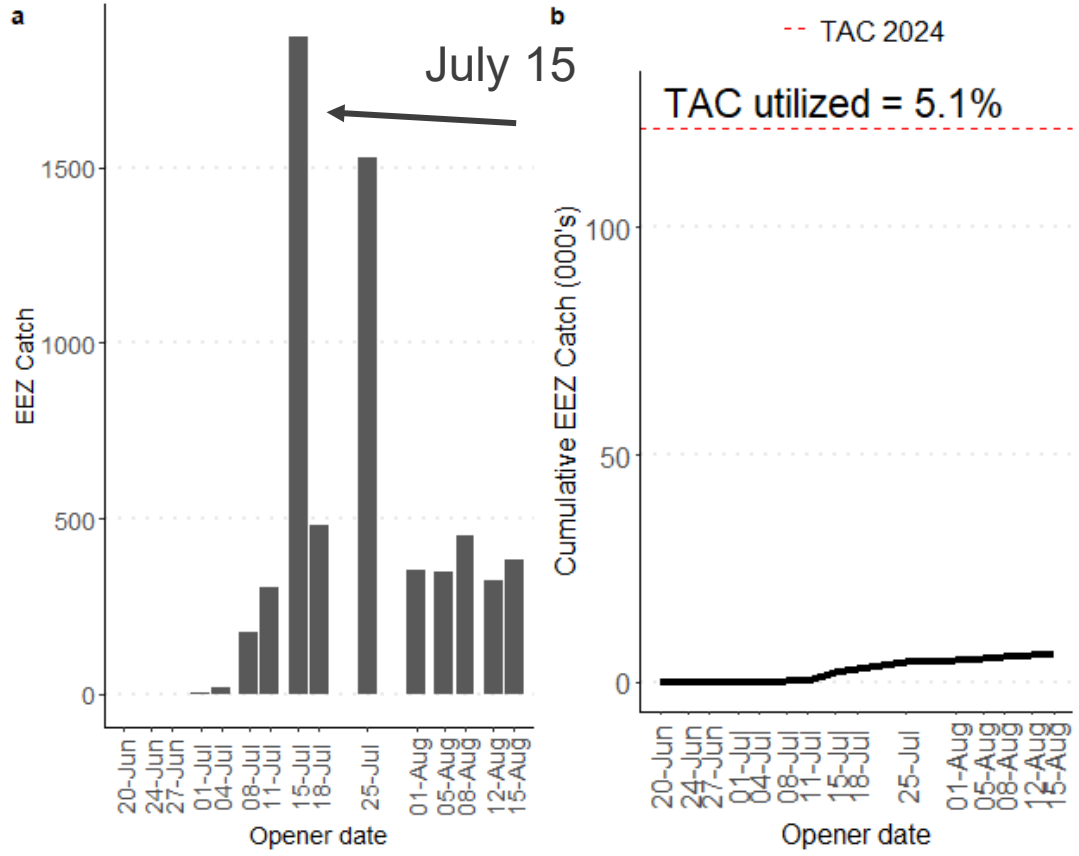


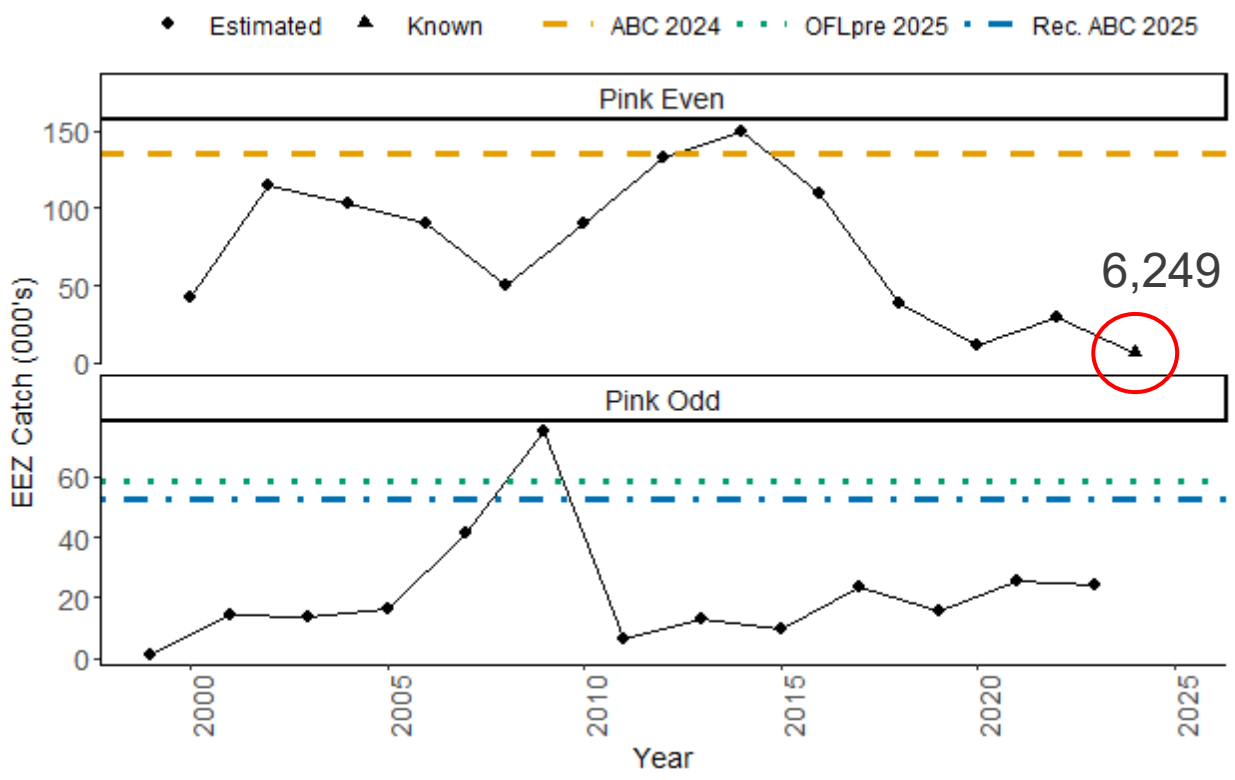
AGGREGATE PINK SALMON STOCK COMPLEX (PINK) TIER 3 (Section 7.8)

- All UCI pink salmon harvested in the CI EEZ
- No Indicator stocks
- Generation time = 2 years
- Strict 2-year life history (even and odd year runs completely separate
- Separate SDC for even- and odd-year classes



AGGREGATE PINK SALMON STOCK COMPLEX (PINK)
2024 CI EEZ FISHERY (PINK EVEN-YEAR CLASS) (Section 7.3)





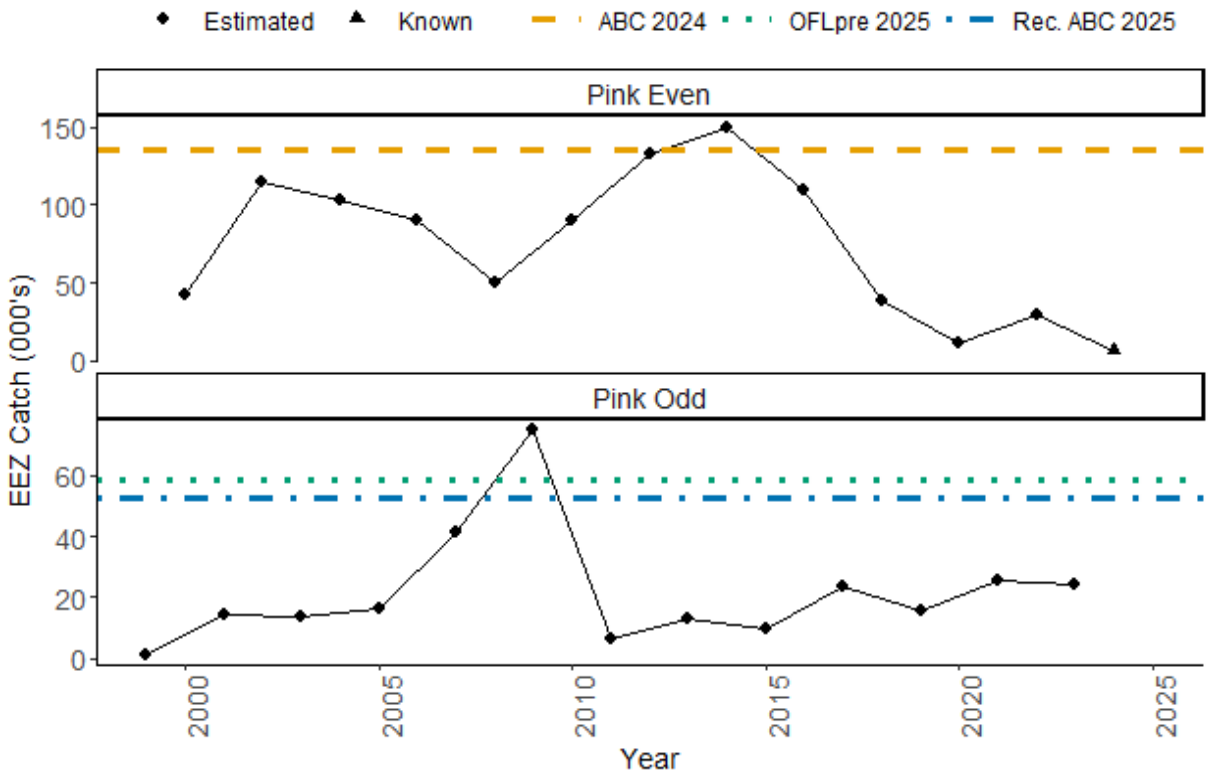
AGGREGATE PINK SALMON STOCK COMPLEX (PINK) STOCK SUMMARY (Section 7.8)

- No overfishing in 2024:
  - Cumulative Harvest (36K) < OFL (300K)

AGGREGATE PINK SALMON STOCK COMPLEX (PINK)
TIER 3 ABC/ACL RECOMMENDATIONS (ODD-YEAR) (Section 7.8)

Recommendations:

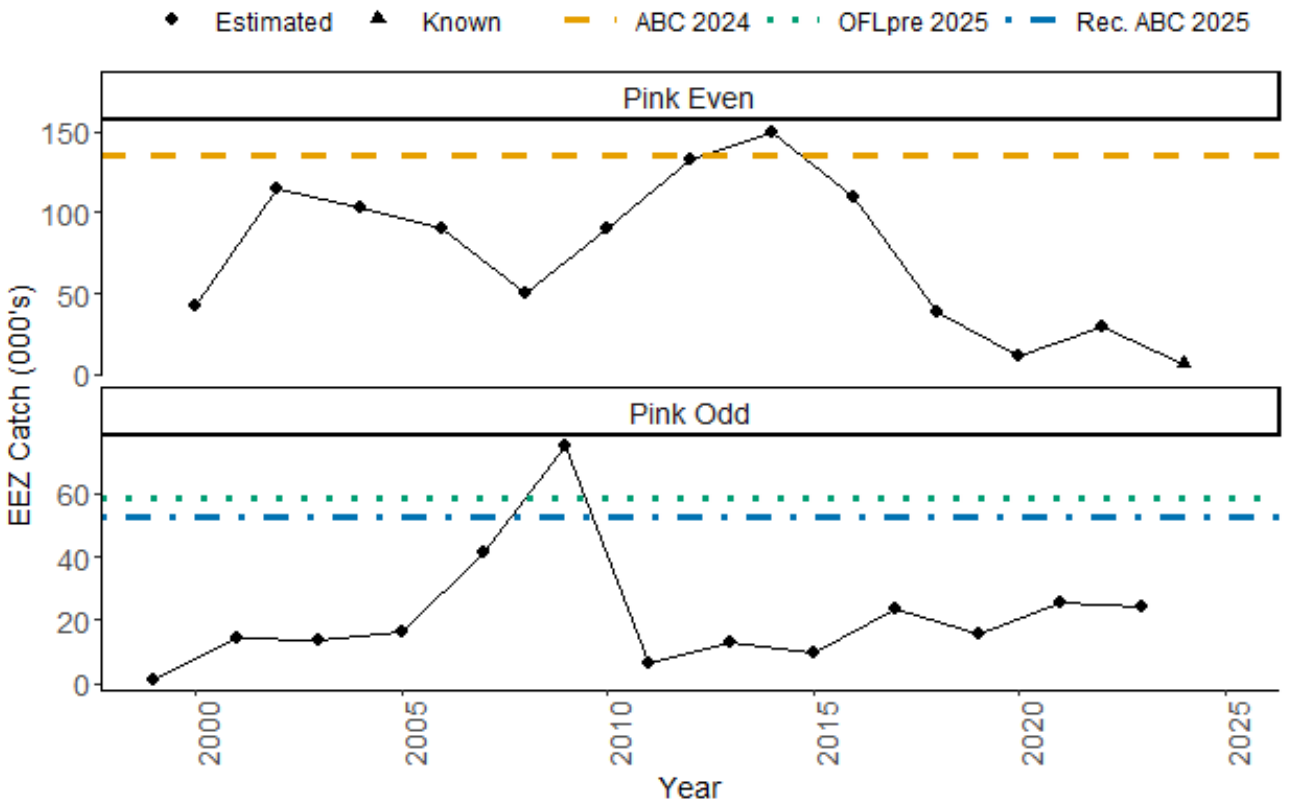
- Tier……3
- OFL……116,348 fish
- OFL_{PRE}……58,174 fish
- Buffer……10%
- ABC ……52,357 fish
- ACL = ABC



AGGREGATE PINK SALMON STOCK COMPLEX (PINK)
TIER 3 ABC/ACL RECOMMENDATIONS (ODD-YEAR) (Section 7.8)

Buffer justification (10%)

- Buffer range 10 - 90% (low - high concern)
- Small size makes PINK less susceptible to gillnets
- Historic catch is assumed to be incidental
- ABC = 52K :
  - Exceeded once for the odd-year class (2008)



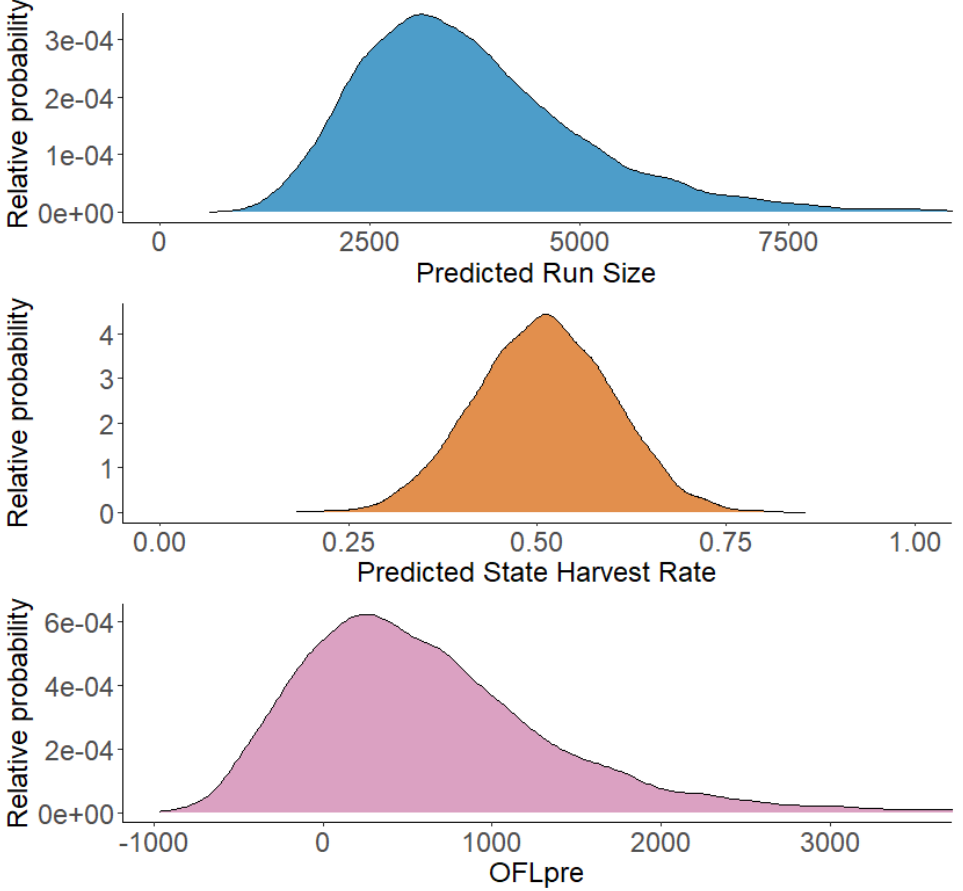
SUMMARY OF NMFS SAFE TEAM RECOMMENDATIONS Section 8

- The lower bound of the State's spawning escapement goals represents S_{MSY} under National Standard 1 Guidelines and is the appropriate value to calculate SDC.
  - Markov yield range (Hilborn and Walters, 1992) represents biological reference point of MSY and S_{MSY}
- Recommend study of genetic mixed stock analysis of salmon caught in the CI EEZ fishery
  - Chinook salmon: CI or other origin?
  - Sockeye salmon: KNSOCK, KASOCK, or AOSOCK?
- Length measurements of Chinook salmon caught in CI EEZ
- Assessment of alternative fishery methods for the CI EEZ
  - Challenge: harvest available yield for high abundance stocks while enabling release or avoidance of species/stocks in a low state of abundant
- 2024 Coho indicator stocks do not represent a complete and reliable index of abundance for COHO and this stock is **not in an overfished condition**.

TIER 1 BAYESIAN OFL MODEL
Appendix B

- Similar to current Tier 1 method
  - AR1 model for forecast
  - White noise model (KNSOCK) or MA (KASOCK) to project State harvest rate
  - However, arima function picks optimal model for each retro year when calculating the buffer. Bayesian model would use same models for each retro year
- Benefits:
  - Results in a distribution of probable OFL values that account for uncertainty in the PF and F_{STATE}.
  - Can make probabilistic statements about potential yield and ABC

$$p(\widehat{OFL}_y) = p(\hat{R}_y) - G_y - [p(\hat{F}_{state,y}) * p(\hat{R}_y)].$$



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Stock	Method	Runsize (000's)	State Harvest (000's)	OFL_{PRE} (000's)
Kenai	Current	3,454	50%	515
	Bayes	3,475	50.8%	472
Kasilof	Current	1,313	32.5%	664
	Bayes	1,348	36.3%	628

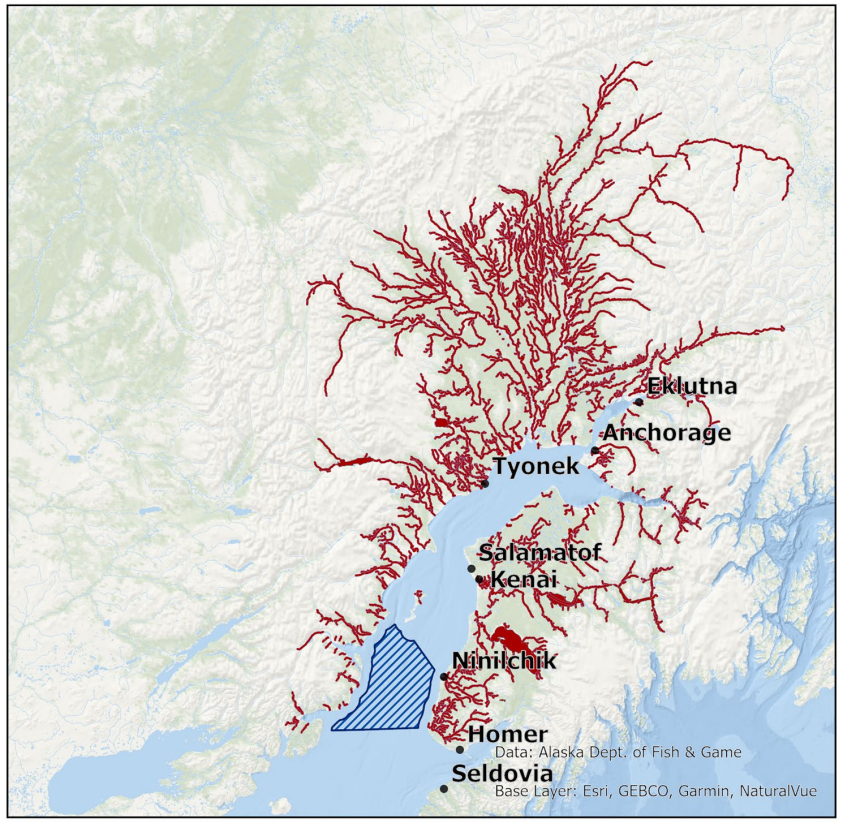
TIER 1 BAYESIAN OFL MODEL
Appendix B

- How to determine the buffer?
  - Retrospective testing and the probability of overforecasting?
  - Salmon plan team?
- Buffer
  - Predict OFL for previous ten years
  - Apply a range of buffers (10 - 90%)
  - Look at how many years the resulting ABC is larger than the observed postseason OFL (OFL_{POST})
  - Choose a buffer based on the risk of overforecasting

Buffer (%) $OFL_{PRE} \rightarrow ABC$	$P(ABC>OFL_{POST})$
10	.40
20	.40
30	.40
40	.20
50	.20
60	.20
70	.20
80	.20
90	.10

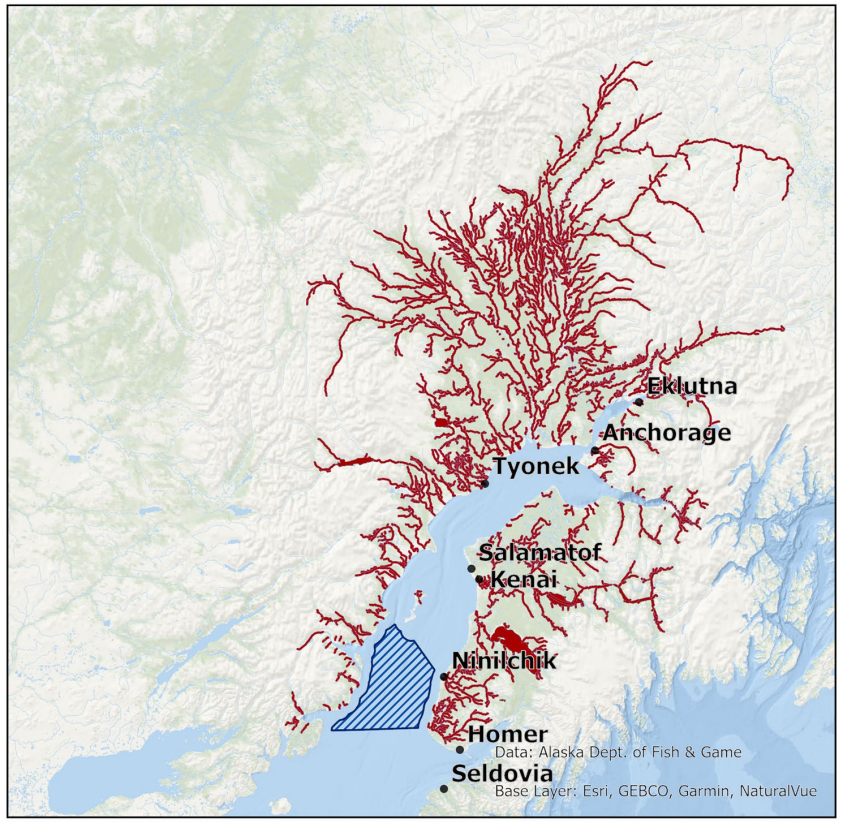
Update on requests for a tribal fishery in the Cook Inlet EEZ Area

- NMFS is consulting with 7 Cook Inlet area Tribes on their request for a Cook Inlet EEZ Area tribal salmon fishery
- NMFS provided feedback on potential management measures requested by the Tribes and suggested that they bring a proposal under staff tasking at the April 2025 NPFMC meeting
- A potential tribal salmon fishery action would need to go through Council development and final action before being implemented by NMFS through rulemaking (2+ year process)
- Consultation Letters can be accessed at:
  - https://www.fisheries.noaa.gov/alaska/consultations/alaska-fisheries-tribal-consultation-documents-and-workgroup#salmon-management-in-the-federal-waters-of-cook-inlet



Discussion of Future FMP changes pertinent to SSC recommendations

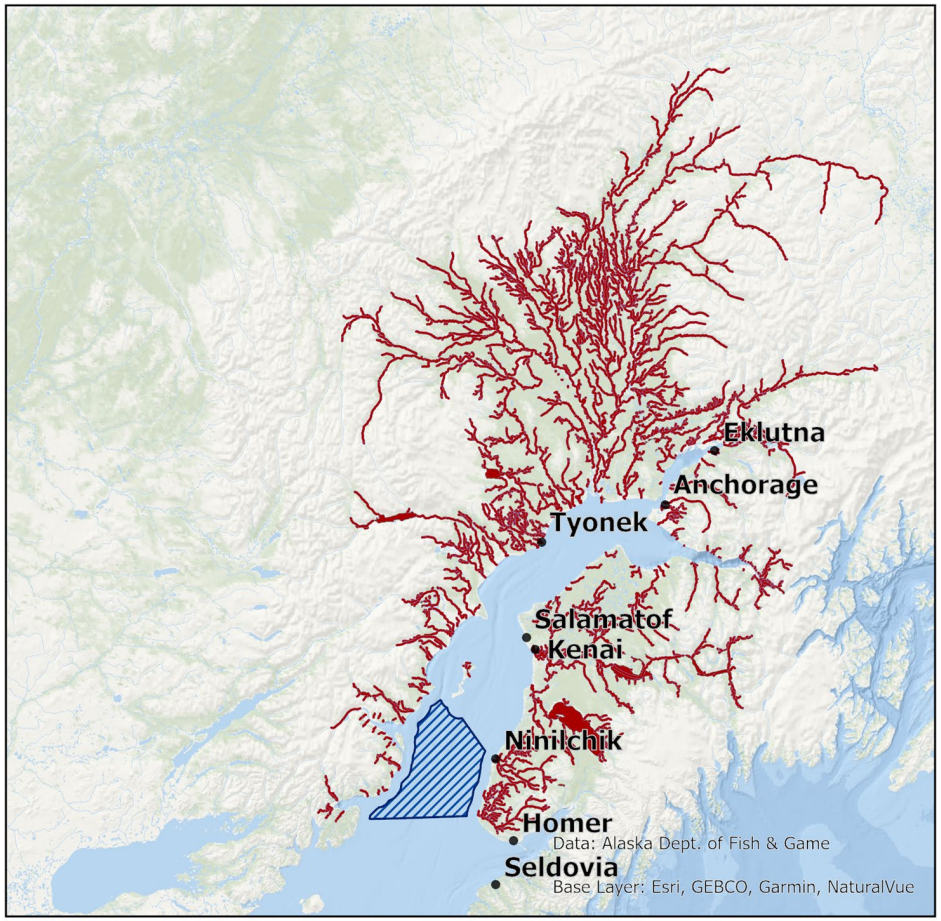
- SDC and ABC are consistent with the Salmon FMP, including SSC recommendations.
  - However, clarification to the Salmon FMP could be helpful
- SSC recommendations for Tier 3 OFL and OFL_{PRE}
- MSST calculation to adjust the level below the escapement target (e.g., 0.5 - 0.75).
  - Current equation in FMP: escapement target * generation time (years) * 0.5
  - Possible clarification: escapement target * generation time * range (0.5 to 0.75)
- Other SSC recommendations?



Considerations for 2026 SAFE

- A Salmon Plan Team would be appreciated.
  - Currently, no avenue for feedback until SSC meeting.

- We are working on methods to deliver the Proposed SAFE in December.
  - However, there is limited time from end of salmon season to sending for SSC review.
  - Incomplete data will be an issue

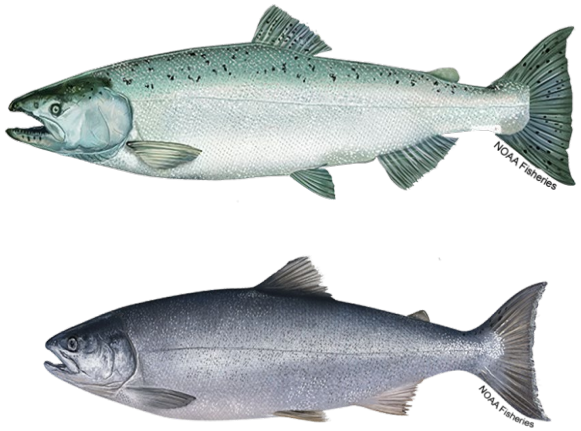


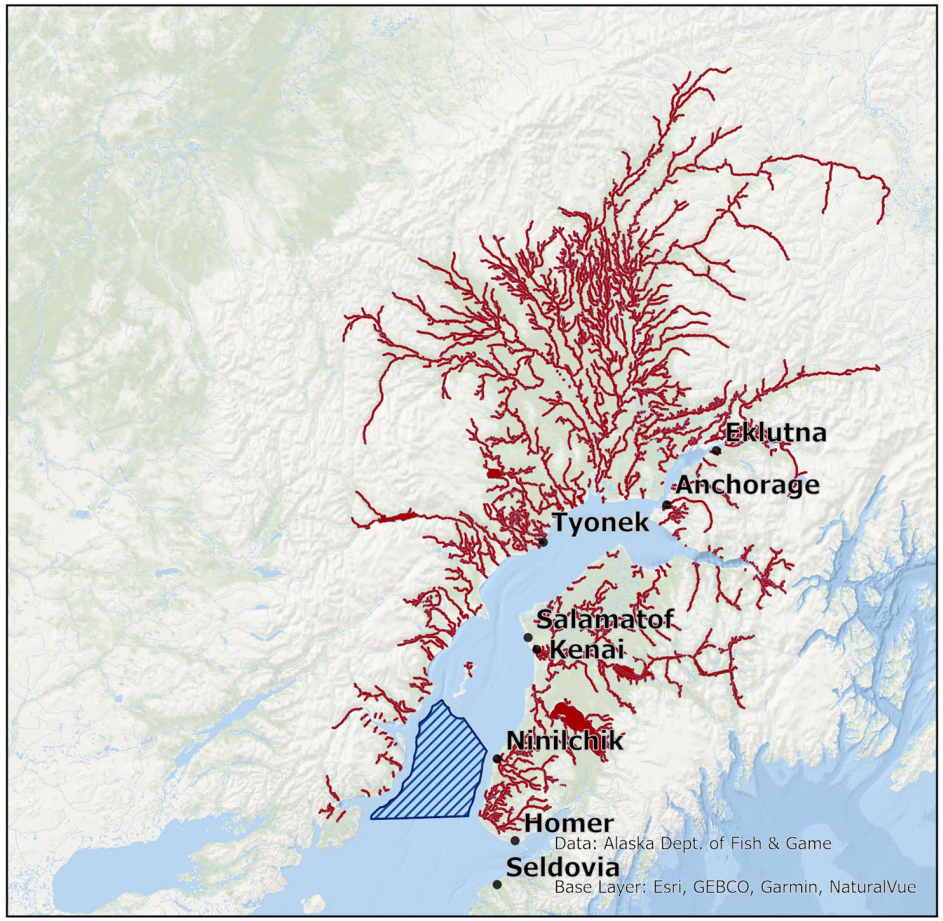
2025 NMFS SAFE TEAM RECOMMENDED SDC & ABC USING LOWER BOUND OF GOALS FOR TIER 1 SDC

Table 2. SAFE Report (page 3)

Stock	Tier	MFMT	MSST	OFL	OFL_{PRE}	Buffer (%)	ABC/ACL	Sockeye Total
KNSOCK	1	0.327	1,875,000	NA	976,761	27.3%	**709,954**	**1.185M**
KASOCK	1	0.572	350,000	NA	746,294	57.0%	**320,841**	
AOSOCK	3	NA	163,000	906,757	181,351	15%	**154,148**	
ACHIN	3	NA	45,000	2,237	373	30%	**261**	
COHO	3	NA	38,800	268,053	67,013	90%	**6,701**	
CHUM	3	NA	NA	390,030	97,508	20%	**78,006**	
PINK (odd-year)	3	NA	NA	116,348	58,174	10%	**52,357**	

Thank you!


NOAA Fisheries
NOAA Fisheries


Eklutna
Anchorage
Tyonek
Salamatof
Kenai
Ninilchik
Homer
Seldovia
Data: Alaska Dept. of Fish & Game
Base Layer: Esri, GEBCO, Garmin, NaturalVue


NOAA Fisheries
NOAA Fisheries
NOAA Fisheries