NSEO Summer Chum Stock

RC 128

NORTHERN SOUTHEAST REGIONAL AQUACULTURE ASSOCIATION, INC.
1308 Sawmill Creek Road
Sitka, Alaska 99835
Office: (907) 747-6850 fax:(907) 747-1470

January 23rd, 2025

Alaska Board of Fisheries
PO Box 115526
Juneau, AK 99811

Re: Northern Southeast Outside (NSEO) Summer-run Chum Index Stock of Concern Memorandum

Introduction

In response to ADFG's concern over the presence of enhanced fish within vicinity of the NSEO summer chum index stream in West Crawfish Inlet and decision to list the NSEO aggregate as a Stock of Concern, NSRAA would like to provide the BOF with the following information and propose an alternative to removing the West Crawfish summer chum salmon stream from the NSEO chum index composite.

West Crawfish Inlet is managed by the department for wild pink salmon seine fisheries and not specifically managed for wild chum harvest. Interception of wild summer run chum does occur but at a small percentage (Tables 1 and 2). ADFG does not sample chum salmon in the region and sampling is performed by the Northern Southeast Regional Aquaculture Association (NSRAA), as proportion of catch by district can be observed in the following tables/appendix. NSRAA performs regionwide otolith sampling including the department test fisheries, and possesses one of, if not the most, comprehensive otolith evaluation sampling and evaluation program in the state.

Table 1. Enhanced and wild contribution estimates by year, districts 113-32 and 113-33 combined.

	Chum			Pink	
	Enhanced Harvest	Wild Harvest	W CI Index Escapement	Harvest 113-32	W CI Escapement
2014			3,065	96,410	103,000
2015			6,970	11,282	72,000
2016			500	-	31,000
2017	79,485	7,692	1,310	7,250	28,000
2018	3,432,459	5,767	1,800	-	13,200
2019	2,014,750	8,363	300	800	7,000
2020	1,535,342	5,498	2,000	2,841	43,000
2021	1,191,367	2,220	610	772	6,000
2022	601,450	9,217	3,370	-	13,000
2023	1,621,827	10,003	438	-	9,000
2024	940,114	3,271	1,200	93,184	70,000

Table 2. Contribution of enhanced and wild chum by year/fishery, segregating 113-32 and 113-33 as data is available.

Sum of Contribution	Column Labels						
	Enhanced		Enhanced Total	Wild		Wild Total	Grand Total
	Crawfish	WEST CRAWFISH		Crawfish	WEST CRAWFISH		
Row Labels							
CR	77.1%	22.5%	99.6%	0.1%	0.3%	0.4%	100.0%
2019	0.0%	97.7%	97.7%	0.0%	2.3%	2.3%	100.0%
2023	64.6%	34.9%	99.5%	0.0%	0.5%	0.5%	100.0%
2024	99.8%	0.0%	99.8%	0.2%	0.0%	0.2%	100.0%
SEINE	51.1%	48.6%	99.7%	0.1%	0.3%	0.3%	100.0%
2019	58.3%	41.5%	99.8%	0.1%	0.1%	0.2%	100.0%
2023	55.9%	43.4%	99.4%	0.0%	0.6%	0.6%	100.0%
2024	0.0%	100.0%	100.0%	0.0%	0.0%	0.0%	100.0%
TROLL	3.2%	95.4%	98.6%	0.0%	1.4%	1.4%	100.0%
2019	1.7%	98.0%	99.6%	0.0%	0.3%	0.4%	100.0%
2023	0.0%	97.5%	97.5%	0.0%	2.5%	2.5%	100.0%
2024	9.9%	86.2%	96.2%	0.0%	3.8%	3.8%	100.0%
Grand Total	55.7%	43.9%	99.6%	0.1%	0.4%	0.4%	100.0%

Wild summer chum escapement to the West Crawfish index stream has trended similarly to the eight remaining NSEO streams (Figure 1). Furthermore, wild chum returns have declined across most of southeast Alaska, potentially as a result of a decrease in observed snowpack and drier weather patterns on Baranof and Chichagof Islands. Another species highly affected by lower snowpack is yellow cedar which occurs in the same ecotone as summer chum along western Chichagof and Baranof Islands for the past 35 years. Summer run chum index streams held in pristine wilderness areas on West Chichagof are experiencing the same trend as those observed on West Baranof. **Given that the NSEO index streams region-wide are performing similarly, the data simply does not support the notion that enhanced fish are driving the downward trend in survival for this index stock and should not be considered during the evaluation for listing as a SOC.**

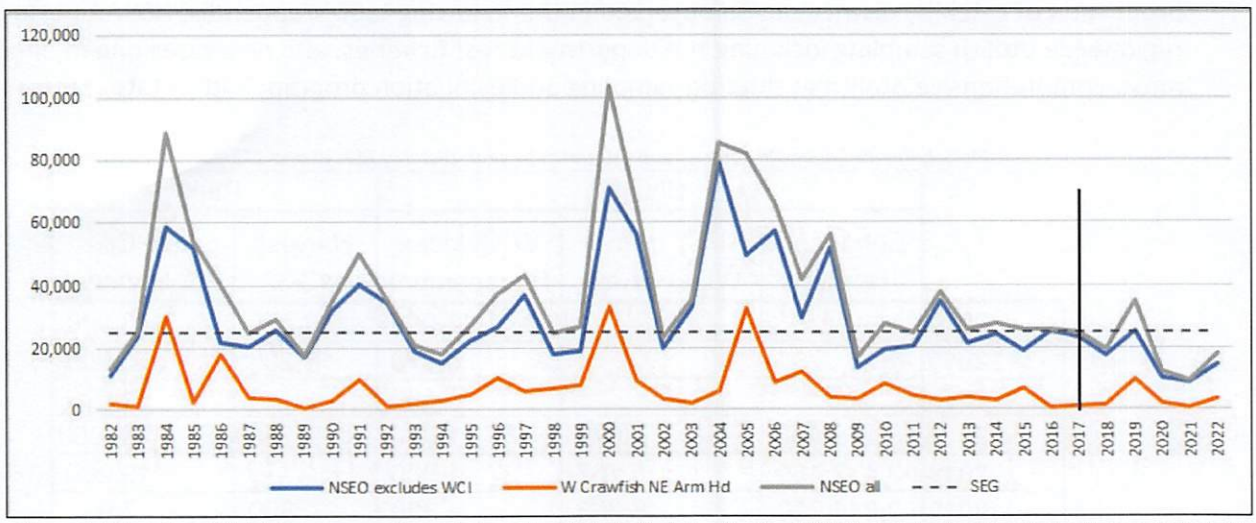


Figure 1. West Crawfish Inlet escapement counts have trended similarly to all other NSEO index stocks. Targeted enhanced fall stock began in 2017.

When examining the statistical relationships between the escapement of the index streams located

on West Chichagof with the index streams on West Baranof, similar survival trends can be observed when comparing the two aggregates. By evaluating raw escapement counts from aerial and foot surveys provided by the department in Figure 2, we can see that the two groups are not significantly different in relation to each other (p=0.32). Similarly, when applying the natural log to these escapement counts there is not a statistically significant difference (p=0.91) between West Baranof and West Chichagof chum returns (Figure 3). Both aggregates appear to be experiencing similar trends in survival. If enhanced fish were influencing the West Crawfish summer chum index counts, we would expect to see that reflected as a localized and mathematically significant effect, which is not the case. We encourage the department to perform the same statistical analyses as NSRAA has conducted prior to implementation of production reductions or elimination.

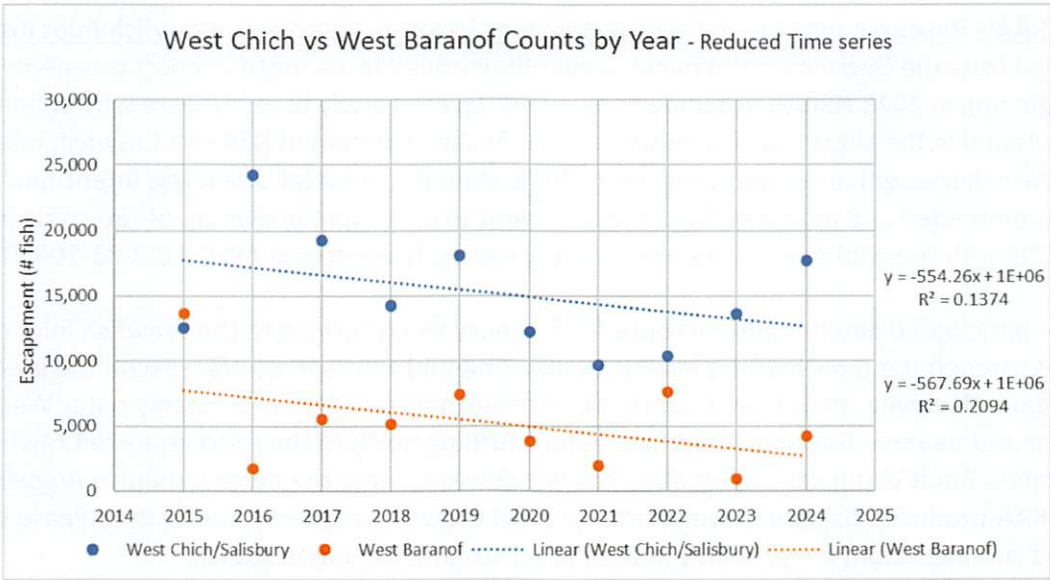


Figure 2. Raw escapement counts (foot & aerial surveys), sourced from ADFG SE AK Chum Salmon Escapement Index (1982-2024).

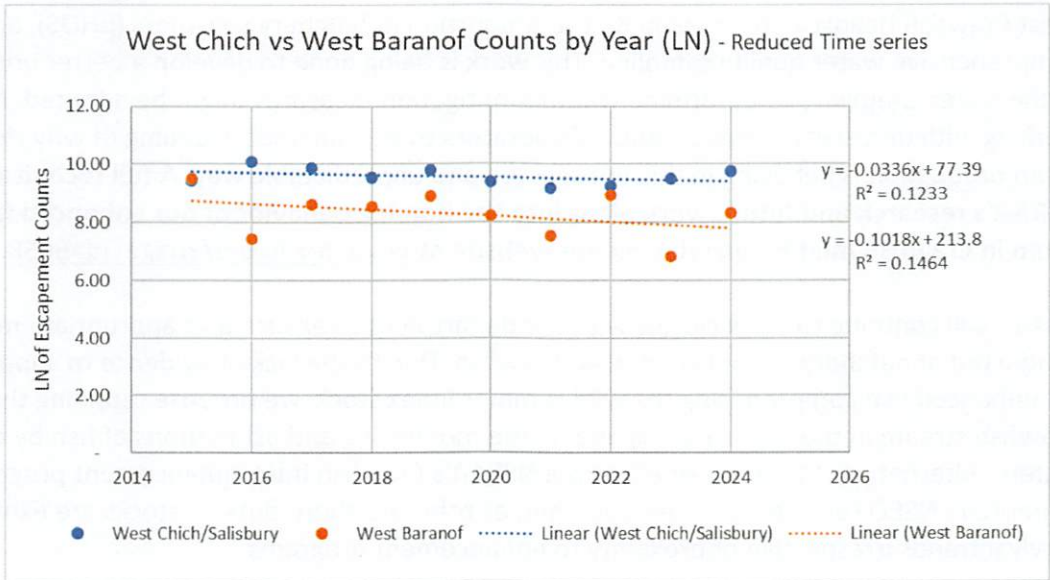


Figure 3. Transformed LN of escapement counts (2014-2024).

In October 2013 NSRAA met with department personnel to evaluate potential release locations for a new NSRAA chum enhancement project, ultimately placed in Crawfish Inlet. The project was developed to provide additional common property harvest opportunity to the troll fleet, who have been out of their allocation range since 2006, and thus far this production has made improvements in getting this gear group into their allocation. NSRAA staff worked with the department through the appraisal of 10 individual locations before settling on Crawfish Inlet, and the request was met with approval from the Regional Planning Teams and ultimately authorized by the department commissioner. **The full summary report issued by the department to NSRAA detailing potential release site evaluation criteria and specific site characteristics for each candidate location can be found on our website at www.nsraa.org/?page_id=1835.**

NSRAA's Research into Chum Homing Behavior Patterns Relative to Crawfish Inlet Production

To address the Department's concerns over their ability to accurately report escapement figures, beginning in 2023 NSRAA has undertook a multifaceted study to investigate why enhanced chum are found in the West Crawfish index stream. At the inception of NSRAA's Crawfish Inlet troll and seine fisheries enhancement program in 2014, utilization of a fall stock was intentional and recommended and approved by the department to avoid spatial overlap of returning hatchery adults with the wild summer index stock, originating from stream AWC #113-32-10050.

The anticipated adult migration route for hatchery fish returning to the Crawfish Inlet release site was through the mouth of the Inlet at Walker Channel where it interfaces with the greater Pacific Ocean. However, an unknown proportion of returning adult chum primarily enter West Crawfish Inlet and traverse through Cedar Pass before turning north to the release site in Crawfish Inlet proper. Adult chum have been observed in tidewaters near the index stream in August when NSRAA-produced fish are moving through West Crawfish Inlet en-route to the release site, while wild summer chum are primarily in their natal stream, staging to spawn.

NSRAA is examining the outmigration behavior of fry post release, conducting carcass surveys in the West Crawfish headstream to evaluate the proportion of hatchery spawners (pHOS), and conducting comprehensive water quality sampling. This work is being done to develop a better understanding of the water chemistry to determine whether mitigation measures might be adopted. NSRAA is working with university scientists and collaborators to gain an understanding of why the Crawfish chum production is behaving in this unexpected and unpredictable way. **A full technical report on NSRAA's research and future work plans into the homing behavior of our enhanced fall stock chum in Crawfish Inlet is available on our website at www.nsraa.org/?page_id=6658.**

NSRAA will continue to work closely with the department to ensure that appropriate monitoring is conducted of hatchery origin fish in West Crawfish. Due to the lack of evidence to support the case for enhanced fish compromising the wild summer index stock, we propose retaining the West Crawfish stream in the index and expanding the monitoring and estimations of fish by origin in the system. Alternatives to reduce or eliminate NSRAA's Crawfish Inlet enhancement program is unlikely to improve NSEO summer chum escapement, as other northern outside stocks are exhibiting similar survival trends irrespective of proximity to enhancement programs.

Appendix

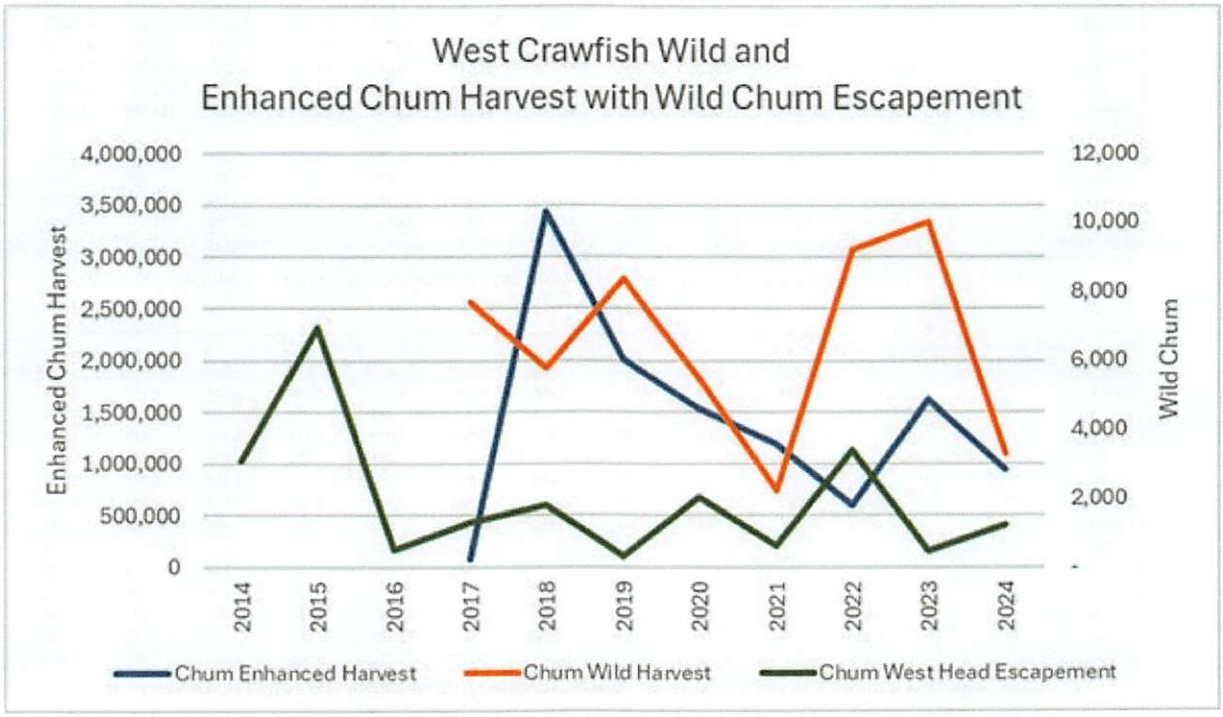


Figure 4. Proportion of harvest by origin and escapement to AWC #113-32-10050, 2014-2024.

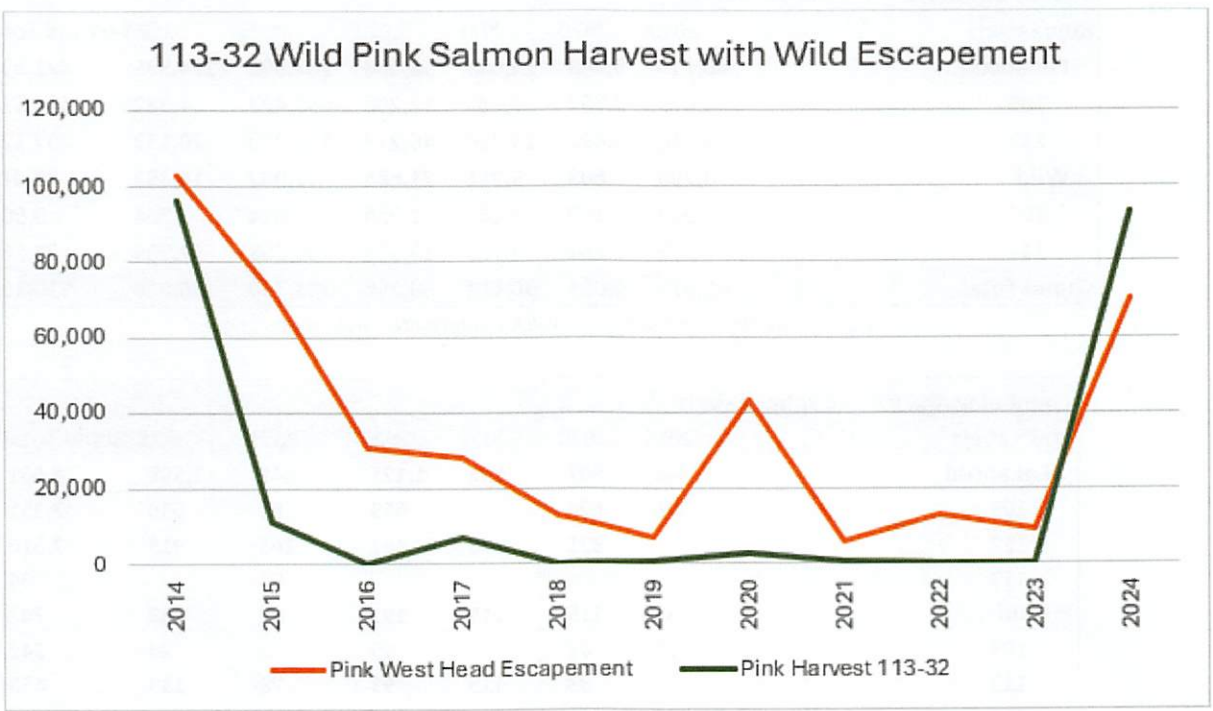


Figure 5. West Crawfish Inlet pink salmon harvest and escapement, 2014-2024.

Sum of Contribution	Column Labels											
Row Labels	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Grand Total
Enhanced	1,139,157	2,321,682	1,743,564	2,026,416	5,288,943	4,398,976	2,440,622	3,304,123	3,605,118	4,626,975	6,442,337	37,337,914
108							670			6,352	28,083	35,105
109		65,290	212,710	66,744	186,659	962,771	132,633	71,455	231,635	417,225	475,772	2,822,894
110							53,714	82,103	91,361	108,604	432,390	768,172
112	267,463	38,754	46,855	217,434	242,055	19,633	9,845	40,544	275,081	1,002,781	1,257,812	3,418,257
113	871,694	2,217,638	1,483,999	1,742,239	4,860,229	3,416,572	2,243,760	3,110,022	3,007,041	3,092,013	4,248,280	30,293,487
Wild	74,247	104,181	21,158	30,356	53,755	45,347	15,274	22,693	85,566	114,989	81,817	649,383
108							57				299	356
109		6,493	2,338	706		22,912	1,389	1,262	4,522	874	2,519	43,014
110							506	487	437	290	408	2,128
112	21,651	4,021	3,158	2,685	19,692	2,206	596	6,270	49,856	90,812	32,006	232,952
113	52,596	93,667	15,663	26,965	34,063	20,229	12,726	14,674	30,752	23,014	46,585	370,933
Grand Total	1,213,404	2,425,863	1,764,722	2,056,772	5,342,698	4,444,323	2,455,896	3,326,816	3,690,684	4,741,964	6,524,154	37,987,297

Figure 6. Contributions within all NSRAA sampled fisheries by origin - 37 M fish.

Count of MARK ID	Column Labels											
Row Labels	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Grand Total
Enhanced	1,531	2,324	3,824	3,853	9,714	8,939	5,730	6,680	8,418	6,411	8,381	65,805
108							163			48	282	493
109		495	1,201	889	859	1,603	1,256	1,314	1,570	619	1,291	11,097
110							862	472	636	304	474	2,748
112	527	247	419	449	440	630	504	947	1,196	1,276	1,799	8,434
113	1,004	1,582	2,204	2,515	8,415	6,706	2,945	3,947	5,016	4,164	4,535	43,033
Wild	175	151	91	131	135	238	182	266	497	402	232	2,500
108							15				3	18
109		54	19	53		110	86	82	111	2	26	543
110							7	3	3	75	1	89
112	46	24	51	27	39	72	42	144	305	282	158	1,190
113	129	73	21	51	96	56	32	37	78	43	44	660
Grand Total	1,706	2,475	3,915	3,984	9,849	9,177	5,912	6,946	8,915	6,813	8,613	68,305

Figure 7. Raw otoliths recovered from NSRAA sampled fisheries by origin - 68,000 fish sampled.

Sum of Contribution	Column Labels						
Row Labels	2019	2020	2021	2022	2023	2024	Grand Total
Enhanced	40,719	5,448	24,666	58,568	167,698	124,535	421,634
109	34,079	2,957	9,380	12,290	51,423	54,382	164,511
112	6,640	2,491	15,286	46,278	116,276	70,153	257,124
Wild	4,794	603	5,951	21,688	41,082	14,353	88,471
109	4,234	369	1,166	1,755	814	1,564	9,902
112	559	234	4,785	19,933	40,268	12,789	78,569
Grand Total	45,513	6,051	30,618	80,256	208,780	138,888	510,106

Figure 8. Contributions within all NSRAA sampled test fisheries by origin.

Count of MARK ID	Column Labels						
Row Labels	2019	2020	2021	2022	2023	2024	Grand Total
Enhanced	346	947	548	1,121	441	1,558	4,961
109	346	626		659	81	639	2,351
112		321	548	462	266	919	2,516
113					94		94
Wild	35	115	115	192	82	163	702
109	35	82		99	2	24	242
112		33	115	93	78	139	458
113					2		2
Grand Total	381	1,062	663	1,313	523	1,721	5,663

Figure 9. Raw otoliths recovered from NSRAA sampled test fisheries by origin.

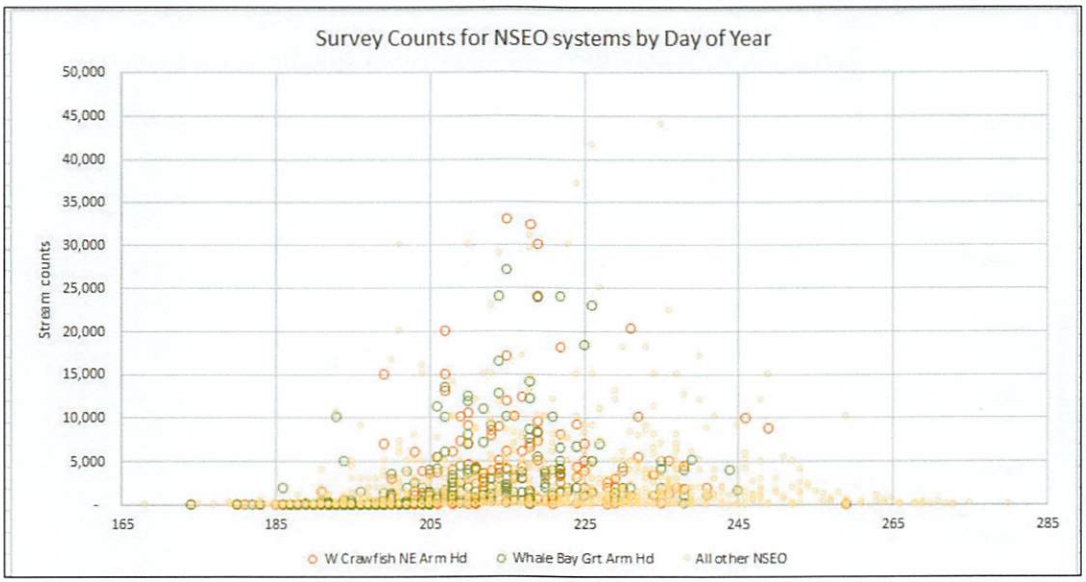


Figure 10. NSEO summer stock index streams that neighbor the Crawfish Inlet THA exhibit the same return timing as the other NSEO systems.

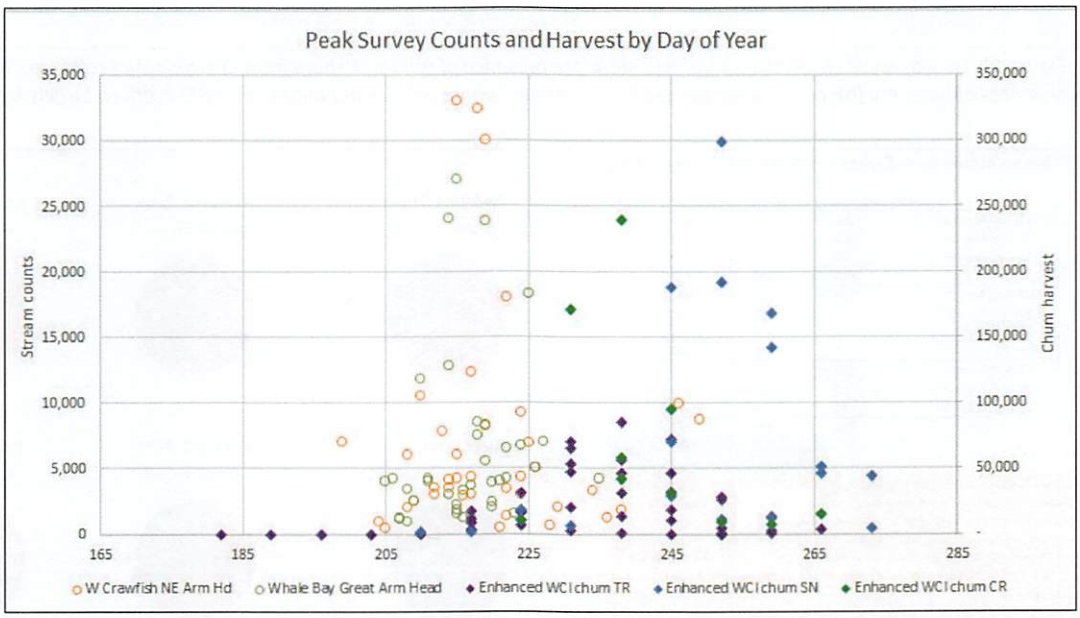
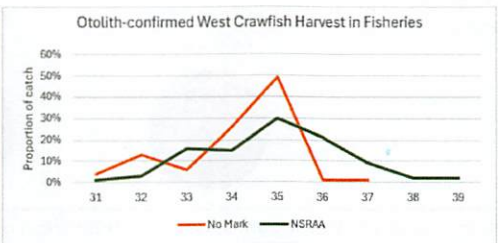


Figure 11. Fall stock enhanced chum return to Crawfish Inlet later than the adjacent summer stock NSEO index systems.

	Fisheries		*WCI Stream Survey*	
SW	No Mark	NSRAA	No Mark	NSRAA
31	4%	1%		
32	13%	3%		
33	6%	16%	600	182
34	26%	15%	500	273
35	49%	30%	200	133
36	1%	21%		
37	1%	9%		
38		2%		
39		2%		



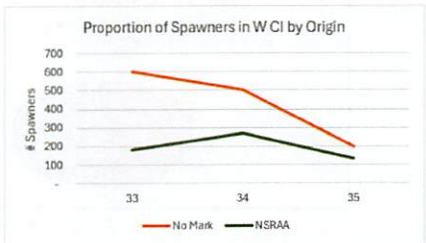


Figure 12. RY 2024 composition of catch and expanded stream survey counts by origin.

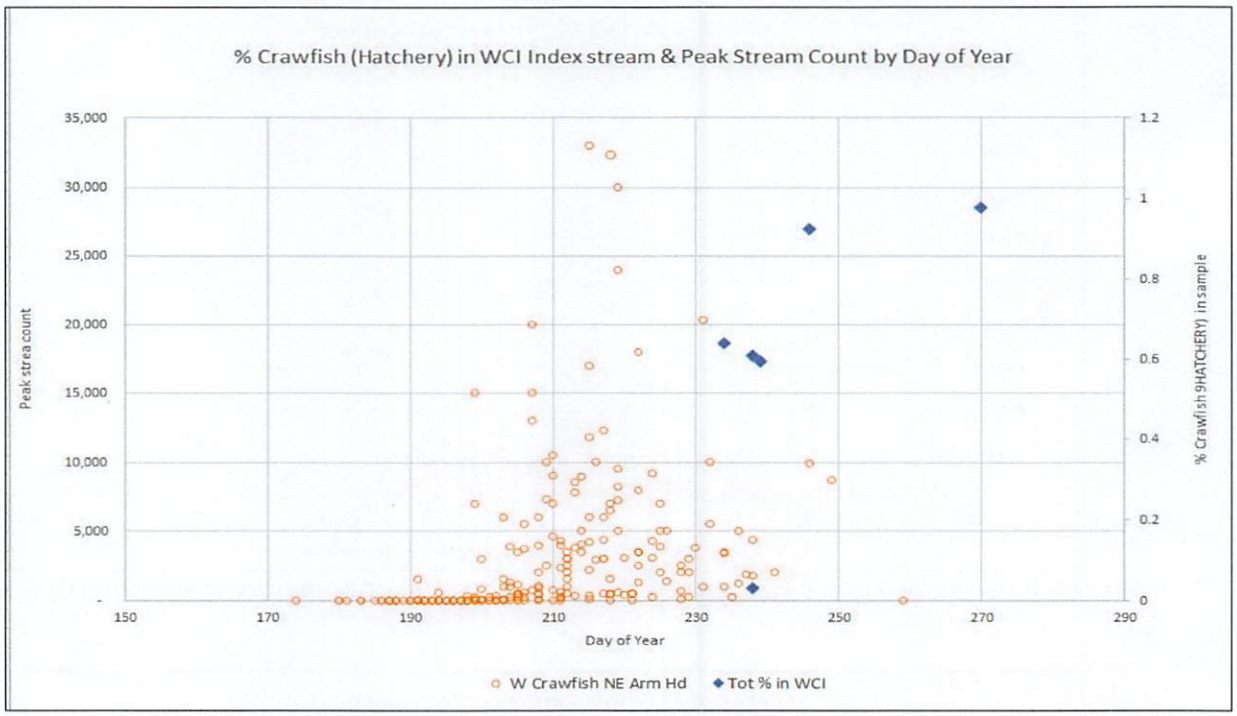


Figure 13. Otolith results from stream surveys show the presence of fall stock chum from Crawfish Inlet releases. Note the higher prevalences of hatchery fish occurs after the peak summer run, where relative magnitude of pHOS is driven largely by the small pNOS.

Figure 14. Return year 2024 W CI stream survey results by origin and stream reach.

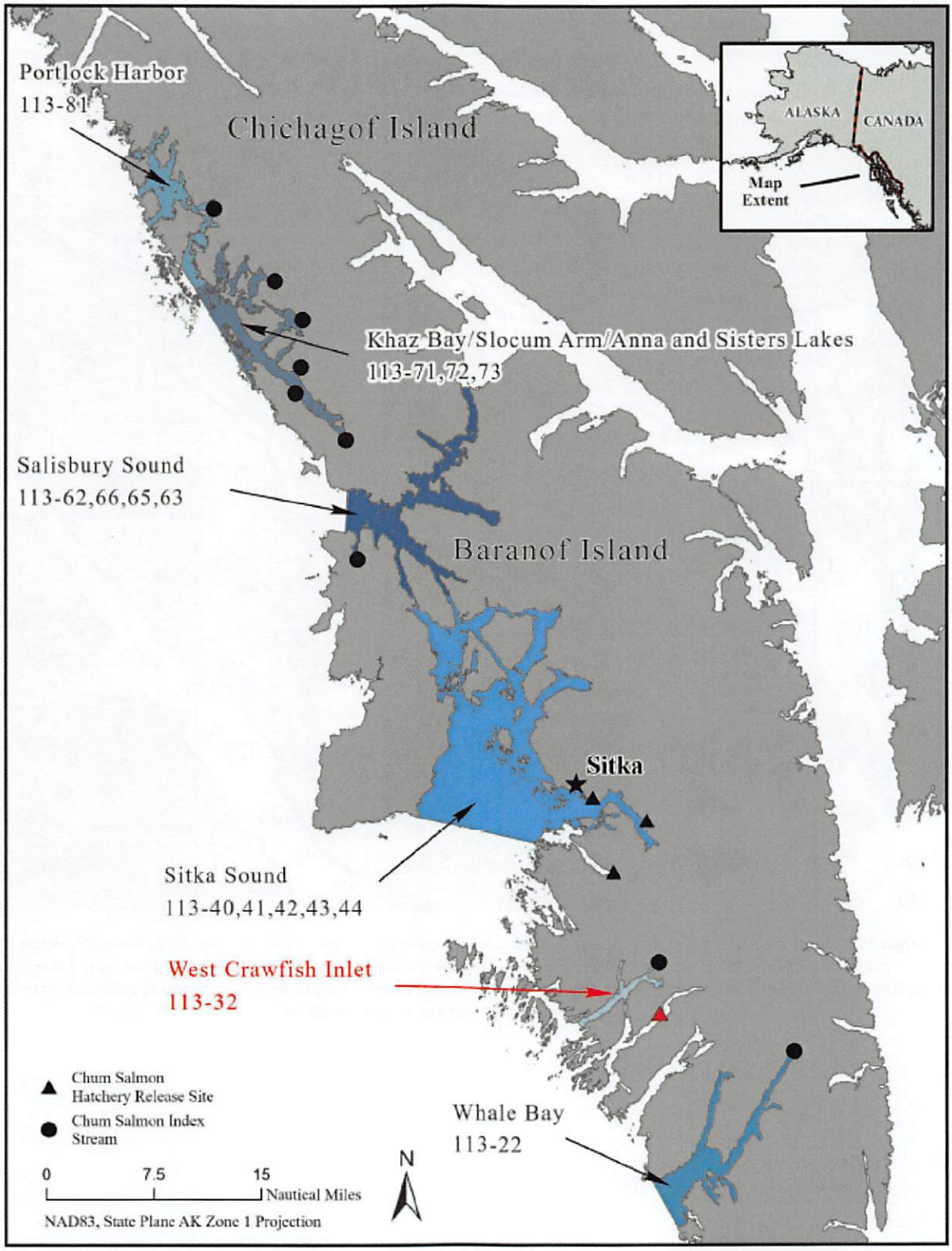


Figure 15. Excerpt from RC5 NSEO Chum Salmon Stock Status and Action Plan, 2025 report depicting Northern Southeast Outside Subregion chum salmon index streams, hatchery chum salmon release sites, and traditional pink salmon purse seine fishing areas in Southeast Alaska. Note the erroneous placement of the Crawfish Hatchery Release Site.

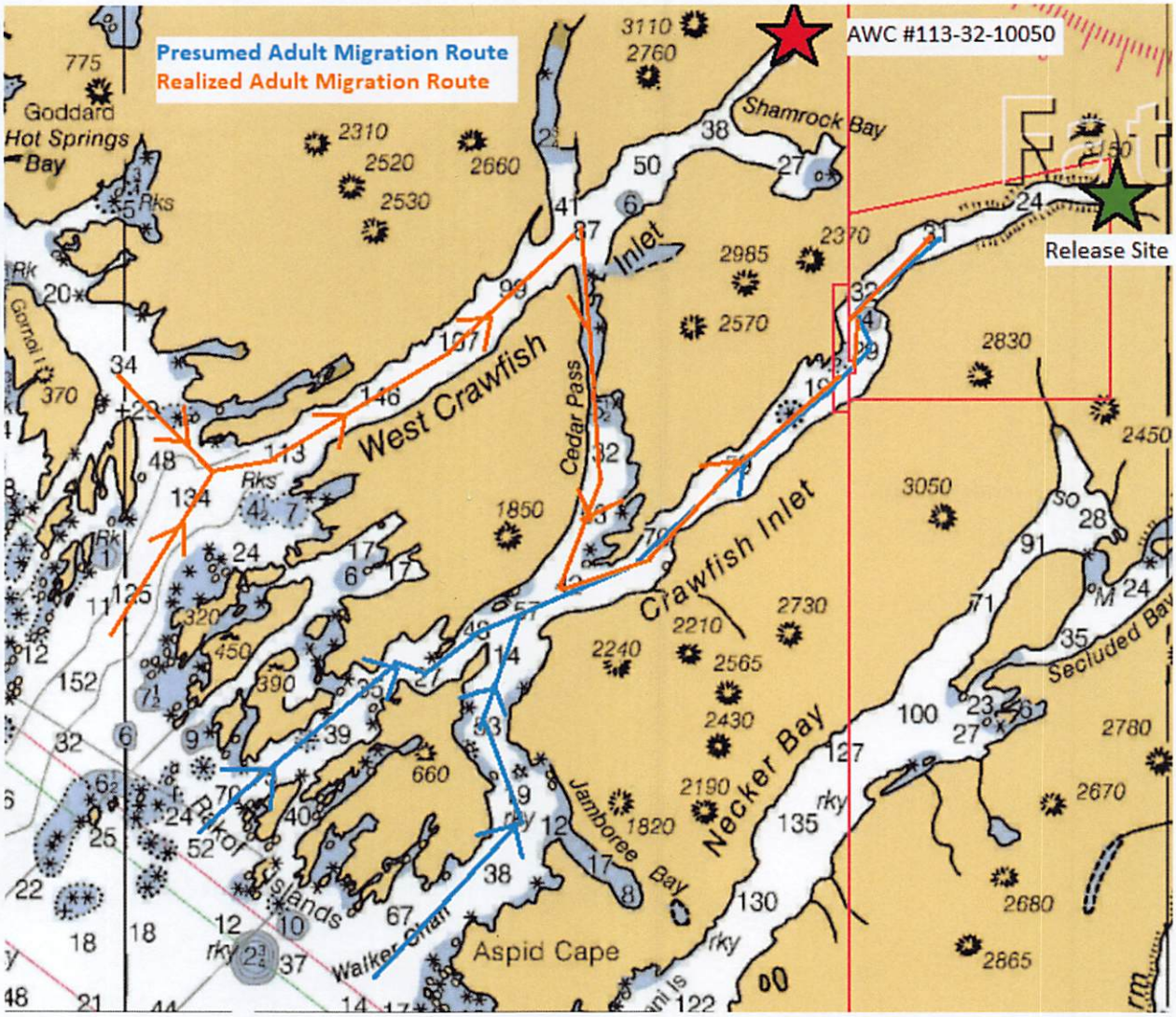


Figure 16. Fish release site (green star), and West Crawfish Inlet index stream (red star). Presumed adult migration route of enhanced fall stock chum in 2014 at project conception depicted by blue line, and actual observed adult migration route (orange line). An unknown portion enter West Crawfish and traverse Cedar Pass into Crawfish proper. An acoustic tagging study will better inform us on nearshore homing patterns of adults.