Prepared by: Kyle Gatt

Total Run Projections

An inseason tier-status assessment is annually performed for late-run stock Kenai River sockeye salmon (See Table 4). Historically, the tier status assessment had relied on cumulative catch-per-unit-effort timing curves from the offshore test fish project (OTF) to project the total run to the Kenai River. This method provided unbiased estimates of run timing because performance of this fishery is largely independent of management actions. In 2024, the OTF project was cut due to budget issues which required other methods to be explored for the inseason projection. Inriver run timing curves were assessed using historical total run data and were found to provide reliable total run projection estimates within the scope of run tier designations.

Stock-specific inriver run timing models spanning years 2000 to 2023 were evaluated to project the total run of sockeye salmon to the Kenai and Kasilof Rivers. Projection model performance was assessed using the mean arctangent absolute percent error (MAAPE) between the projected daily total run estimates and actual runs up to the date the projection was run. The top three models with the lowest MAAPE were selected for each stock and a weighted hybrid model approach was applied. Model weighted were assigned based on the running MAAPE of each selected model, with a lower MAAPE receiving a greater weight towards the final projection estimate.

Table 1.- Management tiers for the late-run stock Kenai River sockeye salmon.

Tier	Total Run Size
Lower	Less than 2,300,000
Middle	2,300,000 to 4,600,000
Upper	Greater than 4,600,000

Table 2.- Total run projections by stock.

Stock	Year	Timing	MAAPE	Model projection	Model weight	Weighted projection	Total
Kasilof	2023	72.9%	11.38	2,321,914	0.36	846,894.6	**2,250,827**
	2019	81.1%	11.75	2,087,404	0.35	737,778.2	

Stock	Year	Timing	MAAPE	Model projection	Model weight	Weighted projection	Total
	2018	71.6%	14.73	2,363,781	0.28	666,154.0	
Kenai	2010	73.6%	21.98	4,437,806	0.35	1,531,110.6	**4,238,564**
	2022	74.3%	22.62	4,397,626	0.34	1,474,199.0	
	2003	84.7%	23.72	3,856,829	0.32	1,233,254.2	

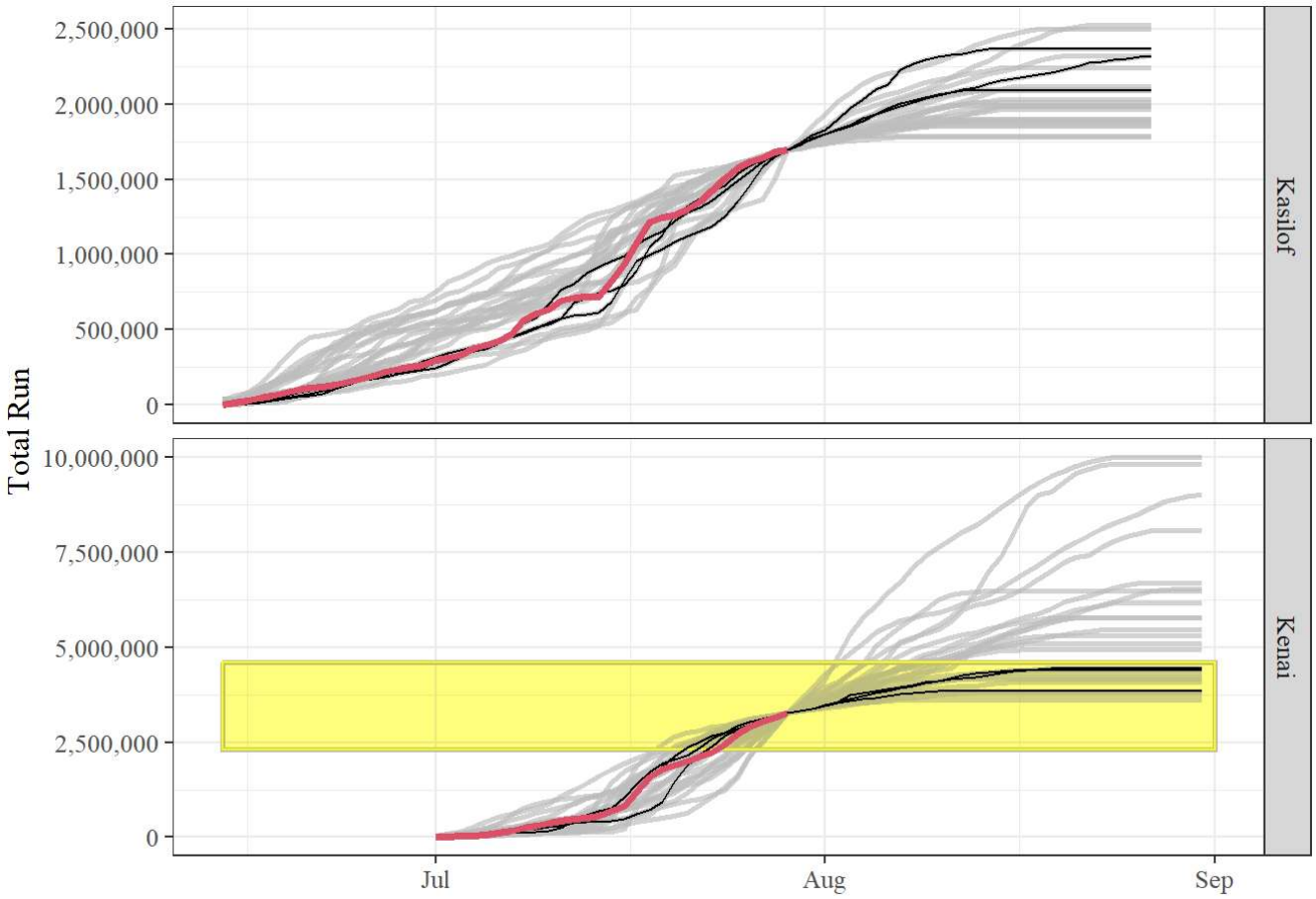

Figure 1.- The top three competing models for each stock (black lines) relative to actual daily cumulative total runs (red line). All other competing models are indicated in grey. The middle management tier (2.3 to 4.6 million fish) for late-run stock Kenai River sockeye salmon is indicated in yellow.

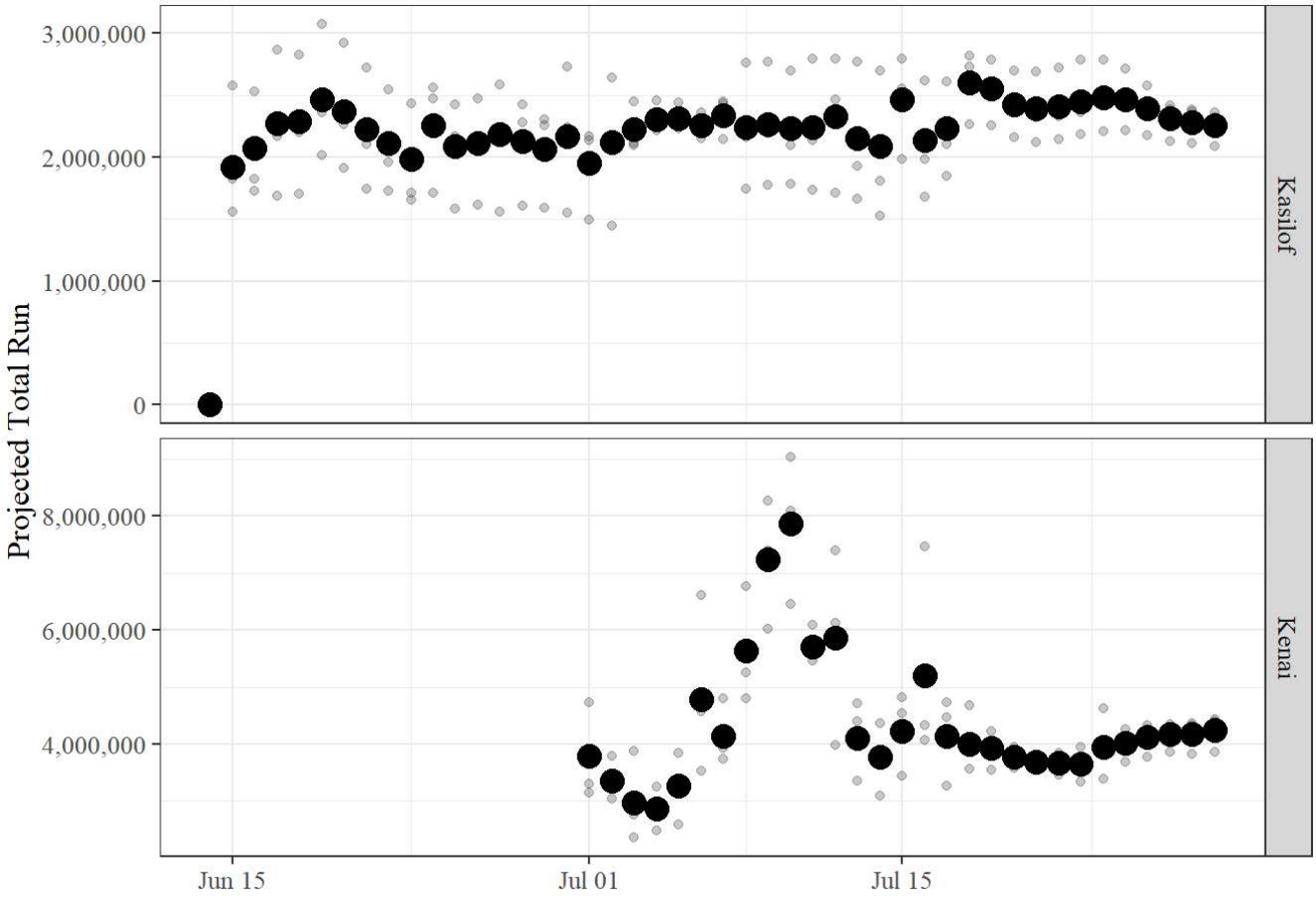

Figure 2.- Weighted total run estimates (black dots) using the top three selected run timing models by projection date and stock. Grey dots represent individual total run projections for each selected model by date.

Age Allocation Modeling

A weighted age composition method was used to estimate the contributions of Kenai, Kasilof, Susitna, and Crescent rivers, Fish Creek, and"Other" sockeye salmon stocks to commercial fishery harvests in UCI (see Bernard 1983 and Tobias and Tarbox 1999 for general methods). The method is based on the assumption that specific fisheries exploit each stock equally. The relative contribution of a specific age class in the escapement represents the relative contribution of that age class in the commercial harvest in a specific time and area fished. Sockeye salmon harvests in the various fishery subdistricts were allocated to the stocks entering major rivers that were in closest proximity to the fishery.

Table 3.- Cumulative total run estimates to date for primary Upper Cook Inlet sockeye salmon stocks.

Stock	Run component	Total
Crescent	Commercial Harvest	4,390
	Escapement	41,465
	Subtotal	45,855
Fish Creek	Commercial Harvest	6,517
	Escapement	24,050
	Subtotal	30,567

Stock	Run component	Total
Kasilof	Commercial Harvest	441,643
	Escapement	952,994
	Personal Use and Sport	297,792
	Subtotal	1,692,430
Kenai	Commercial Harvest	966,149
	Escapement	1,594,506
	Personal Use and Sport	704,907
	Subtotal	3,265,562
Other	Commercial Harvest	208,472
	Escapement	412,748
	Subtotal	621,220
Susitna	Commercial Harvest	62,727
	Escapement	138,898
	Subtotal	201,625

Table 4.- Age composition of returns to the Kenai and Kasilof Rivers in 2024 relative to preseason forecasts.

Stock	Age class	Composition of return	Run to date	Forecasted run	Percent remaining	Total fish remaining
Kasilof	0.2	0.0%	5,442	0	-Inf%	0
	0.3	0.0%	0	0	0.0%	0
	0.4	0.0%	0	0	0.0%	0
	1.1	0.0%	4,164	0	-Inf%	0
	1.2	40.0%	685,196	506,000	-35.0%	0
	1.3	48.0%	809,395	332,218	-144.0%	0
	1.4	0.0%	0	0	0.0%	0
	2.1	0.0%	5,483	0	-Inf%	0
	2.2	10.0%	165,706	221,924	25.0%	56,218
	2.3	1.0%	17,043	55,019	69.0%	37,976
	2.4	0.0%	0	0	0.0%	0
Kenai	0.2	0.0%	0	0	0.0%	0
	0.3	0.0%	0	0	0.0%	0

Stock	Age class	Composition of return	Run to date	Forecasted run	Percent remaining	Total fish remaining
	0.4	0.0%	0	0	0.0%	0
	1.1	0.0%	0	0	0.0%	0
	1.2	26.0%	838,050	515,248	-63.0%	0
	1.3	62.0%	2,028,154	2,143,928	5.0%	115,774
	1.4	1.0%	41,429	0	-Inf%	0
	2.1	0.0%	0	0	0.0%	0
	2.2	7.0%	240,612	248,800	3.0%	8,188
	2.3	4.0%	117,317	472,484	75.0%	355,167
	2.4	0.0%	0	0	0.0%	0

Inseason Total Run Tracking

Table 5.- Cumulative harvest and passage estimates of sockeye salmon in Upper Cook Inlet (UCI), 2024. All personal use and sport harvest estimates are projections based on recent five-year average harvest rates within each fishery. The Susitna River escapement estimate uses the average harvest rate of this stock in UCI commercial salmon fisheries (42%; 2007 to 2015), the average run timing, and pre-season forecasts. The Crescent River escapement estimate is based on the average commercial sockeye salmon harvest in the western district and average harvest rate of this stock (46.3%) from 2006 to 2021.

Run component	Fishery	Cumulative season total
Commercial Harvest	Central District Drift - State Waters	1,300,632
	Kasilof Section Set Net Fishery	1,149
	Kenai Section Set Net Fishery	21,105
	Northern District Set Net Fishery - Eastern Subdistrict	19,946
	Northern District Set Net Fishery - General Subdistrict	14,447
	UCI EEZ	310,340
	Western Subdistrict Set Net Fishery	79,441
	Subtotal	1,747,060
Escapement	Crescent Escapement	41,409
	Fish Creek Escapement	24,050
	Kasilof River Escapement	951,725
	Kenai River Escapement	1,595,570
	Susitna Escapement	138,898
	Other	412,748
	Subtotal	3,164,400

Run component	Fishery	Cumulative season total
Personal Use and Sport	Kasilof Personal Use Dipnet	194,007
	Kasilof Personal Use Gillnet	35,266
	Kasilof Sport	68,123
	Kenai Personal Use Dipnet	472,469
	Kenai Sport	232,909
	Subtotal	1,002,774
Grand Total		5,914,234