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Advisory Announcement

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2026 Upper Cook Inlet Sockeye Salmon Forecast

The Upper Cook Inlet (UCI) sockeye salmon total run forecast of **7.60 million fish** (Table 1) is predicted to be **excellent**. The categorical ranges of sockeye salmon total run strength were developed from the 20th, 40th, 60th, and 80th percentiles of historical runs (Table 2). Forecasts of salmon fisheries are inherently uncertain and are primarily used to gauge the general magnitude of expected runs and guide early-season management strategies.

Table 1. – Forecast of the 2026 Upper Cook Inlet sockeye salmon run, escapement, and available harvest in millions of fish. Forecast range is indicated in parenthesis.

Production component	Forecast estimate
Total run	7.60 (5.07 – 10.13)
Escapement	2.00
Available harvest	5.60

Table 2. – Categorical ranges of Upper Cook Inlet sockeye salmon runs 1986 to 2025 and the 2026 forecast in bold.

Category	Range (million)	Percentile
Poor	Less than 4.2	Less than 20th
Weak	4.2 to 5.2	20th to 40th
Average	5.2 to 5.9	40th to 60th
Strong	5.9 to 6.5	60th to 80th
Excellent	**Greater than 6.5**	**Greater than 80th**

Forecast Methods

The major sockeye salmon systems in Upper Cook Inlet are the Kenai, Kasilof, and Susitna Rivers, and Fish Creek. Five model types were evaluated to forecast the total run of sockeye salmon to the Kenai and Kasilof Rivers in 2026: (1) brood-year spawners, (2) emigrating smolt, (3) fall fry, (4) sibling returns and (5) average returns (Table 3). Forecast model performance was assessed using the mean arctangent absolute percent error (MAAPE) between the forecasts and actual runs over the past 10 years (2016–2025; Table 4). The top three models with the lowest MAAPE and

statistically significant parameters were selected for each age class and a weighted hybrid model approach was applied (Table 3). Model weights were assigned based on the MAAPE of each selected model, with a lower MAAPE receiving a greater weight towards the forecast estimate. Weighted forecast estimates were summed across age classes for stock specific run estimates.

For Susitna River sockeye salmon, returns of age-0.3, -1.2, -1.3, -2.2 and -2.3 fish in 2026 were forecasted using mean return per spawner by age class spanning brood years 2006–2021. Spawners for brood years 2019–2021 were estimated by subtracting the projected commercial harvest, (average harvest rate of 42% from 2007−2015), from the forecasted total run.

The 2026 forecast for Fish Creek sockeye salmon was estimated using the recent 5-year (2021-2025) average of total runs to the system. Total run estimate for Fish Creek sockeye salmon in 2022 is assumed to be biased low because weir operations were stopped early, and the escapement estimate was not expanded to account for unmonitored passage.

The sockeye salmon forecast for unmonitored systems in UCI was estimated as 17% of the aggregate forecast for the four monitored stocks. Unmonitored stocks include Crescent River, Big River, McArthur River, Chilligan River, Coal Creek, Cottonwood Creek, Wasilla Creek, Eagle River, Packers Creek, and many other smaller systems in the area. The fraction of the total run destined for unmonitored systems was calculated using genetic estimates of the stock composition of offshore test fishery harvests.

The estimated available harvestable surplus of sockeye salmon was calculated by subtracting the aggregate escapement from the total run forecast for all stocks. Aggregate escapement was estimated as the sum of the midpoints of the escapement goal ranges for each of the monitored sockeye salmon-producing systems and the escapement into unmonitored systems.

Table 3. – Description of models used to forecast returns of sockeye salmon to the Kasilof and Kenai Rivers, 2026.

Model	Description
5-year moving average	Unweighted average of the previous 5-year's returns for the specified age class.
Exponential smoothing	An exponential function used to assign exponentially decreasing weights over time for the specified age class.
Ricker	Regression between the ratio of recruits of the specified age class and spawners from the same brood year and the number of spawners from the same brood year.
Ricker AR1	Autoregressive integrated moving average (ARIMA) analysis on the ratio of recruits of the specified age class and spawners from the same brood year with a covariate for the abundance of spawners from the same brood year.
Sibling	Regression between the returns of a specified age class and the most recent returns from the same brood year.
Sibling AR1	Autoregressive integrated moving average (ARIMA) analysis on the returns of the specified age class with a covariate for the abundance of spawners from the same brood year.

Note: Log transformation may be needed to meet assumptions of a linear regression.

2025 Run and Forecast Performance

Overall, the 2025 UCI sockeye salmon run of 11.52 million was 4.59 million greater (66%) than the forecast of 6.93 million fish. In 2025, the estimated total run was 8.04 million to the Kenai River; 1.69 million to the Kasilof River; 460,000 to the Susitna River; and 80,000 to Fish Creek. Escapement of Susitna River sockeye salmon in 2025 was estimated by subtracting the projected commercial harvest (average harvest rate of 42% from 2007−2015) from the 2025 run forecast of 404,800 fish. The 2025 run forecast was 4.18 million to the Kenai River; 1.23 million to the Kasilof River; and 105,000 to Fish Creek. In 2025, the commercial harvest of UCI sockeye salmon was 3.45 million fish.

2026 Forecast Results and Discussion

In 2026, a run of approximately 7.60 million sockeye salmon is forecast to return to UCI with an estimate of 5.60 million sockeye salmon available for harvest (Table 1). Based on the absolute percentage error (APE) for the recent 10-year (2016–2025) forecasted UCI runs compared with the estimated runs, there is an 80% probability that the 2026 UCI forecast range falls between 5.07 million and 10.13 million fish (Table 1). This UCI forecast is excellent compared to historical total run estimates from 1986 to present (Table 2). Forecast error for UCI has ranged from 40% below forecast to 45% above forecast over the last ten years with a mean absolute percent error (MAPE) of 22% (Figure 1).

The Kenai River sockeye salmon forecast is approximately 4.45 million fish (Table 4). The 2026 Kenai River forecast is 464,500 (12%) fish more than the historical (1986–2025) average run of 3.98 million and 833,000 (23%) fish more than the recent 10-year (2016–2025) average run of 3.61 million (Figure 1). Forecast error for the Kenai River has ranged from 48% below forecast to 59% above forecast over the last ten years with a MAPE of 25% (Figure 1).

The Kasilof River sockeye salmon run forecast is approximately 1.46 million fish (Table 4). Over the last 10 years, the Kasilof River forecast has experienced a MAPE of 24%, with errors ranging from 35% under forecast to 79% over forecast. The 2026 forecast is 515,00 fish (54%) greater than the historical (1986–2025) average run of 954,000 fish and 439,000 fish (43%) greater than the recent 10-year (2016–2025) average run of 1.02 million fish.

Approximately 489,400 and 100,000 sockeye salmon are forecast to return to the Susitna River and Fish Creek respectively in 2026. The 2026 Susitna River sockeye salmon forecast is approximately 93,000 fish (24%) above the historical (2006–2025) average run of 396,000 fish and approximately 126,000 fish (35%) greater than the recent 10-year (2016–2025) average run of 363,000 fish. The 2026 Fish Creek sockeye salmon forecast is 10,000 (9%) fish fewer than long-term average run size of 110,000 fish.

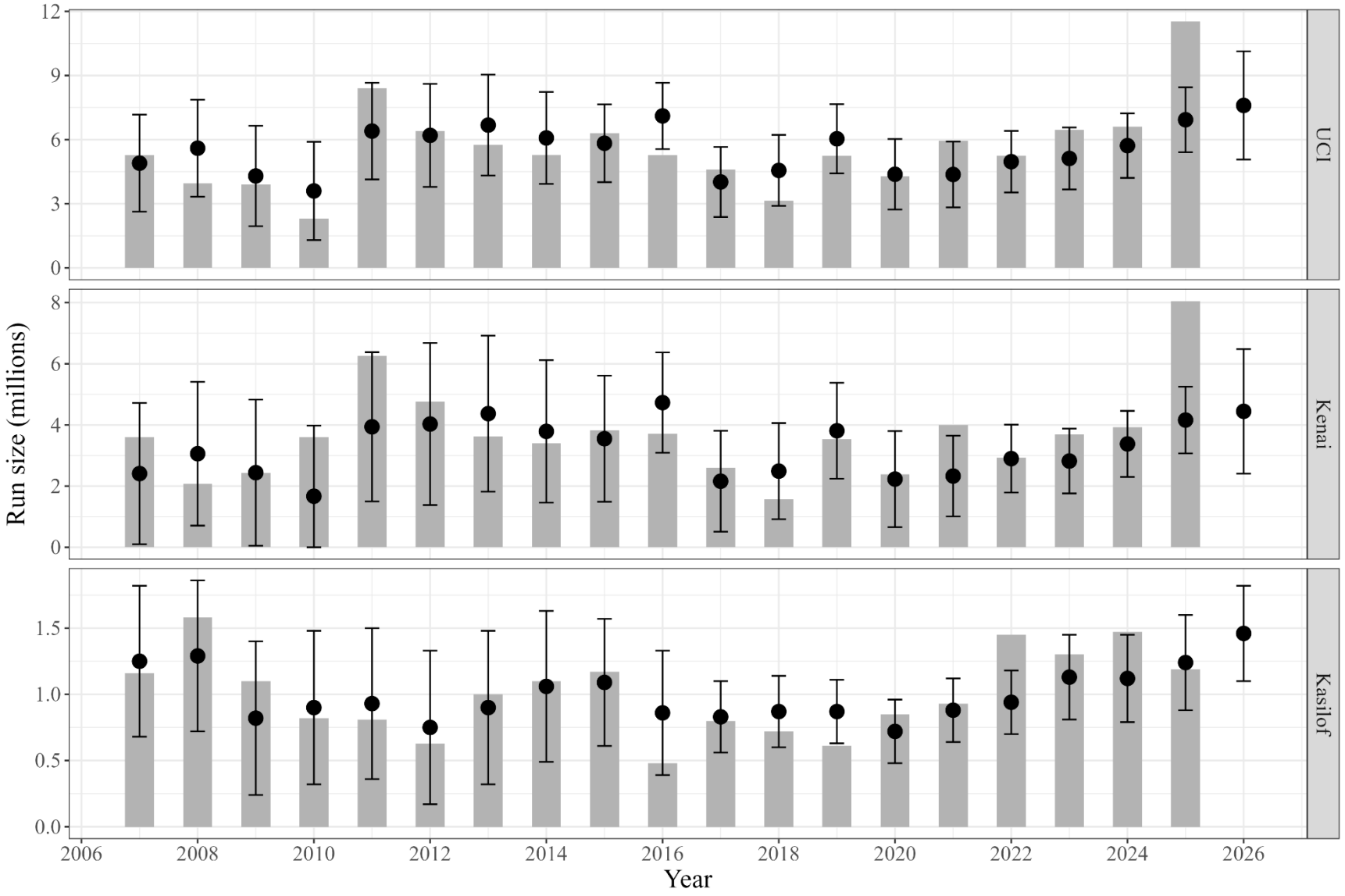

Figure 1. – Estimated total runs (grey bars) of Upper Cook Inlet (top panel), Kenai River (middle panel), and Kasilof River (bottom panel) sockeye salmon compared to total run forecasts (black points), 2007–2025 and 2026 forecast. Error bars represent 80% confidence intervals of forecast

Table 4. – Kenai and Kasilof River sockeye salmon forecast estimates, 2026.

River	Age class	Model	MAAPE	Weight	Prediction	Weighted prediction	Subtotal	Total
Kenai	1.2	5-Year Moving Average	44.14	0.37	675,853	249,771		
		Exponential Smoothing	48.74	0.33	706,663	236,500		
		Log R vs S	55.15	0.30	390,169	115,398	601,670	
	1.3	Log Sibling	26.16	0.42	3,397,410	1,431,673		
		5-Year Moving Average	37.68	0.29	3,149,529	921,529		
		Exponential Smoothing	38.55	0.29	3,263,228	933,303	3,286,505	
	2.2	Log R vs S AR1	33.29	0.36	235,556	85,577		
		Log Sibling	36.40	0.33	218,443	72,578		
		5-Year Moving Average	39.72	0.30	199,016	60,591	218,745	
	2.3	Exponential Smoothing	47.17	0.37	407,561	150,935		
		Log R vs S	52.96	0.33	243,957	80,469		
		5-Year Moving Average	58.27	0.30	357,558	107,202	338,605	**4,445,525**
Kasilof	1.2	Exponential Smoothing	37.11	0.38	928,759	350,396		
		5-Year Moving Average	41.68	0.34	749,627	251,842		
		Log Sibling	48.83	0.29	740,740	212,422	814,660	
	1.3	Log Sibling	35.00	0.35	475,127	167,878		
		Ricker	37.80	0.33	384,043	125,635		
		Log R vs Log S	38.70	0.32	384,043	122,713	416,226	
	2.2	Log Sibling	32.18	0.40	229,681	92,843		
		Exponential Smoothing	43.27	0.30	190,678	57,325		
		5-Year Moving Average	44.08	0.30	171,396	50,586	200,753	
	2.3	Exponential Smoothing	57.81	0.35	11,840	4,102		
		Ricker AR1	59.79	0.33	52,904	17,722		
		5-Year Moving Average	62.88	0.32	20,728	6,602	28,426	**1,460,066**

OTHER SALMON SPECIES

Table 5. – Recent average commercial harvest for other salmon species in Upper Cook Inlet, 2026.

Species	5-year average
pink salmon	199,300
chum salmon	96,000
coho salmon	94,300

Recent Harvest Discussion

Due to the lack of information, the department does not formally forecast these species. The recent 5-year average commercial harvests are presented for chum and coho salmon (Table 5). Pink salmon commercial harvest average is based upon the previous 5 even-numbered years (Table 5). Harvests in these years represent current management strategies. In 2026, harvest opportunities will be based on inseason information.

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