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Area 23 (Barkley Sound, Alberni Inlet) Sockeye Forecast for the 2026 Return

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SUMMARY

1. For 2026 fishery management purposes, the Area 23 Roundtable has agreed to begin fisheries in the “High” zone (700000–1000000 adult return) for early season harvest management. Hucuktlis Lake Sockeye remain a constraining stock in the “Low” zone.
2. There is variability among the 2026 model forecasts. Predictions (Table 3) range between 160592 (survival stanza method), 887202 (Coho leading indicator model), 778017 (multiple regression model), and 1295629 (sibling model). Forecast models for the 2026 aggregate Somass Sockeye return are described in Appendix A.
3. All models, except the Coho leading indicator, predict GCL will comprise the dominant portion of the run. In 2021 and 2022 (broods returning as ages 5 and 4 fish, respectively, in 2026), escapements to both lakes were near or above average (Figure 6). However, Great Central Sockeye have dominated returns observed thus far from these brood years (Table 6). Estimated smolt abundances emigrating from Great Central Lake and Sproat Lake in 2023 and 2024 were low compared to historic levels (Figure 4). Returns from the 2023 sea-entry year thus far suggest relatively high marine survival for Great Central Sockeye but moderate-to-low marine survival for Sproat Sockeye (Figure 7). The marine survival rate for the 2024 sea-entry year is unknown because only jacks that went to sea in 2024 have returned so far. Therefore, a precautionary management approach for early season fisheries is warranted until the total run size and stock composition can be more accurately determined. In-season estimates of stock composition will be available during the second and third weeks of June. The first preliminary run size reforecast is expected 18 June 2026.
4. The recommended management outlook for Hucuktlis (Henderson) Sockeye is the “Low” zone for harvest management, corresponding to an expected return of 15000–25000 (Table 4). Spawner abundances, smolt abundances, and marine survival all appear close to long-term averages for the dominant cohorts that will return in 2026, indicating the Hucuktlis Sockeye return will likely be near-average.

BACKGROUND

Great Central Lake, Sproat Lake, and Hucuktlis Lake are the three lake-type Sockeye Conservation Units (CUs) comprising the WCVI – Barkley/Somass Sockeye Stock Management Unit (SMU). The status of each CU is assessed separately for implementation of Canada’s Wild Salmon Policy. From 1980–2025, the median adult terminal returns (catch and escapement) of Great Central Lake, Sproat Lake, and Hucuktlis Lake Sockeye are 352000, 328000 and 26000, respectively (Table 5). In the Somass Sockeye return, the historical median split between Great Central Lake and Sproat Lake abundance is 55% Great Central (inter-quartile range: 46–61% Great Central).

The pre-season biological forecasts for Somass Sockeye (outlined in this bulletin) inform a *management forecast* that guides June fishing plans (Table 7). The run size forecasts are revised weekly starting in the third week of June based on in-season indicators described later in this bulletin. The first in-season reforecast is anticipated no earlier than Thursday, 18 June 2026.

Data limitations preclude a statistical forecast for Hucuktlis Sockeye. Instead, a management zone is set based on an outlook that considers spawner abundances, smolt abundances, and indicators related to marine survival rates for the contributing brood years. This outlook informs management decisions around the amount and timing of fisheries that are likely to intercept Hucuktlis Sockeye.

2026 SOMASS SOCKEYE BIOLOGICAL FORECASTS

Several indicators of varying accuracy are used to inform the pre-season Somass Sockeye biological forecasts: abundances of younger siblings from the same brood and smolt years as returning 2026 age classes, sea surface temperatures recorded at both Amphitrite Point Lightstation and an offshore buoy anchored south of the Brooks Peninsula, survival rates of Coho from the same brood year that return as adults one year earlier, and estimates of emigrating smolt abundances from Great Central and Sproat Lakes (Hyatt et al. 2003; Brown 2024). The predicted Somass aggregate return is further broken down into age- and stock-specific forecasts in Table 3.

Model forecasts for the 2026 aggregate Somass Sockeye return are described in detail in Appendix A and summarized here:

- The Multiple Regression forecast (Table 3) predicts a total return to the Somass River of 778000 (retrospective 75% prediction interval: 477000–1270000) adult Sockeye. The predicted returns to Great Central and Sproat Lakes are 597000 and 182000 adult Sockeye, respectively (77% GCL).
- The Sibling Regression forecast (Table 3) predicts a total return to the Somass River of 1296000 adult Sockeye. The predicted returns to Great Central and Sproat Lakes are 1124000 and 172000 adult Sockeye, respectively (87% GCL). The model suggests age-5 fish will be the dominant age class in the Great Central return and age-4 fish will be the dominant age class in the Sproat return (Table 3).
- The sea-surface-temperature-based SStM forecast (Table 3) predicts a total return to the Somass River of 161000 adult Sockeye. The predicted returns to Great Central and Sproat Lakes are 117000 and 44000 adult Sockeye, respectively (73% GCL). Spring marine temperatures at Amphitrite Point were below average in 2023 and above average in 2024, which results in a “high” survival scenario (5%) for returning 5-year-olds and a “low” survival scenario (2.5%) for returning 4-year-olds. Observed returns to date suggest marine conditions were generally favourable for Sockeye survival in 2023 (Figure 7).
- The Coho Leading Indicator (CLI) model (Table 3) predicts a total return to the Somass River of 878000 adult Sockeye. The predicted returns to Great Central and Sproat Lakes are 344000 and 534000 adult Sockeye, respectively (39% GCL). The CLI model accounts for spawner abundances in the contributing brood years, as well as the survival rate of Robertson Creek Coho from the contributing sea-entry years. Coho survival rates were slightly below the 6% average in 2023 (5.1%) and above average in 2024 (7.8%).

2026 SOMASS SOCKEYE MANAGEMENT FORECAST

For early season fishery management, the Area 23 Roundtable has agreed to manage to a forecast in the “High” zone (see Table 7) with an expected return of 750000 adult Sockeye.

Based on the projected return, a precautionary approach to fisheries management will be required until in-season information can inform run size estimates. In-season indicators that will be applied to inform management in 2026 include:

- Stock compositions from samples collected by the test fishery in June will be used as an indicator of the relative proportions of Great Central and Sproat Lake at the end of the run.
- Area D gillnet catch rates in Area 23 in the second and third weeks of June will be used as an indicator of the final Somass Sockeye adult return.

- The total cumulative accounting (escapement, catch, Alberni Inlet abundance estimate, and lower river abundance estimate) and estimated run timing will be used to predict the final Somass Sockeye adult return.
- Scale samples collected from the test boat, fisheries, and escapement at the fishways will inform the predicted age composition of the return.
- River temperatures and inlet conditions will inform holding patterns and migration conditions, which affect escapement timing, pre-spawn natural mortality, and susceptibility to fisheries.

2026 HUCUKTLIS SOCKEYE OUTLOOK

The recommended management outlook for Hucuktlis Sockeye is the “Low” zone for harvest management, corresponding to an expected return of 15000–25000 Sockeye (Table 4). Spawner abundances in the 2021 and 2022 brood year were near the historical median of 13000 (Table 5). These spawners produced roughly average abundances of smolts in the 2023 and 2024 ocean-entry years (Table 4). Based on data from incomplete smolt years, Hucuktlis marine survival rates for 2023 are likely close to the long-term average of 3% (Figure 7). Therefore, expectations are for a near-average Hucuktlis sockeye return in 2026.

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APPENDIX A. FORECAST METHODOLOGY

Statistical forecast models

Four models have historically been used to forecast Sockeye returns to Great Central and Sproat Lakes: the Survival Stanza Method (SStM), Surface Salinity Method (SSM), Salmonid Enhancement Program Biostandard Method (SEPB), and Coho Leading Indicator Method (CLI; Hyatt et al. 2003). Circa 2010, a sibling regression model was developed that uses the relationships between the returns of Sockeye at earlier ages to predict future returns of their older siblings (*i.e.* predicts age 4, 5, and 6 returns based on the abundance of earlier returning age 3, 4, and 5 fish from matching brood years; Peterman 1982; Fisheries and Oceans Canada 2012). In 2021, a multiple regression model was developed that integrates data from younger sibling abundances, smolt abundances, and ocean temperatures during smolt marine entry (Brown and Luedke 2023).

The SStM and SSM use annual estimates of the numbers of smolts from Great Central and Sproat Lakes and predictors of early marine survival (marine temperature and salinity measured off Amphitrite Point, Ucluelet, respectively) to estimate returns (Hyatt et al. 2003).

The CLI model is based on the observation that marine survivorships for both juvenile Sockeye and Coho migrating through Barkley Sound and up the West Coast of Vancouver Island often covary because both species face similar physical and biological conditions at sea-entry in a given year (Hyatt et al. 2003). Because Coho return one year earlier than most Sockeye, Coho survival values observed in one year can be used to predict survival of Sockeye returning the following year.

In general, the Sibling and SStM forecasts have provided the most accurate forecasts over the long term, with mean absolute percentage errors (MAPE) of 38% and 48%, respectively. Over the past 5 years, the CLI models has outperformed the SStM (5-year MAPEs of 38% and 69%, respectively). The multiple regression model appears to improve on the Sibling model, with a retrospective MAPE of 35% (Figure 2), and a recent 5-year MAPE of 23% (2021–2025). The multiple regression analysis suggests that much of the variation in survival rates ascribed to sea-entry conditions in the smolt-based models is captured in the returning sibling abundances. New in 2024 was the inclusion of average March–May sea surface temperatures from ECCC buoy c46132 “South Brooks” (Figure 5), which appears to more accurately predict survival rates compared to the nearshore temperatures recorded at the Amphitrite Point Lightstation (Brown 2024).

The forecasts generated from all methods are evaluated based on their relative accuracy at predicting past returns along with other relevant information (*e.g.* marine environmental conditions or observations). A heuristic management forecast for the Somass aggregate return is produced to guide early season fisheries. This forecast sets pre-season expectations and guides early-season harvest planning.

2025 forecast performance

The pre-season management forecast was in the “Moderate” zone with a predicted return of approximately 500000 adult Somass Sockeye (Table 2; Hamilton & Power 2025). The observed return of approximately 678000 adult Somass Sockeye was in the 58th percentile of all runs recorded since 1977 (Table 5; Figure 3). Fish from the 2019–2022 brood years returned in 2025, with the majority contributed from 2020 and 2021. All models predicted the dominance of age 4_2 fish (52%) among returning age classes (Sibling = 59%; SStM = 63%; CLI = 64%; Multiple regression = 57%). The 2025 return included an above average jack (ages 3_2 and 4_3) return to Sproat Lake.

All models, except the sibling forecast, under-predicted the 2025 return (Table 2). The prediction from the multiple regression model was closest to the observed return (absolute percentage error: 12%; Table 2). The proportion of Great Central Lake in the total adult return (81%) was higher than expected pre-season by all models except the SStM (Sibling = 75%; SStM = 82%; CLI = 53%; Multiple regression = 67%). Returns from the 2020 and 2021 brood years are heavily dominated by Great Central Lake (79%), but returns from the 2022 brood year may indicate the beginning of a shift toward more similar proportions (67% Great Central; Table 6).

The return of approximately 21000 Hucuktlis Lake Sockeye in 2025 exceeded the 10-year median of *c.* 16000 (Table 5; Figure 3) and aligned with the pre-season outlook for a return in the "low" management zone (15000–25000 Sockeye). Pre-season expectations were based on a below-average spawner abundance in the 2020 brood year (*c.* 4600 spawners) and average spawner abundance (*c.* 14500 spawners) in the 2021 brood year.

Sources of uncertainty

The mean absolute percentage errors (MAPEs) for five forecast models that have been used to predict Somass Sockeye returns range from about 35–70%. Retrospective analysis suggests the multiple regression model is the best performing forecast; on average, the observed return is about 36% higher or lower than the predicted return (retrospective interval:1996–2025). The multiple regression MAPE is 23% over the 5 years since the model was first used to forecast the return (2021–2025). Factors that contribute to forecast uncertainty include, but are not limited to: model structure, assumptions about the relationships between returns and the predictor variables, and uncertainty in the source data (*e.g.* smolt abundances, age compositions in historical returns). Smolt estimates for the 2018–2024 sea-entry years were derived from a revamped acoustic-trawl survey program and are considered to have better accuracy compared to previous years in the historical record.

For the Hucuktlis Sockeye outlook, there is considerable uncertainty due to lower quality assessment data relative to the Somass stocks. There are less complete age data, relatively high uncertainty in the estimates of spawner abundance, and uncertainty in catch estimates. Catch estimates are particularly uncertain in recent years when the abundance of Hucuktlis Sockeye is low relative to the Somass stocks. Under these circumstances, the probability of detection of Hucuktlis Sockeye in catch samples is lower and therefore catch of Hucuktlis Sockeye may be underestimated.

The relationships between available ocean indicators and survival rates in Area 23 Sockeye are uncertain. While there are weak correlations between spring sea surface temperatures and salinities measured at Amphitrite Point and Somass Sockeye survival (R^2 = 0.01–0.17), some years with seemingly excellent ocean conditions (*e.g.* 2002) have not yielded high survivorship. The inclusion of spring sea surface temperature data from a buoy further offshore of the WCVI seems to yield improved predictions of sockeye survivals (R^2 = 0.01–0.26; Figure 5).

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APPENDIX B. TABLES AND FIGURES

Table 1. Total return of Sockeye to Barkley Sound in 2025.

Conservation Unit	Age at Return						Total	Adults
	3_2	4_2	4_3	5_2	5_3	6's		
Great Central Lake	96913	368279	14933	106404	90479	3760	680768	568922
Sproat Lake	48336	68378	5230	29813	8801	1568	162126	108560
Hucuktlis Lake	67	20232	0	242	64	0	20605	20538
Total	**145316**	**456889**	**20163**	**136459**	**99344**	**5328**	**863499**	**698020**

Table 2. Forecast performance of Somass Sockeye models for 2025. Absolute Percentage Error (APE) is the absolute value of (Forecast return – Observed return) × (Observed return)$^{-1}$.

2025 Management forecast: Moderate zone (500000–700000 adults)				
677669 observed	**Forecast 2025**			
	SStM	**CLI**	**Sibling**	**Multivariate**
Expected	330481	477312	1048087	593720
Observed − Expected	347001	200170	−370605	83762
APE	51%	30%	55%	12%

Table 3. Predictions by age and lake for 2026 from four Somass Sockeye forecast models.

Forecast		Age at return				% of return
		4_2	**5_2**	**5_3 and 6_3**	**Total**	
Sibling reg.	GCL	465,644	584,926	72,848	**1,123,418**	87%
	SPL	107,502	39,306	25,403	**172,211**	13%
	Total	573,146	624,232	98,251	**1,295,629**	
	% at age	44%	48%	8%		
		4s	**5s**		**Total**	
SStM	GCL	48,586	68,263		**116,849**	73%
	SPL	28,161	15,582		**43,743**	27%
	Total	76,747	83,845		**160,592**	
	% at age	48%	52%			
		4_2	**5_2**	**5_3**	**6_3**	**Total**	
CLI	GCL	182,876	99,617	54,754	6,922	**344,169**	39%
	SPL	470,991	49,144	10,988	3,041	**534,164**	61%
	Total	653,867	148,761	65,742	9,963	**878,333**	
	% at age	74%	17%	7%	1%		
		4_2	**5_2**	**5_3**	**6_3**	**Total**	
Multiple reg.	GCL	309,379	206,398	52,406	28,228	**596,411**	77%
	SPL	129,314	33,246	16,686	2,360	**181,606**	23%
	Total	438,693	239,644	69,092	30,588	**778,017**	
	% at age	56%	31%	9%	4%		

Table 4. Factors considered in the 2026 outlook for the Hucuktlis Sockeye return.

Return Year	Age at Return	Brood year	Spawner abundance	Smolt Year	Smolt Abundance	Marine Survival
2026	4	2022	18.6k (avg.)	2024	1.1M (avg.)	unknown
2026	5	2021	14.5k (avg.)	2023	1.0M (avg.)	>2.2% (low–avg.)

Table 5. Terminal adult return of Area 23 Sockeye; 1980–2025. Note.—"Total A23 catch" includes Hucuktlis Sockeye.

Return year	Test	Tseshaht & Hupacasath	Maa-nulth FN	Comm. GN	Comm. SN	Special Use	Rec.	Total A23 catch	Total HUC catch	GCL adult esc.	SPR adult esc.	HUC adult esc.	Total Adult Return
1980		15791		292339	374760			682890		246041	124943	21000	1074874
1981		17000		391950	617474			1026424		195124	118710	40000	1380258
1982		23500		229271	246673			499444		155579	213477	56000	924501
1983		30000		315478	603827			949305		339204	239763	45000	1573272
1984		21000		454813	463971			939784		131000	76373	61000	1208158
1985	77	15987		249814	190038		1731	457570		112339	113688	16000	699597
1986	2885	12800		30461	13640		17	56918		119820	173915	3000	353653
1987	6993	23395		19921	189643		21424	254383		277562	105457	26000	663402
1988	1047	21292		146391	146603		348	314634		195327	210518	35000	755479
1989	648	23395		4145			139	27679		171652	133349	36000	368679
1990	7211	10480		3617	8062		14430	36589		163320	93631	32000	325541
1991	8505	36523		282833	762634		78551	1160541		402976	140123	37000	1740640
1992		53662		203890	211938		101408	570898		149898	192641	35000	948437
1993	11997	58020		258957	346246		107407	780630		227694	187860	150000	1346183
1994	10475	53656		74981			30261	179373		113121	142162	18000	452655
1995	146	23782					6519	30447		40940	43254	4000	118642
1996	4513	28139					28033	60685		157087	207716	56000	481489
1997	10493	29508		52241			36531	142971		174088	126349	49000	492408
1998	17522	45200		49924			55421	207929		184542	142360	82000	616831
1999	4445	39820		53800			7870	115754		203969	162776	12000	494499
2000	6904	36649		16260			24315	105864		52043	108568	23000	289475
2001	7004	58245		46640			67190	220100		307106	158923	11000	697130
2002	9207	99014		131176	202893		58718	593670		259482	190971	18000	1062123
2003	10577	64908		149499	209823		61610	522069		223546	163807	3000	912421
2004	10318	119522		46420	48041		81836	334810		213021	113798	3000	664629
2005	9233	49213		11305			31292	104788		172962	131949	2000	411700
2006	11188	35808		5449			30514	87959		135493	61940	3000	288391
2007	885	8706						9591		67717	52837	12000	142145
2008										59589	65333	11000	135921
2009		55345		9138	14735		55218	147399		203858	130289	30000	511547
2010		85596		240170	495495		77462	919638		255339	296956	30000	1501934
2011		109369	17081	231442	192333		42799	593024	6965	431213	381980	20423	1426640
2012		154951	18047	116106	79550		16940	385593	5942	147440	192226	17133	742393
2013	5313	31208	11851	11390	9128		13274	82164	1125	66688	119849	12500	281201
2014	9636	164319	19659	169685	243937	5190	16313	628739	21656	66298	159751	11837	866624

Return year	Test	Tseshaht & Hupacasath	Maa-nulth FN	Comm. GN	Comm. SN	Special Use	Rec.	Total A23 catch	Total HUC catch	GCL adult esc.	SPR adult esc.	HUC adult esc.	Total Adult Return
2015	11298	319351	25267	329505	521003	15000	88232	1309656	5192	417774	312265	6400	2046096
2016	8887	170326	26765	161607	228329	13124	51680	660719	23111	220952	211926	10700	1104297
2017	3328	36305	14672	9879	16461		12420	93065	3217	125846	142684	22704	384299
2018	4837	35886	18278	10785	6075		5566	81427	626	36418	146312	12203	276360
2019	3409	27770	12792	6482			2193	52646	154	35982	91245	13549	193422
2020	6314	35890	7876	6961			6575	63616	443	109174	131529	4589	308908
2021	7272	51306	20795	35777	35110		36410	186670	4359	220319	105441	14520	526950
2022	7872	98114	22698	99292	108395		9531	345902	7731	194241	366294	18646	925083
2023	9281	87295	24045	71280	93572		23067	308540	8196	120979	122622	13113	565254
2024	8580	70378	18818	51046	82085	9367	45785	286060	4854	319953	77851	2968	686831
2025	8981	64152	23004	74144	80594		23296	274171	4641	347988	58924	15899	696982

Table 6. Escapement, catch, and total return-at-age to date from brood years contributing to the 2026 Somass Sockeye return. Note.—data from each brood year span multiple return years; e.g. fish from the 2020 brood year returned as age 3s in 2023, 4s in 2024, 5s in 2025, and will return as age 6s in 2026.

		2020 brood year			2021 brood year			2022 brood year		
	Age	GCL	SPL	TOTAL	GCL	SPL	TOTAL	GCL	SPL	TOTAL
Escapement	3_2	80113	29049	109162	43917	39477	83394	86045	42916	128,961
	4_2	267755	61534	329290	214842	40044	254886			
	4_3	5630	2367	7997	13584	4473	18057			
	5_2	68784	14313	83097						
	5_3	61776	3524	65300						
	TOTAL	*484058*	*110787*	*594845*	*272343*	*83994*	*356337*	*86045*	*42916*	*128961*
Catch	3_2	10666	5404	16070	2034	4334	6368	10868	5420	16288
	4_2	161677	51872	213548	153437	28334	181771			
	4_3	925	399	1324	1349	757	2106			
	5_2	37620	15500	53120						
	5_3	28703	5277	33980						
	TOTAL	*239591*	*78452*	*318043*	*156820*	*33425*	*190245*	*10868*	*5420*	*16288*
Total Return	3_2	90779	34453	125232	45951	43811	89762	96913	48336	145249
	4_2	429432	113406	542838	368279	68378	436657			
	4_3	6555	2765	9321	14933	5230	20163			
	5_2	106404	29813	136217						
	5_3	90479	8801	99280						
	TOTAL	**723649**	**189239**	**912888**	**429163**	**117419**	**546582**	**96913**	**48336**	**145249**
% of Somass return		79%	21%		79%	21%		67%	33%	

Table 7. Excerpt from the management plan: Standardized Area 23 Sockeye Fishing Regime for early-season (June) fisheries. Typically, commercial seine fisheries are not planned until late June. However, all fisheries may be adjusted depending on in-season assessment results.

MANAGEMENT ZONE	FORECAST RUN SIZE	MAANULTH FIRST NATIONS	RECREATIONAL	TSUMASS ECONOMIC OPPORTUNITY	COMMERCIAL SEINE*	COMMERCIAL GILLNET
1 - Critical	**Less than 200,000**	no harvest	no harvest	no harvest	no harvest	no harvest
2 - Very Low	**200,000 to 350,000**	Open, fishing to target through limited effort (designated g/n vessels)	2 fish/day + Area restrictions + Late opening	Community/elder seine 1 day/week g/n	no harvest	1 day/week starting 64 (1 day total)
3 - Low	**350,000 to 500,000**	Open, fishing to target through limited effort (designated g/n vessels)	2 fish/day + Area restrictions	Community/elder seine 2 days/week g/n	seine fishing to target	1 day/week starting 63 (2 days total)
4 - Moderate	**500,000 to 700,000**	Open, fishing to target through limited effort (designated g/n vessels)	4 fish/day (time-area closures if required)	Community/elder seine 3 days/week g/n	seine fishing to target	1 day/week starting 62 (3 days total)
5 - High	**700,000 to 1,000,000**	Open, fishing to target through limited effort (designated g/n vessels)	4 fish/day (time-area closures if required)	Community/elder seine 4 days/week g/n	seine fishing to target	1 day/week starting 62 (3 days total)
6 - Abundant	**1,000,000 +**	Open, fishing to target through limited effort (designated g/n vessels)	4 fish/day	Community/elder seine 5 days/week g/n	seine fishing to target	1 day/week starting 61 (4 days total)

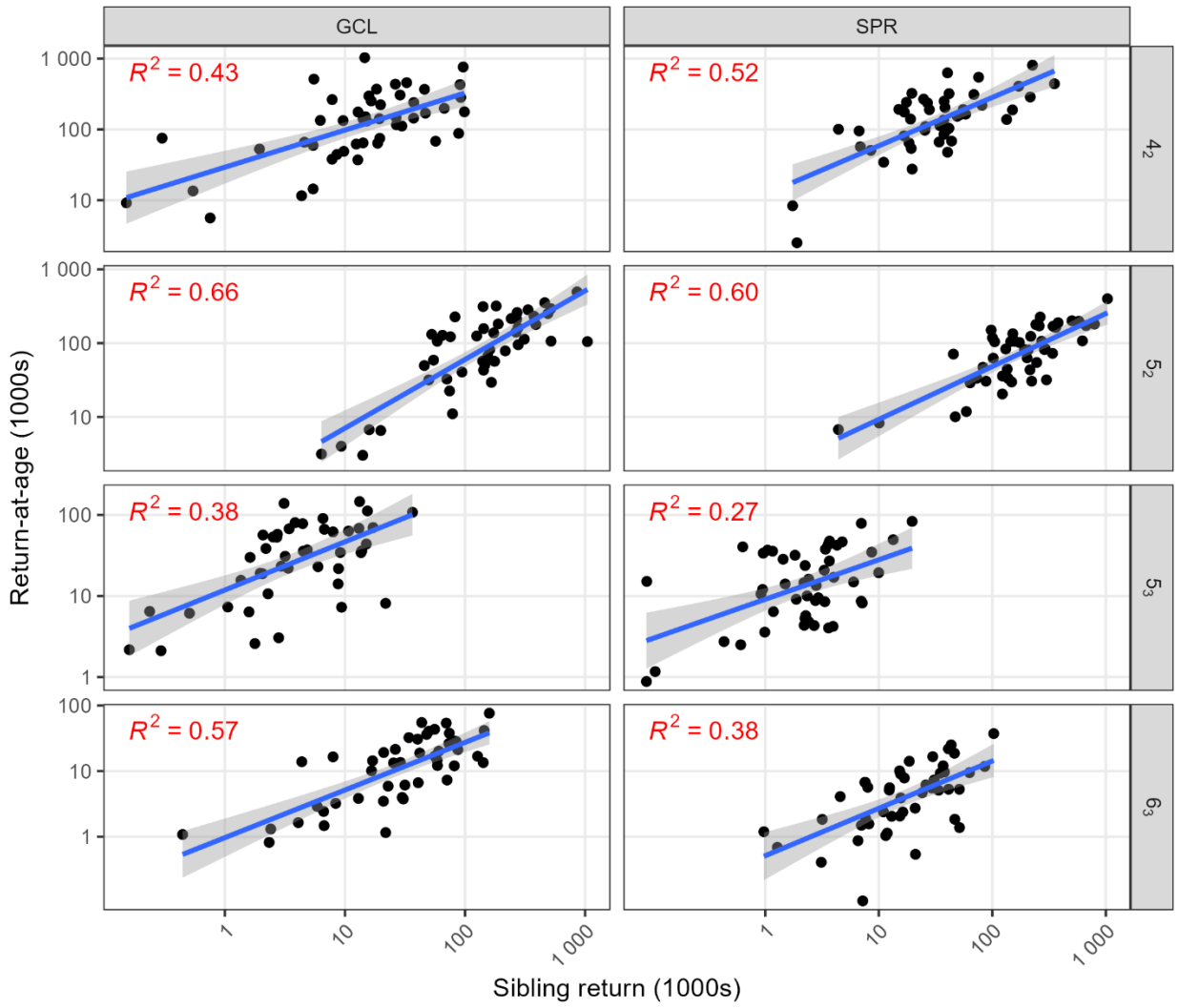

Figure 1. Sibling model predictions and observed returns by Gilbert-Rich age (rows) and lake (columns; GCL = Great Central Lake, SPR = Sproat Lake). Each dot shows returns-at-age versus sibling returns (i.e. 1 ocean year younger than ages listed in panel column titles) for one brood year. Blue lines and the shaded areas around them show the mean predictions and 95% confidence interval, respectively. Note.—both axes are on log_{10} scale.

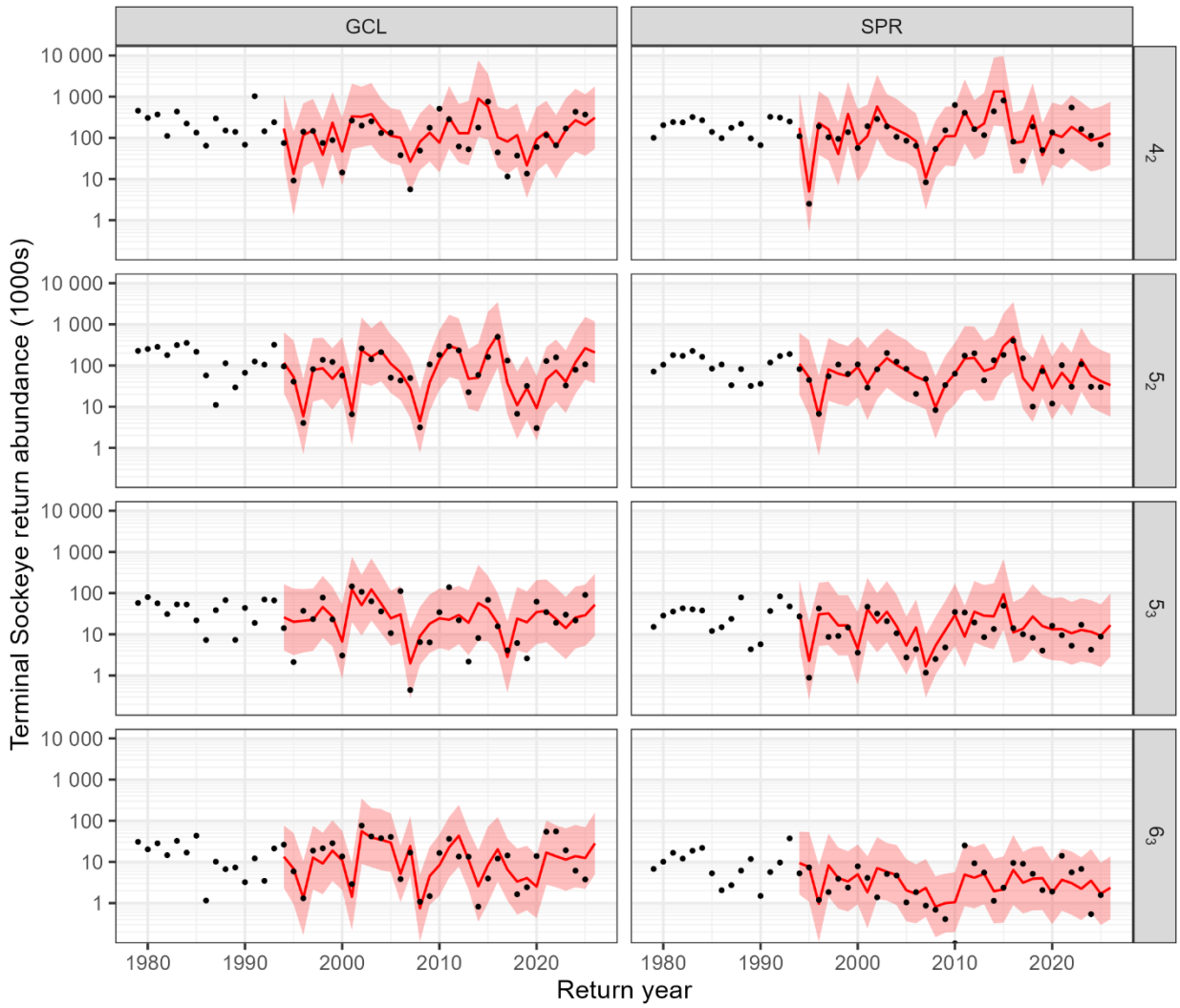

Figure 2. Multiple regression model retrospective predictions and observed returns by Gilbert-Rich age (rows) and lake (columns; GCL = Great Central Lake, SPR = Sproat Lake). Black dots show the observed return for each year. Red lines and the shaded areas around them show the mean predictions and 75% prediction interval, respectively. Note.—the vertical axis is plotted on log_{10} scale.

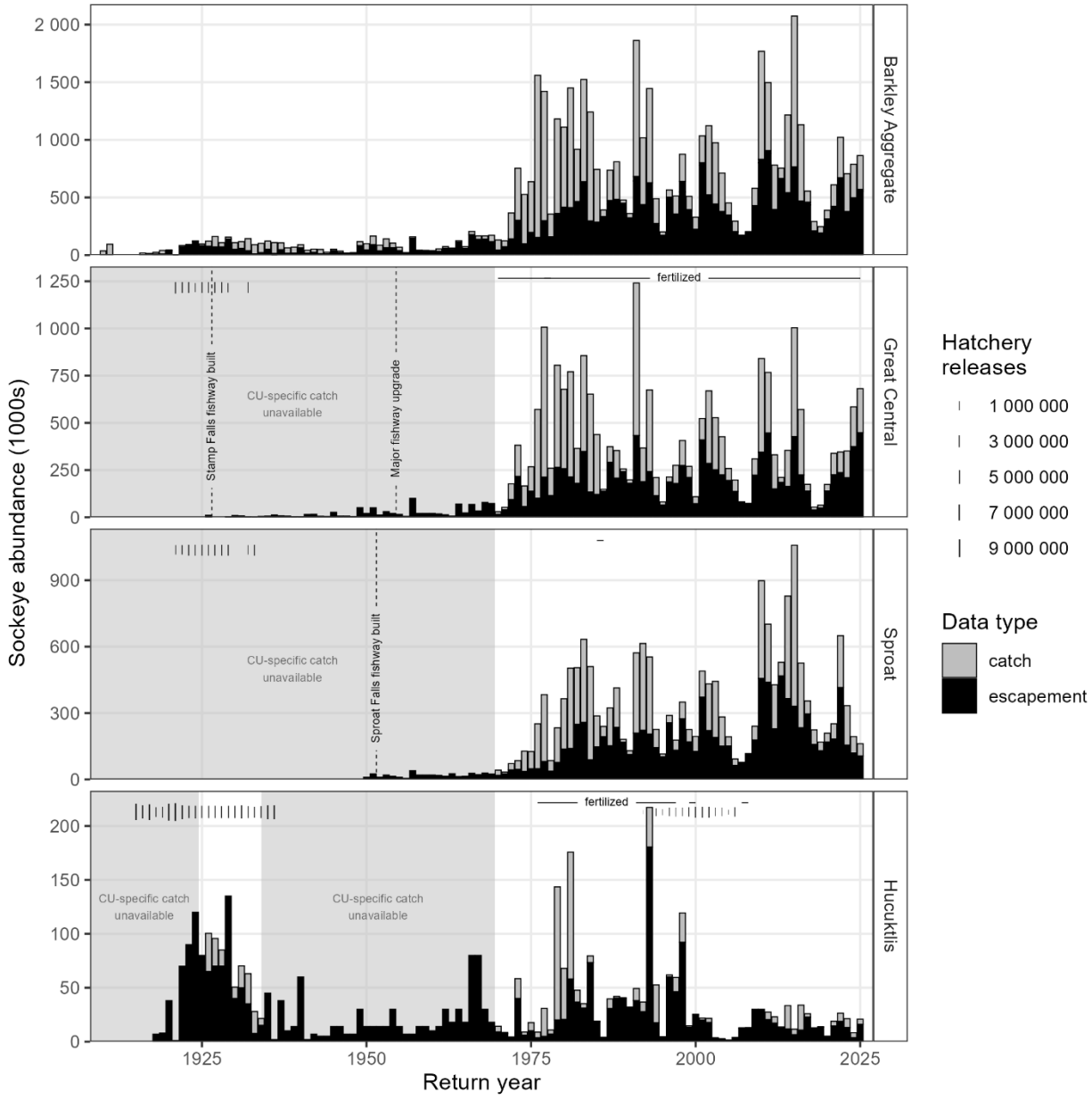

Figure 3. Time series of Barkley Sockeye abundances, both on aggregate (top panel) and by Conservation Unit (CU; remaining panels, which are summed together in the top panel). Escapement records begin in 1917, 1926, and 1950 for the Hucuktlis, Great Central, and Sproat CUs, respectively. Horizontal black lines along the tops of each panel show years when fertilizer was added to each lake. Vertical black ticks along the tops of each panel show the magnitude of annual hatchery Sockeye releases into each lake. Hatchery releases into Great Central and Sproat lakes between 1921–1932 were transplanted from the Hucuktlis CU by the old Anderson Hatchery on Hucuktlis Lake. Additional efforts to bolster Sockeye production included the construction of fishways at Stamp Falls in 1927 (with a major upgrade in 1954) and at Sproat Falls in 1951. Note.—y-axis scale differs between panels.

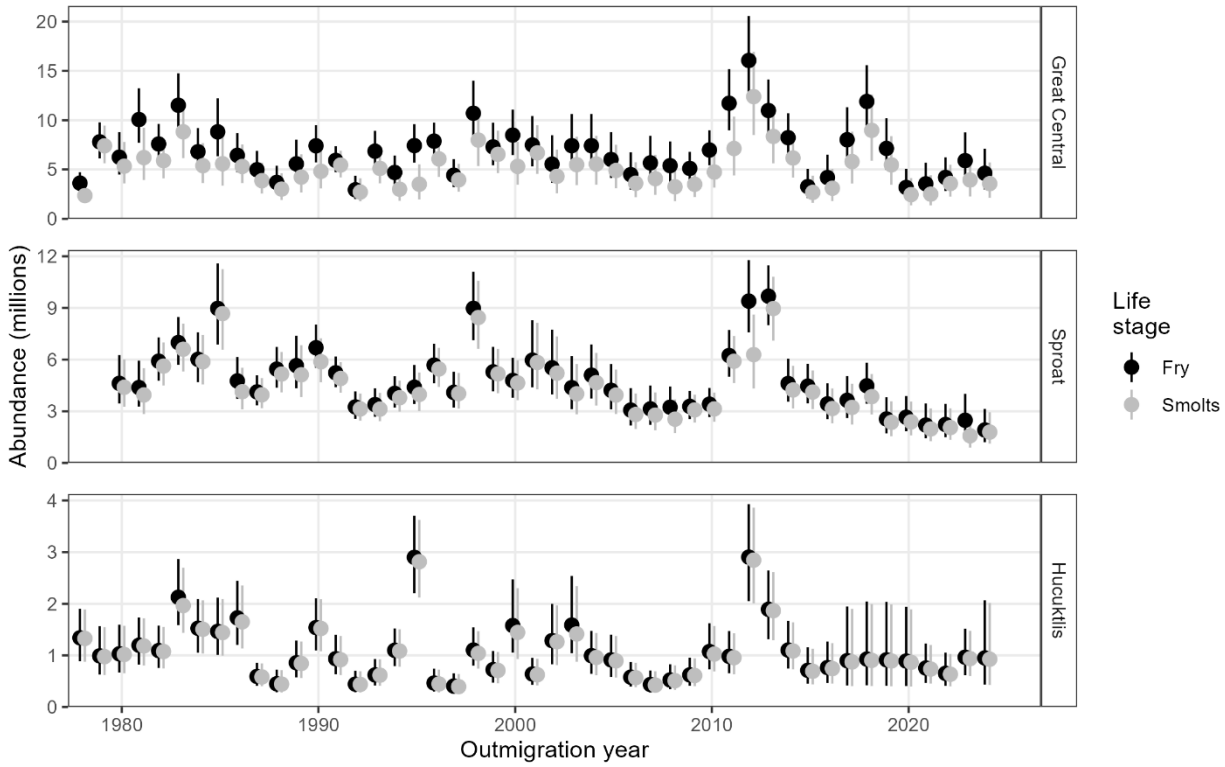

Figure 4. Time series of estimated fry and smolt abundances from Barkley Sockeye nursery lakes. Estimates are derived from freshwater life cycle models, which are based on abundance estimates derived from acoustic and trawl surveys (ATS). Points show median estimates and whiskers show 80% credible intervals. Note.—vertical axis scale ranges differ between panels.

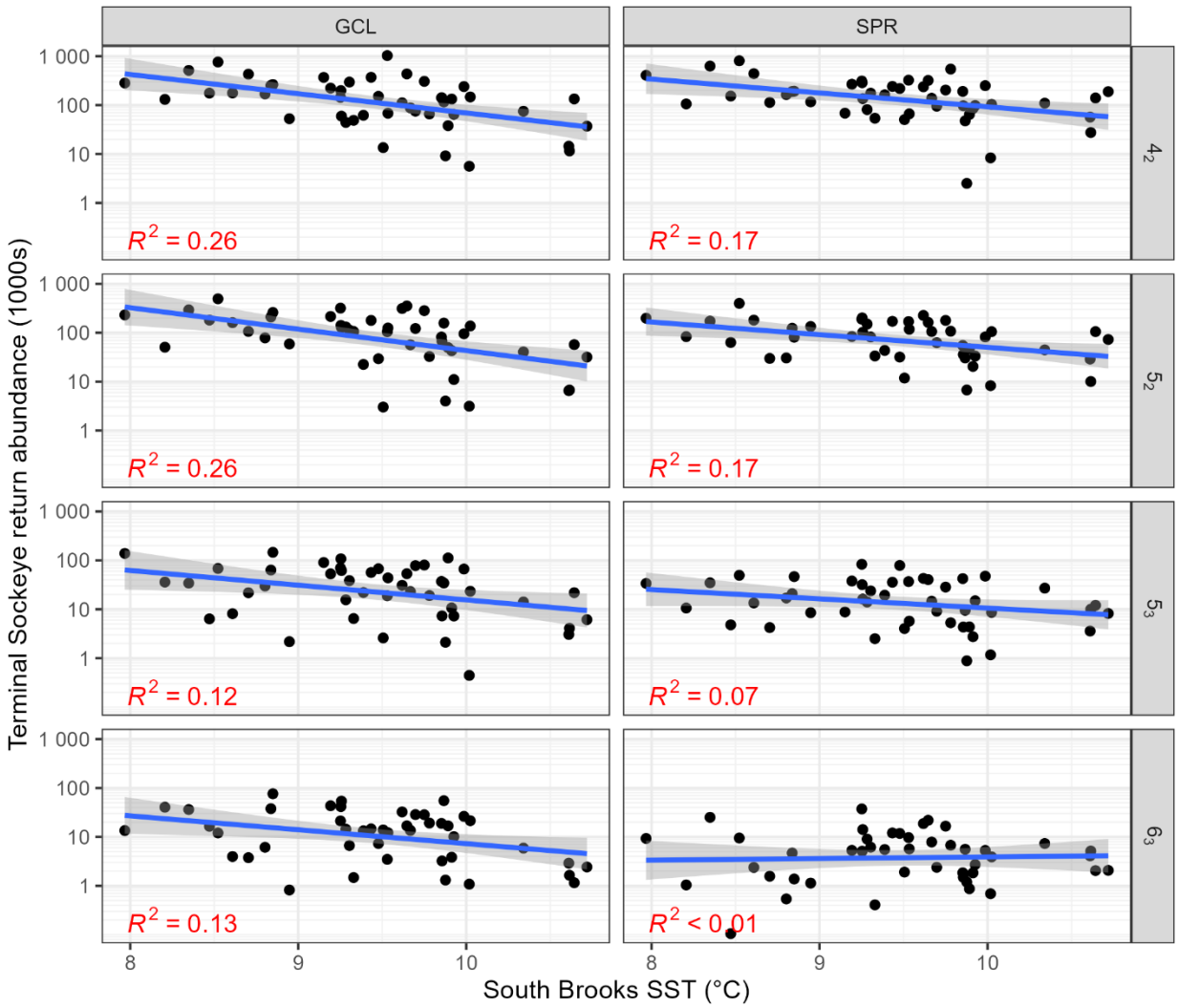

Figure 5. Correlations between March–May mean sea surface temperatures (SST) recorded at the "South Brooks" monitoring buoy and Barkley Sockeye returns by Gilbert-Rich age (rows) and lake (columns; GCL = Great Central Lake, SPR = Sproat Lake). Black dots show observed returns for each lake and age group. Blue lines and the shaded areas around them show the mean predictions and 95% confidence interval, respectively. SST values from 1978–1996 were imputed using the National Oceanographic and Atmospheric Administration's ERSST model, based on its correlation with the observed temperatures (R^2 = 0.88). Note.—vertical axis is plotted on log10 scale.

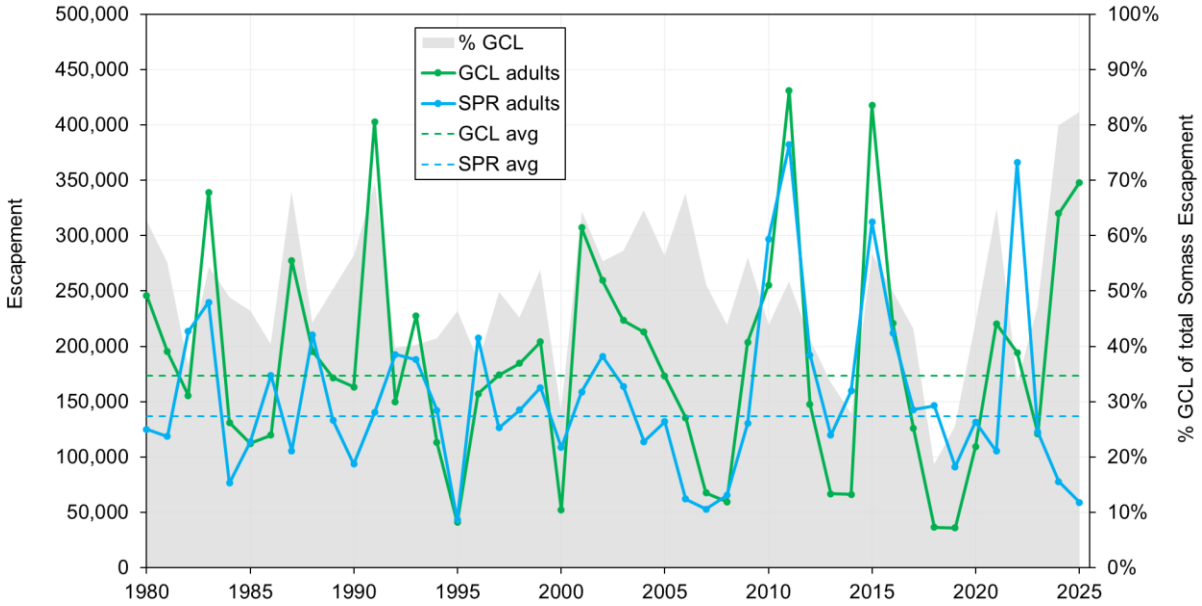

Figure 6. Time series of adult escapements to the Somass River. Solid and dashed coloured lines are plotted with respect to the left axis and show annual and long-term median values, respectively, for Great Central Lake (GCL) and Sproat Lake (SPR). The shaded grey area is plotted with respect to the right axis and shows the annual percentage of total Somass sockeye escapement comprised of Great Central Lake sockeye.

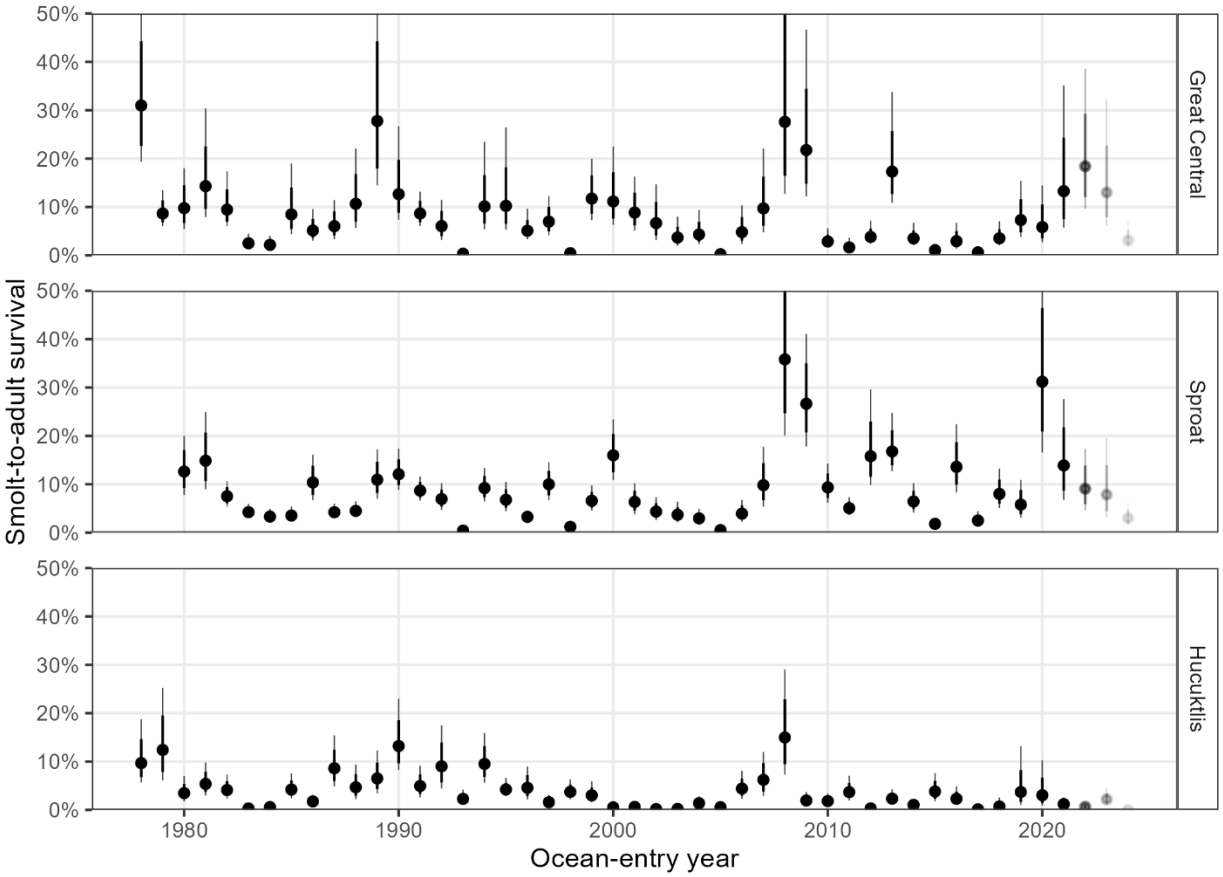

Figure 7. Time series of estimated marine survival rates for Somass Sockeye Conservation Units. Points show the median estimates with thick and thin whiskers indicating the 80% and 95% credible intervals, respectively. Transparent values indicate incomplete smolt years, where some of the adults that will contribute to the numerator in the survival rate calculation are still at sea and have therefore not been observed. Transparency is scaled to show the number of age classes missing for a complete survival calculation.