

**DRAFT: Yukon River King Salmon Stock Status and
Action Plan, 2026**

by

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Month Year

Alaska Department of Fish and Game

Division of Commercial Fisheries



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Weights and measures (metric)		General		Mathematics, statistics	
centimeter	cm	Alaska Administrative Code	AAC	<i>all standard mathematical signs, symbols and abbreviations</i>	
deciliter	dL	all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.	alternate hypothesis	H_A
gram	g	all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.	base of natural logarithm	e
hectare	ha	at	@	catch per unit effort	CPUE
kilogram	kg	compass directions:		coefficient of variation	CV
kilometer	km	east	E	common test statistics	(F, t, χ^2 , etc.)
liter	L	north	N	confidence interval	CI
meter	m	south	S	correlation coefficient	
milliliter	mL	west	W	(multiple)	R
millimeter	mm	copyright	©	correlation coefficient	
		corporate suffixes:		(simple)	r
Weights and measures (English)		Company	Co.	covariance	cov
cubic feet per second	ft ³ /s	Corporation	Corp.	degree (angular)	°
foot	ft	Incorporated	Inc.	degrees of freedom	df
gallon	gal	Limited	Ltd.	expected value	E
inch	in	District of Columbia	D.C.	greater than	>
mile	mi	et alii (and others)	et al.	greater than or equal to	≥
nautical mile	nmi	et cetera (and so forth)	etc.	harvest per unit effort	HPUE
ounce	oz	exempli gratia		less than	<
pound	lb	(for example)	e.g.	less than or equal to	≤
quart	qt	Federal Information Code	FIC	logarithm (natural)	ln
yard	yd	id est (that is)	i.e.	logarithm (base 10)	log
		latitude or longitude	lat or long	logarithm (specify base)	log ₂ , etc.
Time and temperature		monetary symbols		minute (angular)	'
day	d	(U.S.)	\$, ¢	not significant	NS
degrees Celsius	°C	months (tables and figures): first three letters	Jan, ..., Dec	null hypothesis	H_0
degrees Fahrenheit	°F	registered trademark	®	percent	%
degrees kelvin	K	trademark	™	probability	P
hour	h	United States	U.S.	probability of a type I error	
minute	min	(adjective)		(rejection of the null hypothesis when true)	α
second	s	United States of America (noun)	USA	probability of a type II error	
		U.S.C.	United States Code	(acceptance of the null hypothesis when false)	β
Physics and chemistry		U.S. state	use two-letter abbreviations (e.g., AK, WA)	second (angular)	"
all atomic symbols				standard deviation	SD
alternating current	AC			standard error	SE
ampere	A			variance	
calorie	cal			population	Var
direct current	DC			sample	var
hertz	Hz				
horsepower	hp				
hydrogen ion activity	pH				
(negative log of)					
parts per million	ppm				
parts per thousand	ppt, ‰				
volts	V				
watts	W				

REPORT TO THE ALASKA BOARD OF FISHERIES

**DRAFT: YUKON RIVER KING SALMON STOCK STATUS AND ACTION
PLAN, 2026**

by

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ABSTRACT

Yukon River king salmon have been designated a stock of yield concern since 2000 because of an inability to consistently achieve expected yields above escapement needs since 1998. Currently, escapements have not achieved the lower bound of any currently established escapement goal range in 5 of the last 5 years (2020–2024). In response to guidelines established in the Policy for the Management of Sustainable Salmon Fisheries (SSFP), the Alaska Board of Fisheries changed the stock of concern designation for Yukon River king salmon (*Oncorhynchus tshawytscha*) from a yield concern to a management concern based on the recommendation of the Alaska Department of Fish and Game (department) in October 2025. A “management concern” is defined as “a concern arising from a chronic inability, despite use of specific management measures, to maintain escapements for a salmon stock within the bounds of the sustainable escapement goal (SEG), biological escapement goal (BEG), optimum escapement goal (OEG), or other specified management objectives for the fishery.” This action plan summarizes historical assessment of annual run size and describes the existing regulations and emergency order (EO) authority that the department follows to manage the Yukon River king salmon run. Options under Board authority are then presented for potential management actions for the commercial, sport, and subsistence fisheries, and describe current research projects that are being conducted. It also includes proposed criteria for future removal of the stock of concern status. Management actions have reduced harvest rates to near zero, however king salmon productivity remains poor and escapement goals have not been achieved.

Keywords: Chinook salmon, *Oncorhynchus tshawytscha*, Yukon River, stock of concern, sustainable salmon fisheries policy, Alaska Board of Fisheries.

INTRODUCTION

The Yukon River originates in Canada and approximately 60% of the drainage is in Alaska. Management of the shared fishery stocks on the Yukon River mainstem is conducted on a collaborative basis under the auspices of the Yukon River Salmon Agreement (YRSA), Chapter 8 of the Pacific Salmon Treaty. Recognizing the persistent decline of Canadian-origin king salmon has resulted in an inability to meet conservation objectives and provide benefits to the fisheries of both countries, ADF&G acting under its authorities delegated by congress under the Yukon River Salmon Act and the Department of Fisheries and Oceans Canada entered into an agreement concerning Canadian-origin Yukon River king salmon for 2024 through 2030. The agreement, referred to as the 7-Year Agreement, contained several elements relevant to this action plan (Figure 1). Most notably, it called for *a suspension of directed Chinook commercial, sport, domestic, and personal use fisheries in the mainstem Yukon River in Alaska and Canada for one full life cycle (seven years) ... regardless of run abundance*. The 7-Year Agreement acknowledged that *in the absence of fisheries, the status of Chinook salmon has continued to be depressed and reflects the long-term cumulative effects of other factors, particularly habitat degradation resulting from resource development, competition from hatchery production, cyclic natural phenomena, and large scale environmental variability affecting both marine and freshwater habitats*. Accordingly, it prioritized the undertaking of research to better understand the causes of low run abundances and called for the development of a bilateral (U.S.-Canada) rebuilding plan. The YRSA and the 7-Year Agreement supersede Board authority on actions affecting Canadian-origin king salmon.

Figure 1.– Agreement of April 1, 2024 regarding Canadian-origin Yukon River Chinook Salmon for 2024 through 2030.



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Agreement of April 1, 2024 regarding Canadian-origin Yukon River Chinook Salmon for 2024 through 2030

The following agreement between Fisheries and Oceans Canada and the Alaska Department of Fish and Game (hereafter referred to as “the Parties”) concerning Canadian-origin Yukon River Chinook salmon shall apply to the period from April 2024 through 2030.

Recognizing the persistent decline of Chinook salmon has resulted in an inability to meet conservation objectives and provide benefits to the fisheries of both countries, the Parties agree to:

1. Implement a suspension of directed Chinook commercial, sport, domestic, and personal use fisheries in the mainstem Yukon River and Canadian tributaries for one full life cycle (seven years). This suspension will remain in effect regardless of run abundance.
2. Implement over the duration of this seven-year period a Rebuilding Target of 71,000 Canadian-origin Chinook salmon (international border passage). After 2030, unless the Parties choose to continue to use this Rebuilding Target, adopt a biologically-based escapement goal or implement a different goal, the Parties shall use the Interim Management Escapement Goal of 42,500 – 55,000 Canadian-origin Chinook salmon.
3. Over this seven-year period directed subsistence fishing for Chinook salmon in the mainstem Yukon River and Canadian tributaries will be closed except when the bilateral inseason estimate of Canadian-origin international border passage, accounting for enroute mortality, is projected to exceed 71,000 based on Pilot Station sonar. In this circumstance, the Parties may consider providing limited subsistence fishing opportunity.
4. Recognizing the importance of Chinook salmon for ceremonial use and the transmission of cultural knowledge, the Parties may, at their discretion, provide limited harvest opportunity for these purposes.
5. Alaska shall continue to minimize incidental harvest of Chinook salmon in all other mainstem Yukon River fisheries over this seven-year period.
6. The Parties place a priority on stock assessment and on scientific research on the health of Yukon River Chinook salmon to better understand the causes of low run abundances and identify possible solutions. Such stock assessment and scientific research programs shall be discussed jointly by the Parties at Yukon River Panel and Joint Technical Committee meetings. Over this seven-year period, the take of Chinook for scientific research purposes shall be minimized and non-lethal sampling methods shall be used where possible.
7. The Parties place a priority on traditional and local ecological knowledge research on the health of Yukon River Chinook salmon to better understand the causes of low run abundances and to identify possible solutions. Such traditional and local ecological knowledge research shall be discussed jointly by the Parties at the Yukon River Panel and Traditional Knowledge Committee meetings.



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8. In accordance with Pacific Salmon Treaty Chapter 8 provisions, during this seven-year period the Yukon River Panel shall develop a rebuilding plan for Yukon River mainstem Chinook salmon.
9. In accordance with Pacific Salmon Treaty Chapter 8, section 12, Alaska will maintain efforts to increase the in-river run of Yukon River origin Chinook salmon by reducing marine catches and bycatches of Yukon River origin salmon to the extent practicable.
10. In the absence of fisheries, the status of Chinook salmon has continued to be depressed and reflects the long-term cumulative effects of other factors, particularly habitat degradation resulting from resource and hydroelectric development, competition from hatchery production, cyclic natural phenomena, and large scale environmental variability affecting both marine and freshwater habitats. The Parties shall work collaboratively on habitat and stock restoration activities and support research to better understand the declines of Chinook salmon.
 - Alaska will pursue an increase in Yukon River Salmon Agreement base funds from the U.S. Congress and pursue other available funding opportunities to be directed toward Yukon River habitat and stock restoration activities.
 - Canada will seek to increase federal funding to be directed towards Yukon River habitat and stock restoration activities.

Doug Vincent-Lang
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The *Policy for the Management of Sustainable Salmon Fisheries* (SSFP; 5 AAC 39.222) directs the Alaska Department of Fish and Game (department) to provide the Alaska Board of Fisheries (board) with reports on the status of salmon stocks and identify any salmon stocks that present a concern related to yield, management, or conservation during regular board meetings. A full report of the stock status was presented to the board at the Arctic/Yukon/Kuskokwim (AYK) board meeting held in November 2025 (Jallen et.al 2025). This report will provide a brief historical summary of the king salmon (*Oncorhynchus tshawytscha*) stock status, in addition to describing the existing regulations and emergency order (EO) authority that the department has followed to manage the Yukon River king salmon. Potential management options and proposed criteria for future removal of the stock of concern designation will also be presented.

In response to guidelines established in the SSFP (5 AAC 39.222), the board classified Yukon River king salmon as a yield concern at its September 2000 work session. A stock of yield concern is defined as “a concern arising from a chronic inability, despite the use of specific management measures, to maintain expected yields, or harvestable surpluses, above a stock’s escapement needs; a yield concern is less severe than a management concern” (5 AAC 39.222(f)(42)). The SSFP defines chronic inability as “the continuing or anticipated inability to meet expected yields over a 4-to-5-year period.” This determination as a yield concern was originally based on low harvest levels 1998–2000 and anticipated low harvest in 2001 (Vania 2000). An action plan was subsequently developed by the department and acted upon by the board in January 2001. The classification as a yield concern was continued at each subsequent cycle through 2023 (Jallen et al. 2025). Based on definitions provided in SSFP (5 AAC 39.222(f) (5, 42)), only the most recent 5-year escapements and yield estimates (2020–2024), and historical levels of yield or harvestable surpluses (harvests during the 10-year period from 2010 through 2019 were used as the historical basis for comparison) were considered in the current analysis and current recommendation concerning stock of concern status.

Conservative management actions have been taken over the last 5 years to achieve the largest possible escapements given extremely poor run sizes of Yukon River king salmon and all fisheries (subsistence, commercial personal use, and sport) have been closed. Those actions resulted in harvests at or below historical levels. Annual subsistence harvests have been below 2,000 fish since 2020 (Table 1), with most of those fish being harvested incidentally during non-salmon fishing opportunities. Even with such small harvests, no Yukon River drainage king salmon escapement goals were achieved from 2020–2024 (Table 2). If harvest had been reduced to zero during this timeframe, escapement goals would still not have been achieved. Based on this information, the department recommended and the board adopted a change in designation for Yukon River king salmon from a stock of yield concern to a stock of management concern at the October 2025 work session.

This action plan summarizes historical assessment of annual run size and describes the existing regulations and emergency order (EO) authority that the department follows to manage the Yukon River king salmon run. Options are then presented for potential management actions under Board authority for the commercial, sport, and subsistence fisheries, and describe current research projects that are being conducted. It does not include actions outside of Board authority.

STOCK ASSESSMENT BACKGROUND

Overview

The Yukon River is the largest river in Alaska and the fifth-largest drainage in North America. The river originates in British Columbia, Canada, within 30 miles of the Gulf of Alaska, and flows over 3,190 km (1,980 mi) through Yukon Territory, Canada, and Alaska, United States, before emptying into the Bering Sea at the Yukon–Kuskokwim Delta. It drains an area of approximately 321,500 mi², of which 195,200 mi² lies within Alaska (Figure 1). Except for a few fish taken in the adjacent coastal waters near the Yukon River delta, only salmon of Yukon River origin are harvested in the Yukon management area (Ransbury et. al 2022).

King salmon are one of 5 Pacific salmon species that inhabit the Yukon River. They have the longest spawning migration of any salmon. Spawning populations have been documented throughout the Yukon River drainage from the Archuelinguk River, located approximately 80

miles upstream of the mouth, to nearly 2,000 miles upstream at the headwaters of the drainage in Canada. King salmon begin entering the Yukon River after ice breakup in late May or early June and continue to migrate upriver through mid-July.

The department, federal agencies, Department of Fisheries and Oceans (DFO) Canada, Native organizations, Yukon Delta Fisheries Development Association (YDFDA), and various organized groups of local researchers operate king salmon stock assessment projects throughout the Yukon River drainage, which are used to inform fishery management decisions in the Alaska portion of the Yukon River drainage. Inseason run assessment includes run timing and relative abundance indices from the sonar project located near the community of Pilot, which serves as a platform for collecting age, sex, and length (ASL) composition, and tissue sampling for inseason genetic mixed stock analysis (MSA). Assessment projects such as sonar, weir, and tower counts enumerate passing fish (both salmon and nonsalmon), aerial surveys are also used to monitor escapement in tributaries. Additionally, fisheries are monitored using commercial CPUE and subsistence, personal use, and sport fisheries harvest data for inseason and postseason estimates of total run size and determination of exploitation rates. There has been an additional focus on fish health, including monitoring for *Ichthyophonus* infections, body condition assessments, fecundity measures, and utilizing radio tagging methods to document migration success.

Escapement

Between 2010 and 2022, the king salmon border passage objective consisted of an interim management escapement goal (IMEG) of 42,500–55,000 king salmon. This passage estimate is assessed at a sonar project located near the community of Eagle and includes a harvest share for Canadian fisheries. The Yukon River Salmon Agreement outlines the harvest share in Alaska to be 20–26% of the total allowable catch (surplus above escapement needs) of Canadian-origin king salmon. The lower end of the IMEG and Canadian harvest share objective was achieved in 2011 and from 2014 to 2018. The upper bound of the IMEG and harvest share was exceeded during 2014–2017 (Table 3 and Figures 2 and 3).

In 2023, the Yukon River Panel did not agree upon a goal; Alaska used the previous king salmon IMEG range, and DFO in Canada used the upper end of the range (55,000 fish) as the management objective for border passage. In April of 2024, Canada and Alaska implemented a 7-year rebuilding target (border passage goal) of 71,000 Canadian-origin king salmon (JTC 2025). Fishing for king salmon in the Alaska portion of the mainstem Yukon River remains closed unless the border passage objective is anticipated to be met or exceeded. The agreement also directs management to consider en route mortality and uncertainty in estimates when projecting border passage and any potential harvest opportunity in the mainstem Yukon River. Despite conservative management actions from 2019 to 2024, low run sizes resulted in border passage below the objectives (Table 3).

Tributary escapements have been monitored using counting towers and sonar projects on the Chena and Salcha Rivers, weir projects on the East Fork Andreafsky and Gisasa rivers and Henshaw Creek, along with aerial surveys on the Anvik, West Fork Andreafsky, and Nulato Rivers (Figure 2). For the Chena and Salcha River salmon enumeration projects, visual counts from a counting tower are the primary means of enumeration, supplemented by sonar counts during periods of high, occluded water. The biological escapement goal (BEG) for the Chena River was met or exceeded in 9 out of 20 years from 2005 to 2024; however, it has not been met since 2018. The BEG for the Salcha River was met or exceeded in 11 out of 20 years from 2005 to 2024;

however, it has not been met since 2019. Both the Chena and Salcha River estimates in some years are a combination of visual counts, sonar estimates, or modeled data due to flooding or mechanical issues with the sonars. The department did not conduct king salmon aerial surveys in 2021 due to high water and poor visibility, and the department was unable to index several tributaries in 2022 due to poor conditions. No aerial survey escapement goals were met between 2020 and 2024 (Tables 2 and 3).

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Harvest

Poor king salmon runs have caused a dramatic decline in commercial and sport king salmon harvests since 1998, and decreased subsistence harvest opportunities since 2007 (Table 1, Figure 4). King salmon-directed commercial fisheries have not occurred since 2007, and the summer chum salmon-directed fisheries have been conservatively managed to reduce incidental harvest of king salmon. Two management areas encompass the Yukon River sport fisheries: the Yukon River Area (YRA) that excludes the Tanana River, and the Tanana River Area (TRA). Due to poor projected king salmon run sizes during 2018–2025, the sport fishery closed preseason in the YRA. However, in 2019, sport fishing was reopened on July 11 with an annual limit of 1 king salmon greater than 20 inches. For the TRA, the majority of sport fishing occurs in the Chena and Salcha Rivers, and the earliest portion of the run arrives in late June, so management decisions are usually made later than the YRA, which includes the lowermost portion of the Yukon River. During 2018, the king salmon bag limit was reduced to 1 fish, and bait was prohibited in the TRA. During 2019, the king salmon sport fishery in the TRA was restricted to catch-and-release and was closed in late July. During 2020–2025, sport fishing for king salmon was closed in the TRA for the entire season.

From 2020 through 2024, yearly subsistence harvests of king salmon have fallen below the established ANS range of 45,500–66,704 king salmon. The most recent year king salmon ANS was met was 2019 (Table 1). Subsistence fishing for king salmon was closed the entire season from 2021 to 2025. The subsistence harvest of 1,564 king salmon in 2023 was the lowest on record.

Approximately 30% of that harvest came from the ADF&G test fisheries, with those fish being distributed to local communities (Table 1).

Exploitation Rate

The exploitation rate is defined as the proportion of the run that is harvested; hence, stock-specific total run, escapement, and harvest estimates are needed to calculate exploitation rates. From 1998 through 2007, an average of 43% of the Canadian-origin king salmon total run was harvested in Alaska, while 26% of U.S. stocks were taken (Figure 4). With poor returns of Canadian-origin and U.S.-bound fish in recent years, coupled with a conservative management strategy, the average exploitation rate for the recent period of 2020–2024 has decreased to approximately 10% for Canadian stocks and 4% U.S. stocks, with a low of 4% and 1%, respectively, in 2021 (Figure 4).

Brood Year Return Information

The brood year data for Canadian-origin king salmon is used to assess the productivity of the Canadian-origin stock and serves as a representative of the drainagewide run at this time. A new integrated drainagewide reconstruction model was developed as part of the review of the escapement goal for the Canadian stock for the Yukon River Panel between 2019 and 2022 (Conners et al. 2023). The department has extended that work to include spawner-recruitment analyses of the U.S. stock components. The brood table for the Canadian stock has been adopted by the bilateral Joint Technical Committee (JTC) but currently no decisions have been made about brood table use for the lower U.S. or middle U.S. river stock groups. Total brood year return divided by the parent-year escapement is a measure of stock productivity and is expressed as recruits or returns per spawner (R/S). Higher R/S values suggest better productivity. The minimum level of replacement for a stock occurs when R/S is equal to 1; i.e., for each fish that spawns, 1 fish returns to spawn (Figure 5). The most recent brood year with the majority of the age classes returned (ages 3–6) is 2018. The R/S of Canadian-origin king salmon has ranged from a low of 0.18 to a high of 5.35, with an overall R/S average of 2.16 from 1982 to 2018 (Figure 5).

Brood year tables also provide information regarding the age class composition of the return. Yukon River king salmon return as age-2 through age-8 fish, but age-5 and age-6 salmon dominate the run. Age class composition of the run varies from year to year because of the variability in individual year class strengths.

ESCAPEMENT GOAL EVALUATION

The Policy for Statewide Salmon Escapement Goals (SSEGP; 5 AAC 39.223), adopted by the board in 2001, established the formal process for setting escapement goals. Prior to this the department followed its Salmon Escapement Goal Policy (EGP) adopted in 1992 that established a formal process to set, evaluate, and modify existing escapement goals (Fried 1994). The SSEGP and the SSFP require the department to report on salmon stock status and escapement goals to the board on a regular basis, document and review existing salmon escapement goals, establish goals for stocks for which escapement can be reliably measured, and prepare scientific analyses with supporting data when goals are created, modified, or recommended for elimination.

Yukon management area escapement goals were first documented by Buklis (1993), as required under ADF&G's original escapement goal policy, and adopted in 1992. These early goals were generally established using a simple escapement averaging methodology based on aerial survey counts. Following the adoption of the new policies (SSFP and EGP), several new or revised BEGs

were established (Table 4). These included BEGs for king salmon on the Chena and Salcha rivers (Evenson 2002), and king salmon SEG goals on the East Fork Andreafsky (Volk et al. 2009), West Fork Andreafsky, Nulato, and Anvik rivers were based on aerial surveys (ADF&G 2004). The lower bound of the SEG on Chena River was recently revised during the 2023 board cycle (Liller and Savereide 2022).

Liller and Savereide (2022) provided a summary of a completed data review, genetic baseline, run reconstruction, and stock assessment efforts that could prove useful for establishing and stock-specific escapement goals for Yukon River king salmon. Since that time, all review products have been finalized and published: Lee et al. (2021) presents revised genetic baseline and reporting groups; Pestal et al. (2022) presents a comprehensive data review of all abundance, ASL, and stock identification data; and Connors et al. (2023) presents the results of a multistock run reconstruction model and spawner–recruitment analysis for the Canadian stock component. ADF&G has extended this work to include spawner–recruitment analyses for the Alaska stock components and is drafting summary reports for future consideration.

Consideration of these new products is warranted during future escapement goal review cycles. The East Fork Andreafsky River king salmon SEG has been monitored using a weir operated by United States Fish and Wildlife Service (USFWS). The weir was discontinued in 2025. As such, the established SEG for East Fork Andreafsky River king salmon may not be possible to assess in future years. It was premature for the escapement goal review team (EGRT) to recommend this goal be discontinued during the 2025 review cycle. However, the EGRT acknowledged that the goal should be discontinued in a future cycle if assessment options are not resolved.

STOCK OF CONCERN RECOMMENDATION

In accordance with the SSFP guidelines, the BOF designated Yukon River king salmon as a stock of yield concern in 2000 due to low harvests from 1998 to 2000 (Table 1), and projected low harvest in 2001 relative to the 1989–1998 average (Vania 2000). This designation has been reaffirmed in each subsequent cycle through 2023 because the stock continued to meet the criteria for a stock of yield concern. An action plan was developed by ADF&G and adopted by the BOF in January 2001 and was subsequently revised or modified in future cycles.

In response to not meeting king salmon escapement goals during the period from 2008 to 2013, the BOF implemented significant changes to the management plan and regulations to increase flexibility and reduce harvest during years of low abundance. From 2014 to 2018, escapement goals were generally met in monitored systems in Alaskan waters (Table 2), and in 2019, 4 of 7 goals were achieved, including 1 that was exceeded. In 2022, gear regulations were updated to allow for greater flexibility in releasing salmon species of concern while maintaining harvest opportunities for more abundant species.

From 2020 to 2024, Yukon River king salmon runs declined to unprecedented lows. Average subsistence harvest dropped to 5,777 fish—about 80% below the 2010–2019 average of 27,874 which is itself roughly half of historical subsistence harvests in Alaska. (Table 1). From 2021 to 2024, directed fisheries for king salmon remained closed. This resulted in annual harvests of approximately 2,000 fish, primarily from test fisheries, incidental catch, and limited early or late season harvests. Despite these closures, no escapement goals were met during this period (Table 2). As a result, ADF&G recommended reclassifying Yukon River king salmon from a stock of

yield concern to a stock of management concern, which was adopted by the board at its October 2025 work session.

Research suggests that continued poor returns will probably continue for the foreseeable future. Juvenile abundance of Canadian-origin king salmon in the northern Bering Sea has declined since 2017, with 2024 marking the lowest level since surveys began in 2003 (Figure 2). Productivity has remained fewer than 1 recruit per spawner from 2015 through the most recent brood year, 2018 (Figure 3).

FACTORS AFFECTING YUKON KING SALMON STOCKS

Habitat Assessment

Salmon spawning, rearing, and migration habitat throughout much of the Alaskan and Canadian portions of the drainage remain largely undisturbed; however, some habitat factors are present that may adversely affect salmon production. Although the effects of these factors are not well understood, the potential individual and cumulative effects of these habitat factors should be considered when assessing the future stock productivity. A detailed discussion of these habitat issues in Alaska is found in the public draft of the *Yukon River Comprehensive Salmon Plan for Alaska*¹ and Holder and Senecal-Albrecht (1998). This plan discusses mining, logging, and potential pollution and habitat changes related to urban development, rural sanitation, increased road traffic along a few tributaries, and agriculture. A similar report reviewing the ecosystem and habitat factors limiting king salmon in the Canadian portion of the drainage was recently published by von Finster et al. (2025) where a large proportion of Yukon River king and fall chum salmon spawn; these limiting factors are the purview of the Canadian government and are not discussed in detail here.

With few notable exceptions, the Yukon River watershed is free-flowing. The Chena River Lake (Tanana River drainage) Flood Control Project is the only dam in the Alaska portion of the drainage. The structure was built by the U.S. Army Corps of Engineers from 1973 to 1979 to control flood waters in downtown Fairbanks in response to the devastating 1967 flood. Some resource users have raised concerns about the dam's effects on the emigration of salmon fry or the migration of adults. During high water events, the dam's gates are lowered to divert some of the Chena River's flow to a vegetated floodway immediately upstream of the dam until the flow recedes to manageable levels. This diverted water may later flow into the Tanana River or drain back into the Chena River. The potential effects on outgoing juveniles from stranding, avian predation, and disruption of imprinting are unknown. The Whitehorse Dam on the mainstem Yukon River in Whitehorse, Canada, is known to impede the passage of spawning salmon and the outmigration of juvenile salmon, and numerous studies have been conducted to evaluate the effect of the dam on resident and migrating fish. This dam provides a fish ladder to allow passage of fish and has a mitigation hatchery with an annual release target of 150,000 king salmon fry upstream of the dam. Fish passage at the Whitehorse Dam and hatchery activities have been ongoing since the mid-1980s, and data are summarized in the annual JTC report (JTC 2025). The Whitehorse Dam recently underwent a licensing review and was renewed with a 20-year term. The Wareham Dam and the Mayo Lake Control Structure were constructed in the early 1950s and provide

¹ Yukon River Comprehensive Salmon Plan for Alaska, under public review. <https://www.adfg.alaska.gov/index.cfm?adfg=fishingHatcheriesPlanning.enhance> (cited September 19, 2025).

hydroelectric power from the Mayo River in Canada. Both structures prevent upstream fish passage and have extirpated salmon species within a portion of their historic spawning grounds.

Climate change is associated with rising water temperatures in both fresh water and marine environments, with implications for salmon survival. Globally, the ten warmest years on record occurred during 2015–2024 (World Meteorological Organization 2025).² Elevated air temperatures are directly associated with increased water temperatures, variable snow/ice cover, permafrost melt, and glacial retreat. Each factor has implications for Yukon River salmon and their habitats, growth, and survival. Analysis of Yukon River water temperature data indicates that summer temperatures frequently exceeded 17°C for extended periods, conditions known to increase physiological stress in migrating salmon. Those high temperatures are known to increase stress on migrating salmon. Both the Bering Sea and Gulf of Alaska marine ecosystems have experienced unusually warm conditions over the past decade. The eastern Bering Sea has been in a warm phase since 2014 and has experienced heat waves between 2016 and 2019 (Siddon 2021). Higher ocean temperatures increase metabolic demands, which require salmon to consume more food to meet their energetic needs. Additionally, changing temperature regimes are associated with changes in the abundance, quality, and distribution of salmon prey (Siddon 2021). Temperatures in the Bering Sea have returned to more average conditions in recent years; however, a lagged effect of prior-year warm conditions on recent years' salmon returns are possible.

It is estimated that at least 50% of all water bodies in the Yukon watershed have not been evaluated for the distribution of anadromous species, and a similar or higher percentage of first and second-order tributaries have not been surveyed. Streams lacking field-based documentation are not granted legal protection under Alaska Statute 16.05.841 (Fishway Act) or AS 16.05.871 (Anadromous Fish Act). A significant number of streams could be added/corrected in the Anadromous Waters Catalog. This catalog undergoes regular review and nominations are submitted to document the presence of anadromous fish.

Marine Distribution, Abundance, and Survival

After leaving the Yukon River in the early summer months, juvenile king salmon spend their first few months at sea in relatively shallow waters of the continental shelf of the Northern Bering Sea (NBS; Murphy et al. 2025). Immature king salmon from the Yukon River are believed to spend the rest of their marine life in the Bering Sea, alternating between southern Bering Sea shelf habitats in the winter and moving into the central Bering Sea basin in the summer (Myers et al. 2010).

The abundance and genetic data collected from the NBS Survey are used to calculate the stock-specific abundance of juvenile Yukon River king salmon for all years (2003–2024; Murphy et al. 2017; Howard et al. 2020; Murphy et al. 2025). Juvenile abundance data combined with total adult returns provides a powerful piece of information that identifies which life stages are most influential to adult run abundance. For Yukon River king salmon, there is a strong, positive relationship between the abundance of juveniles in the NBS and the number of adult king salmon that return to the Yukon River years later. This suggests that later marine survival, the years spent in the ocean after the juvenile life stage, is remarkably stable, but there is evidence that this

² World Meteorological Organization. 2025. WMO confirms 2024 as warmest year on record at about 1.55°C above pre-industrial level. WMO Press Release. <https://wmo.int/news/media-centre/wmo-confirms-2024-warmest-year-record-about-155degc-above-pre-industrial-level> (accessed October 20, 2025).

relationship has weakened in recent years suggesting reduced later-marine survival contributing to poor run sizes (Murphy et al. 2017; Howard et al. 2020; Murphy et al. 2025; JTC 2025). This means that factors dictating whether run sizes will be good or poor are occurring sometime between the spawner life stage and the juvenile's first winter in the ocean. Stable survival after the juvenile life stage suggests that later marine drivers of mortality, such as competition with hatchery fish, predation, and catch in federal marine fisheries, such as the BSAI (Bering Sea-Aleutian Island pollock fishery), are not substantially changing future run sizes. Recent analyses leveraging juvenile Yukon River king salmon data suggest that during the past 20 years, the spawner life stage itself may be particularly influential to abundance patterns of this stock (Howard and von Biela 2023). State and Federal agencies, nongovernmental organizations (NGOs), and tribal groups are actively investigating factors in the spawning life stage that may be important drivers for the sustained low abundance of Yukon River king salmon. These factors include increased mortality associated with *Ichthyophonus* infection, increased river temperatures, and decreased success of eggs due to poor food quality during maternal marine stage.

Change in Size and Age at Return

Yukon River king salmon size at age for each age class and overall size has declined roughly 5–7% since the late 1970s. (Ohlberger et al. 2020). Lengths-at-age have been below respective averages since 2020, with the smallest recorded lengths in the recent 5 years (AYKDBMS). A decline in body length is partially a result of a change in size-selective gear types over time, but is likely also a result of changing ocean conditions which have dynamic effects on food sources, growth rates, competition among species, predator/prey interactions, and other factors affecting survival and age at maturity (Lewis et al. 2015; Ohlberger et al. 2020).

Age class composition of the Canadian-origin king salmon returns from brood years 1979–2017 indicates that there was a dramatic decrease in age-7 salmon from an average of 28% during years 1979–1982, to an average of 8% during the following 10-year period (1983–1992). From 1993 to 2012, the age-7 age class represented, on average, about 4% of the return, and in 2013–2017, the age-7 class contributed 2% of the return. The brood year age class composition for age-4 salmon remained relatively stable during 1993–2001 and increased during 2001–2017 (Figure 6). Starting in 2001, there has been a trend of age-5 and age-6 king salmon alternately dominating the brood year age class composition, with age-5 dominating consistently since 2010 (Figure 6).

Declining body size (at age), coupled with a reduction in older age classes, influences the quality of spawning escapement. Reviews of historical observations of body size from the Yukon River, found that the average female reproductive potential has declined 24–35% since the 1970s (Ohlberger et al. 2020). Due to these concerns, they suggested that the change in spawning quality be taken into consideration when developing future assessment programs and management reference points.

Fish Health

Many factors influence fish health and disease burden on Yukon River salmon. Water temperature, environmental stresses on both salmon and their prey, as well as natural rhythms of disease can affect the overall health of salmon. *Ichthyophonus* infection is another factor affecting Yukon River king salmon, with an increased virulence between 1999 and 2004, along with documented declines in the population (Kocan et al. 2004). Subsistence users in the mid-1980s began reporting signs of *Ichthyophonus* in king salmon hearts and flesh. These reports resulted in collaborated research projects between ADF&G, USFWS, and the University of Alaska Fairbanks (UAF) that

focused on Chinook fecundity. ADF&G began a sampling program in 2021, followed by a partnership with USFWS to conduct a 3-year sampling program that began in 2022, designed to test the hypothesis that *Ichthyophonus* disease may be contributing to large-scale natural mortality of Canadian-origin king salmon in Alaska. Limited lethal sampling to collect heart tissue for *Ichthyophonus* laboratory testing was conducted at a lower river location (Pilot Station sonar), mid-river location (Rampart Rapids), and upriver location (Fort Yukon or Eagle sonar). Preliminary results from samples taken during 2022–2024 show that roughly 35% were infected in 2022, 47% in 2023, and 42% in 2024, but of the fish infected, the level or severity of infection declined over the 3-year period.

The Salmon Ocean Ecology Program continued a study that began in 2022 to evaluate the condition, diet, and thiamine levels (a vital B-vitamin required for a range of metabolic processes) of king salmon returning to the Yukon River. The department’s Pathology Lab led work to evaluate *Ichthyophonus* infection status for juvenile and immature king salmon and common king salmon prey species sampled from the northern and southern Bering Sea surveys. Marine sampling was initiated to help determine when, during their marine residency, king salmon became infected with *Ichthyophonus* and which foods are potential sources of infection. Opportunistic marine sampling for *Ichthyophonus* began in 2021, and agencies continue to explore options to implement a more standardized marine disease surveillance program in future years. ADF&G and USFWS continue to support efforts led by the UAF and United States Geological Survey (USGS) to evaluate the feasibility of nonlethal *Ichthyophonus* surveillance methods using blood and muscle tissue. ADF&G, USGS, and Alaska Pacific University secured funding and completed the first of a 2-year (2024 and 2025) laboratory trial aimed at determining the *Ichthyophonus* disease severity levels associated with mortality in Yukon River king salmon. The department and partners at University of Tennessee are developing new tools to quantify king salmon affected by *Ichthyophonus*, as well as other diseases such as microsporidiosis, an emerging disease recognized in Oregon king salmon in 2021.

The department completed 2 years (2023–2024) of a 3-year drainagewide radiotelemetry study to evaluate the upriver migration success of Yukon king salmon, with a special focus on the Canadian-origin stock component. Fish were tagged with esophageal radio tags at the mouth of the Yukon River near Emmonak and tracked along the mainstem river in Alaska using ground-based tracking towers and aerial survey methods. DFO and several Canadian First Nations coordinated with the department to extend tracking efforts into Canada to evaluate distribution and en route mortality in Canada (JTC 2025). Survival in 2024 was high, with 95 (98%) of the 97 Canadian-origin fish tagged detected at the U.S.-Canada border tracking stations.

In addition to possible disease-induced mortality, high water temperatures have been shown to cause decreased spawning success and early mortality. Evidence of heat stress in Yukon River king salmon was documented in 2016 and 2017 (von Biela et al. 2020). Samples to detect heat stress in king salmon are an ongoing project with samples collected from 2022 through 2024, but analysis of that research is still ongoing, and results are unavailable at the time of this publication. Understanding disease burden and other factors that may cause inriver prespawning mortality will allow for more accurate run reconstruction and better management strategies to detect disease and account for excess mortality to continue to reach escapement goals.

FISHERY MANAGEMENT OVERVIEW AND BACKGROUND

Overview

Management of the Yukon River salmon fishery is complex because of many factors, including the following: the difficulty in determining stock-specific abundance and timing, overlapping multi-species salmon runs, increasing efficiency of the fishing fleet, the gauntlet nature of the fisheries, allocation issues between lower and upper river Alaska fishermen, allocation and conservation issues between Alaska and Canada, and the immense size of the drainage. Salmon fisheries within the Yukon River may harvest stocks that are several weeks and over a thousand miles from their spawning grounds. Because the Yukon River fisheries are largely mixed stock fisheries, some tributary populations may be under- or overexploited in relation to their abundance. It is not possible to manage for individual stocks in most areas where commercial and subsistence fisheries occur. However, recent refinements in genetic stock identification methods allow managers to obtain regional stock proportions of salmon inseason. A mainstem sonar project at Pilot Station is the primary assessment tool to determine salmon run timing and relative run strength. Subsistence catch reports, age composition of harvest, and weather are also used as indicators of relative run strength and timing.

Yukon River Salmon Agreement

Yukon River king salmon are managed through provisions set forth in Chapter 8 of the Pacific Salmon Treaty (treaty), the Yukon River Salmon Agreement (YRSA) and, since 2024, in accordance with the 7-Year Agreement. Per YRSA, annual inriver run-size and inriver harvest estimates of the Canadian-origin Yukon River stock are developed bilaterally from the sonar program at Eagle and GSI analyses. The YRSA directs both countries to take actions necessary to ensure that escapement and border passage objectives are achieved. Management plans for Canadian and Alaska fisheries are reviewed prior to the season and resultant harvest and escapement estimates are reviewed postseason by the Yukon River Panel. Management actions are predicated on bilaterally agreed to pre-season forecasts of run abundance and are reviewed weekly based on inseason estimates of run size.

Under the treaty umbrella, a 7-Year Agreement was signed by ADF&G and the Department of Fisheries and Oceans Canada as the designated responsible management entities regarding management of salmon stocks originating from the Yukon River in Canada. The 7-Year Agreement stipulates actions both parties will take across a 7-year period from between 2024 and 2030 (Figure 1). The agreement utilized a 7-year (one Chinook salmon life cycle) approach consistent with YRSA Treaty language regarding rebuilding these stocks. It set forth a rebuilding target of 71,000 king salmon international border passage; this number is expected to maximize recruits to the spawning grounds and is large enough to offset pre-spawn mortality that may be occurring before king salmon reach spawning grounds in the upper portions of the watershed in Canada. The agreement paused all directed commercial, sport, domestic, and personal use fisheries targeting Canadian-origin king salmon through 2030 (7 years) regardless of run abundance. It also allows for subsistence harvest opportunity in circumstances where the run is projected to exceed the rebuilding target of 71,000.

Past Board of Fisheries Actions for King Salmon

Since 2001, the Alaska Board of Fisheries has adopted numerous regulatory changes to enhance Yukon River king salmon conservation and improve the ability for management to adapt to changing conditions. Early actions included amending the *Yukon River King Salmon Management Plan* (5 AAC 05.360) to clarify objectives, establish harvest allocations, and implement structured subsistence schedules that aligned with migratory timing and provided ‘windows’ without fishing time to allow fish to pass. Emergency order authority was granted to adjust schedules and restrict gear, including gillnet mesh size, during conservation periods. Over the following decade, regulations expanded to include gear restrictions, marking requirements for subsistence harvests, and catch-and-release provisions for sport fisheries. Additional measures implemented maximum mesh size limits, prohibited king salmon sales during chum-directed fisheries, and required live release of kings during conservation periods. The board also adopted first-pulse protection, standardized dip net specifications, and authorized alternative gear types such as dip nets and beach seines for commercial chum fisheries while in king salmon conservation.

From 2014 onward, refinements continued at each board meeting. The board adopted regulations to ensure all king salmon are returned to the water, eliminating retention of dead fish, and require close attendance of fish wheels during operation. Gear specifications for beach seines were standardized for both subsistence and commercial fisheries. In 2016, the Board reinforced live-release requirements and expanded emergency authority for gear restrictions. By 2019, subsistence opportunities were broadened through the extension of hook-and-line fishing to the Nulato River area and the addition of dip nets as legal gear. Tail-marking requirements of subsistence-caught king salmon were removed when the commercial fishery was closed. Hook-and-line fishing for subsistence was again extended in the Yukon drainage above the Nulato River, excluding the Tanana River drainage and some closed waters near the highway systems. These cumulative changes reflect an ongoing effort to balance conservation objectives with subsistence and commercial harvest needs in the Yukon River drainage.

Summer Season Management Review (2020–2025)

After the 2019 season, which was notable for subsistence harvests meeting the king salmon ANS and for having very hot water conditions in some tributaries and observed die-offs of summer chum salmon, the 2020–2024 seasons were marked by low runs and fishing restrictions.

In 2020, subsistence fishing remained open during the early trickle of the king salmon run; however, by mid-June, it appeared that the first pulse of king salmon run was late, and fishing in most districts was closed or restricted to selective gear types. Despite very conservative management and widespread reports of poor harvests, the early run passage counts at the Eagle sonar project started to indicate that, similar to 2019, fewer Canadian-origin king salmon were arriving at the border than predicted by the Pilot Station sonar genetic estimates. Projections indicated it was unlikely the IMEG at the border would be met, and fishing for salmon in District 5 closed on July 28 and remained closed for the rest of the summer season. Additional closures of 4-inch mesh nets were implemented throughout the drainage to avoid any harvest of king salmon in this gear. This action caused considerable hardship for dog mushers and other subsistence users who rely on 4-inch or smaller mesh to target nonsalmon species. Harvest opportunities for summer chum salmon were also limited due to the late and weak run, persistent high-water levels, and closures to protect king salmon. Sport fishing for king salmon was closed for the season.

The king and summer chum salmon runs in 2021 and 2022 were both well below average. The summer chum run was below the lower end of the drainagewide escapement goal. Subsistence, commercial, sport, and personal use salmon fishing were closed all summer season. The opportunity to harvest nonsalmon species for subsistence with 4-inch or smaller mesh gillnets remained open. During the closures in the 2021 and 2022 summer season, some king salmon were taken incidentally in nonsalmon gear or harvested before or after closures were in effect. Harvest totals include fish that were harvested in test fisheries and distributed within nearby communities.

In 2023 and 2024, the king salmon run remained well below average with no harvestable surplus. Summer chum salmon were within the drainagewide escapement goal, and subsistence opportunities with selective gear types were opened through Subdistrict 5-C (all king salmon were required to be released alive). Subdistrict 5-D remained closed because summer chum salmon do not migrate that far upriver. Fishing opportunity for summer chum salmon was extended past the traditional start date of fall season management up through Subdistrict 5-C and in the Tanana River. For example, District 1 transitions to fall season management on July 16, but remained open with selective gear types for chum, sockeye, and pink salmon until July 25. Sport fishing for king salmon was closed in the Yukon Area in those years as well. In 2023, nonsalmon subsistence fishing opportunities remained open 24 hours a day, 7 days a week, throughout the entire summer season. In 2024, all gillnet opportunities were closed in each district for a 2-week period that roughly coincided with the first quarter point to the third quarter point of the king salmon run. Fishery participants were asked to release all king salmon alive from selective and nonsalmon gear whenever possible, and to avoid fishing in areas where king salmon could be caught. Pink and sockeye salmon could be retained all season.

The 2025 forecast of Yukon River king salmon was for a well below average run and no escapement or border passage goals were expected to be met. Subsistence, commercial, sport, and personal use salmon fishing were closed all summer season. Subsistence fishery closures began on June 1 in the Coastal District and District 1 and progressed upriver based on run timing. During the salmon fishing closures, nonsalmon gear could be used, including hand line, longline, fyke net, dip net, and spear. Gillnets of 4-inch or smaller mesh were restricted to setnets 60 feet in length. When using dip nets, beach seines, and hook-and-line gear, king and summer chum salmon were required to be released alive. Nonsalmon, pink, and sockeye salmon could be retained all season. Additionally, the summer chum salmon run was below the drainagewide escapement goal, which lead to no selective gear opening to target those.

All gillnets had to be removed from the water between the projected first and third quarter points of the king salmon run (about 2.5 weeks). This closure was several days longer than in 2024 to further reduce the incidental harvest of king salmon. More information on the management of nonsalmon fisheries in the Yukon Area are detailed in Jallen et. al (2025).

ACTION PLAN MANAGEMENT OPTIONS FOR ADDRESSING STOCK OF CONCERN

Action Plan Goal

The primary goal of this action plan is to facilitate rebuilding the king salmon run in the Yukon River drainage to consistently achieve escapement goals while providing for increased levels of fishing opportunity. Since 2020, Yukon River king salmon have declined to unprecedented levels

of low production and run size with no yield available for Yukon River king salmon fisheries. This has occurred in concert with similar unprecedented declines on other Yukon River salmon populations. The impact of these combined declines on Yukon River subsistence, commercial, personal use, and sport fisheries has been disastrous. There are a range of factors impacting Yukon River king salmon production, most of which are beyond our ability to affect or control. In general, the goals of this action plan are to maximize king salmon escapements during a time of unprecedented low productivity and run size while minimizing the impact on what little subsistence harvest opportunity is currently possible in the Yukon Area. The many regulatory changes the board has implemented over past cycles have already provided Yukon Area managers with a variety of conservation-oriented options and tools used to achieve these general goals. There is not much more that can be done until such time as the range of factors impacting production improves and fall chum salmon yield rebuilds to historical levels. The following options are intended to build upon past actions and set the stage for any further amendments or actions the board may want to consider.

Action #1–Subsistence, Commercial, and Sport Fisheries

Status Quo

Objective: Continue management of Yukon River king salmon with regulations currently specified in 5 AAC 01.210 (*Fishing seasons and periods*), 5 AAC 01.220 (*Lawful gear and gear specifications*), and 5 AAC 05.360 (*Yukon River King Salmon Management Plan*).

These regulations and the management plan have been developed over the 2 decades, while this stock has been listed as a stock of yield concern. The commissioner may take additional actions by EO authority to limit time and area based on preseason and inseason indicators of abundance. Additionally in 2024, Canada and Alaska implemented a rebuilding target (border passage goal) of 71,000 Canadian-origin king salmon through the 7-Year Agreement. This states that the directed king salmon subsistence fishery in the mainstem Yukon River will be closed unless this target is projected to be met. Current management practices have employed these regulations during the historically low run sizes in recent years. Directed king salmon fishing in the subsistence fishery has been completely closed since mid-way through the 2020 season. There has not been a directed king salmon commercial fishery since 2008, and the sport fishery has been closed preseason since 2019. Despite the full closures in all fisheries, escapement goals have not been achieved since 2019. This points toward a decline in overall production in this stock. As a component of the 7-Year Agreement, beginning in 2025 the department implemented a new cultural and educational permit program within the Yukon River. This provides a limited number of salmon for harvest during times of conservation and is intended to preserve customary and traditional harvest traditions amid the historically low runs of salmon being experienced. These permits will continue to be issued until returns are large enough to provide for subsistence opportunity.

Benefits: Allows the department to flexibly manage this stock based on preseason and inseason indicators of abundance.

Detriments: Continued closures and substantial restrictions within the subsistence gillnet fishery to protect king salmon, which could see foregone harvest opportunity for summer chum salmon when run abundance allows and nonsalmon species.

Action #2–Subsistence Fishery

Fish wheel Specifications

Objective: Adopt gear operation and construction specifications for fish wheels that are considered more fish-friendly, similar to those found in 5 AAC 05.362(j)(1).

Currently there are no defined specifications for the construction of a fish wheel used in the Yukon River subsistence fishery. This allows stakeholders to build their fish wheels with any combination of materials. Fish wheel baskets are commonly made of wood and chicken wire is sometimes used for the basket. The use of wire and other rigid materials are not considered fish-friendly. Over time fish wheels have been more often used as a conservation tool to allow for fishing opportunity on abundant species while allowing for the release of a species of concern, with the fish wheel being equipped with a live box or chute and be closely attended while in operation and when immediate live release is required. However, in the commercial fishery of Subdistrict 4-A and District 6, fishermen have been using specially constructed, fish-friendly fish wheels with basket sides and bottoms consisting of soft mesh material similar to that of seine web, and with a slide or chute with a smooth bottom, and with closed cell foam-lined sides which return king salmon immediately back to the water. These construction specifications are intended to reduce the potential for injuring king salmon that are being released back to the water alive when targeting the abundant summer chum salmon.

Benefits: The department has refrained from allowing the operation of subsistence fish wheels at certain times because of the historically low run sizes of Yukon River king salmon being experienced since 2020. This is because of a concern that wheels may potentially harm fish that will ultimately be released, such as removal of their slime layer and scales, along with getting beat up as they thrash around in the basket after removal from the water. By adopting new requirements to construct fish wheels in a fish friendly manner, the department may be more inclined to allow additional opportunity when there is surplus summer chum salmon while requiring the live release of king salmon.

Detriments: This would result in a direct cost to stakeholders who need to modify existing gear to meet the specifications of a fish-friendly fish wheel

Action #3–Subsistence Fishery

King Salmon harvest limit for Yukon River subsistence permits

Objective: Establish a king salmon harvest limit for existing subsistence fishing permits in the Yukon Area, during times of conservation.

Permits are required to participate in the subsistence salmon fishery in designated areas of the middle and upper Yukon River and the Tanana River drainage in Alaska. The only permit that has established harvest limits is the one required for subsistence fishing in Subdistricts 6-A and 6-B. Annual harvest limits are set at 60 king salmon and 500 summer chum salmon during the summer season, which have not been achieved due to the closure of the salmon fishery in recent years. Other permit areas in the Yukon River have also been closed to salmon fishing and at times closed to the use of all gillnets, due to the historically low runs of king and summer chum salmon. Incidental harvest of king salmon does occur in these areas when the subsistence fishery is open to the use of small mesh gillnets intended to harvest whitefish and other resident species.

Benefits: Establishing a king salmon harvest limit on subsistence fishing permits, during times of conservation, may increase the number of fish making it to the Canadian border or to their spawning grounds in the Tanana Drainage by a small amount.

Detriments: Imposing a subsistence permit harvest limit for king salmon may not decrease the overall annual harvest of king salmon in the area, as recent harvests are already very low because of needed fishing closures to protect king salmon.

CONDITIONS FOR DELISTING A STOCK OF CONCERN

1. If a majority of the lower bounds of the established BEG and SEG ranges are met or exceeded in 5 consecutive years and is expected to meet the goal ranges in the future years, the department may recommend removing the stock as a stock of “management concern” at the first Arctic/Yukon/Kuskokwim board meeting after this condition is met.
2. Should the department determine a harvestable surplus in excess of 71,000 Canadian-origin king salmon exists, limited subsistence opportunity in the Yukon River mainstem may be provided, as stated in the 7-Year Agreement. This agreement is in place through 2030.
3. Subsistence fishery management measures could be relaxed in specific Alaskan tributaries if updated stock composition and run assessment data indicates areas where specific restrictions are no longer needed to ensure the established escapement goals will be met.

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TABLES AND FIGURES

Table 1.—Alaska harvest of Yukon River king salmon, 2004–2024.

Year	Commercial	Total commercial	Subsistence ^a	Personal use	Test fish sales ^b	Sport fish ^c	Total
2004	56,151	56,151	55,713	201	792	1,513	114,370
2005	32,029	32,029	53,409	138	310	483	86,369
2006	45,829	45,829	48,593	89	817	739	96,067
2007	33,634	33,634	55,174	136	849	960	90,753
2008	4,641 ^{d,e}	4,641 ^{d,e}	45,186	126	0	409	50,362
2009	316 ^{d,e}	316 ^{d,e}	33,805	127	0	863	35,111
2010	9,897 ^{d,e}	9,897 ^{d,e}	44,559	162	0	474	55,092
2011	82 ^{d,e}	82 ^{d,e}	40,980	89	0	474	41,625
2012	0 ^d	0 ^d	30,415	71	0	345	30,831
2013	0 ^d	0 ^d	12,533	42	0	166	12,741
2014	0 ^d	0 ^d	3,286	1	0	0	3,287
2015	0 ^d	0 ^d	7,577	5	0	13	7,595
2016	0 ^d	0 ^d	21,612	57	0	20	21,689
2017	168 ^{d,e}	168 ^{d,e}	37,412	125	0	18	37,723
2018	0 ^d	0 ^d	31,986	206	0	200	32,392
2019	3,110 ^{d,e}	3,110 ^{d,e}	48,377	244	0	38	51,769
2020	0 ^d	0 ^d	21,714	112	0	49	21,875
2021	0 ^d	0 ^d	2,095	0	0	0	2,095
2022	0 ^d	0 ^d	1,764	0	0	0	1,764
2023	0 ^d	0 ^d	1,564	0	0	0	1,564
2024	0 ^d	0 ^d	1,750	0	0	0	1,750
Averages							
2010–2019	1,326	1,326	27,874	100	0	175	29,474
2020–2024	0	0	5,777	22	0	10	5,810

Note: Zero indicates that no harvest or fishery was conducted.

^a Includes harvest from the Coastal District and test fishery harvest that were utilized for subsistence. Subsistence includes fish commercially caught but not sold, and test fishery catch given to subsistence users.

^b Includes only test fishery fish that were sold commercially.

^c Sport fish harvest for the Alaska portion of the Yukon River drainage. Most of this harvest is taken within the Tanana River drainage (see Behr 2015; Wuttig and Baker 2017).

^d No directed king salmon commercial fishery was conducted.

^e King salmon sold commercially were incidentally caught in chum salmon-directed commercial fishery.

Table 2.—Yukon River king salmon escapement estimates from sonar projects and selected tributaries, 2004–2024.

Year	Sonar		Tower or weir			Aerial survey ^a		
	Pilot	Eagle ^b	Chena	Salcha	East Fork Andreafsky	West Fork Andreafsky	Anvik ^c	Nulato
2004	200,761	–	9,645	15,761	8,045	1,317	3,475	1,321
2005	259,015	81,529	^d	6,000	2,239	1,492	2,421	553
2006	228,763	73,691	2,936	10,679	6,463	824	–	1,292
2007	170,246	41,697	3,806	6,425	4,504	976	–	2,583
2008	175,046	38,097	3,208	5,415	4,242	–	–	922
2009	177,796	69,957	5,253	12,774	3,004	1,678	832	2,260
2010	145,088	35,074	2,382	6,135	2,413	858	965	711
2011	148,797	51,271	^d	^{d,e}	5,213	1,173	642	1,401
2012	127,555	34,747	2,220	7,165	2,517	–	722	1,374
2013	136,805	30,725	1,859	5,465	1,998	1,090	853	1,118
2014	163,895	63,462	7,191	^d	5,949	1,695	1,051	–
2015	146,859	84,015	6,294	6,288 ^f	5,474	1,356	2,487	1,564
2016	176,898	72,329	6,665	2,675	2,676	–	–	–
2017	263,014	73,313	4,949 ^d	4,195 ^d	2,970	942	1,080	943
2018	161,900	57,893	4,227 ^d	4,053 ^d	3,972	455	1,109	870
2019	219,624	45,560	2,018	4,678	5,111	904	1,420	656
2020	162,252	33,550	502	–	–	508	667	459
2021	124,845	31,796	1,417	2,082	1,425	–	–	–
2022	48,439	12,025	366	1,211	–	–	178	60
2023	58,529	14,752 ^g	1,069	1,242	194	–	181	300
2024 ^h	64,198	24,183 ^g	398	1,527	24 ^d	–	593	385
5-year average (2020–2024)	91,653	23,261	750	1,515	548	508	404	301
Goal range and type	42,500–55,000 (IMEG) ^g	2,800–5,700 (BEG)	3,300–6,500 (BEG)	2,100–4,900 (SEG)	640–1,600 (SEG)	1,100–1,700 (SEG)	940–1,900 (SEG)	

Note: En dash indicates no data. Chena biological escapement goal (BEG) was established in 2001. IMEG = interim management escapement goal; SEG = sustainable escapement goal.

^a Only surveys that were complete and had a higher rating than fair are included.

^b Estimated number of king salmon at Eagle sonar. Does not account for harvest above the sonar project.

^c Standardized for escapement goal review to include the mainstem between the sonar and McDonald Creek. Also includes Beaver, Swift, and Otter Creeks.

^d Incomplete count, project was not operated or was inoperable for a large portion of the season due to water conditions.

^e Aerial survey indicated escapement of at least 3,500 king salmon.

^f Final estimate uses a binomial mixed-effects model to create passage estimates for the period of missed counts prior to the start of tower operations on July 12.

^g The IMEG of 42,500–55,000 fish applies to 2004 to 2022. In 2023, Alaska and Canada managed the run using different objectives; Alaska used the IMEG range, and Canada managed the run using 55,000 fish as the border passage goal. In 2024, the border passage objective of 71,000 fish was adopted from 2024 to 2030 as part of the *Yukon River Salmon Agreement* as of April 1, 2024.

^h Preliminary estimate and subject to change.

Table 3.—Estimated run size, escapement, and harvest shares for Canadian-origin Yukon River king salmon, 2005–2024.

Year	Yukon River			Total king salmon run size ^c	U.S. share (%) of TAC		U.S. harvest ^d	Canada share (%) of TAC		Canada harvest	Spawning escapement ^e	Border objective ^f		Objectives exceeded? ^g		
	Panel goal or IMEG ^a		Border passage ^b		74%	80%		20%	26%			Lower end border objective	Upper end border objective	Lower end border objective ^g	Upper end border objective ^h	
	From	To														
2005	28,000	28,000	78,962	86,895	43,582	47,116	44,650	11,779	15,313	10,977	31,268	39,779	43,313	39,183	35,649	
2006	28,000	28,000	71,388	84,845	42,065	45,476	48,097	11,369	14,780	8,758	27,990	39,369	42,780	32,019	28,608	
2007	33,000	43,000	39,698	70,440	20,306	29,952	48,320	5,488	9,734	4,794	17,326	38,488	52,734	1,210	-13,036	
2008	45,000	45,000	37,282	62,358	12,845	13,886	25,329	3,472	4,513	3,399	33,630	48,472	49,513	-11,190	-12,231	
2009	45,000	45,000	69,575	87,221	31,244	33,777	17,646	8,444	10,977	4,297	65,278	53,444	55,977	16,131	13,598	
2010	42,500	55,000	34,470	59,736	3,505	13,789	25,271	947	4,481	2,456	32,009	43,447	59,481	-8,977	-25,011	
2011	42,500	55,000	50,901	71,725	12,377	23,380	20,824	3,345	7,599	4,594	46,307	45,845	62,599	5,056	-11,698	
2012	42,500	55,000	34,656	48,498	0	4,798	13,842	0	1,559	2,000	32,656	42,500	56,559	-7,844	-21,903	
2013	42,500	55,000	30,573	37,177	0	0	6,604	0	0	1,904	28,669	42,500	55,000	-11,927	-24,427	
2014	42,500	55,000	63,431	64,886	7,316	17,909	1,455	1,977	5,820	100	63,331	44,477	60,820	18,954	2,611	
2015	42,500	55,000	83,674	87,323	23,919	35,858	3,649	6,465	11,654	1,000	82,674	48,965	66,654	34,709	17,020	
2016	42,500	55,000	71,567	82,765	20,546	32,212	11,198	5,553	10,469	2,769	68,798	48,053	65,469	23,514	6,098	
2017	42,500	55,000	71,815	93,188	28,259	40,551	21,373	7,638	13,179	3,500	68,315	50,138	68,179	21,677	3,636	
2018	42,500	55,000	57,264	76,356	15,804	27,085	19,092	4,271	8,803	2,790	54,474	46,771	63,803	10,493	-6,539	
2019	42,500	55,000	44,816	72,620	13,039	24,096	27,804	3,524	7,831	2,764	42,052	46,024	62,831	-1,208	-18,015	
2020	42,500	55,000	33,330	45,501	0	2,401	12,171	0	780	2,363	30,967	42,500	55,780	-9,170	-22,450	
2021	42,500	55,000	31,758	32,972	0	0	1,214	0	0	306	31,452	42,500	55,000	-10,742	-23,242	
2022	42,500	55,000	12,023	13,144	0	0	1,121	0	0	65	11,958	42,500	55,000	-30,477	-42,977	
2023	42,500	55,000 ⁱ	14,780	15,280	–	–	886	–	–	180	14,576	–	–	NA	NA	
2024	71,000	71,000 ^j	24,186	25,390	0	0	1,085	0	0	0	24,184	71,000	71,000	-46,814	-46,814	
2020–2024																
Average			23,215	26,457	0	600	3,295	0	195	583	22,627	49,625	59,195	-24,301	-33,871	

Note: The total allowable catch (TAC) can be calculated by adding the 80% U.S. share and 20% Canada share. The TAC range is calculated by subtracting each end of the goal range from the total run; a more detailed explanation is available in JTC (2022). Meeting the interim management escapement goal (IMEG) and providing Canada’s share of the TAC is part of the U.S. obligation to meet the harvest share objectives. Border objective is the number of fish that would achieve the goal and the harvest share. En dash means no data, and NA means not available.

^a The IMEG is not a biologically based escapement goal.

^b Border passage estimates are the Eagle sonar estimate minus the Alaska harvest from the community of Eagle upstream of the sonar.

^c Total Canadian-origin run size is equal to Eagle sonar passage. Beginning in 2014, this includes harvests from the Coastal District.

^d United States harvest estimates are estimated by applying the Canadian-origin genetic stock proportions collected from harvest sampling to the number of fish harvested in Alaska.

^e Spawning escapement is the border passage estimate minus the Canadian harvest.

^f Border passage required to meet IMEG and provide 20% and 26% Canadian Harvest share (Lower and Upper objective).

^g Number of fish additional to the lower end of the *Yukon River Salmon Agreement* (a negative number is the number of fish below the required value).

Table 4.–Summary of 2024 salmon escapement counts compared to existing goals.

Stock/location	Assessment method	2024 Escapement	Goal type	Goals	Year established	Primary source
King salmon stock						
E. Fork Andreafsky River	Weir	^a	SEG	2,100–4,900	2010	Volk et al. (2009)
W. Fork Andreafsky River	Aerial survey	101	SEG	640–1,600	2005	ADF&G (2004)
Anvik River drainage	Aerial survey	594	SEG	1,100–1,700	2005	ADF&G (2004)
Nulato River (forks combined)	Aerial survey	682	SEG	940–1900	2005	ADF&G (2004)
Gisasa River	Weir	Not operated	none	–	–	–
Henshaw River	Weir	Not operated	none	–	–	–
Chena River	Tower/sonar	397	BEG	3,300–5,700	2023	Liller and Savereide (2022)
Salcha River	Tower/sonar	1,525	BEG	3,300–6,500	2001	Evenson (2002)
Canada (upper Yukon River)	Sonar-harvest	24,184 ^b	^c	71,000	2024	JTC (2025)

Note: BEG = biological escapement goal; IMEG = interim management escapement goal; SEG = sustainable escapement goal. En dash = no data.

^a Incomplete count due to late installation, early removal of the project, or high water events.

^b A statistical model is used to estimate escapement

^c The Yukon River Panel adopted a border passage objective of 71,000 king salmon in the *Yukon River Salmon Agreement* as of April 1, 2024. The objective will be in place from 2024 to 2030.

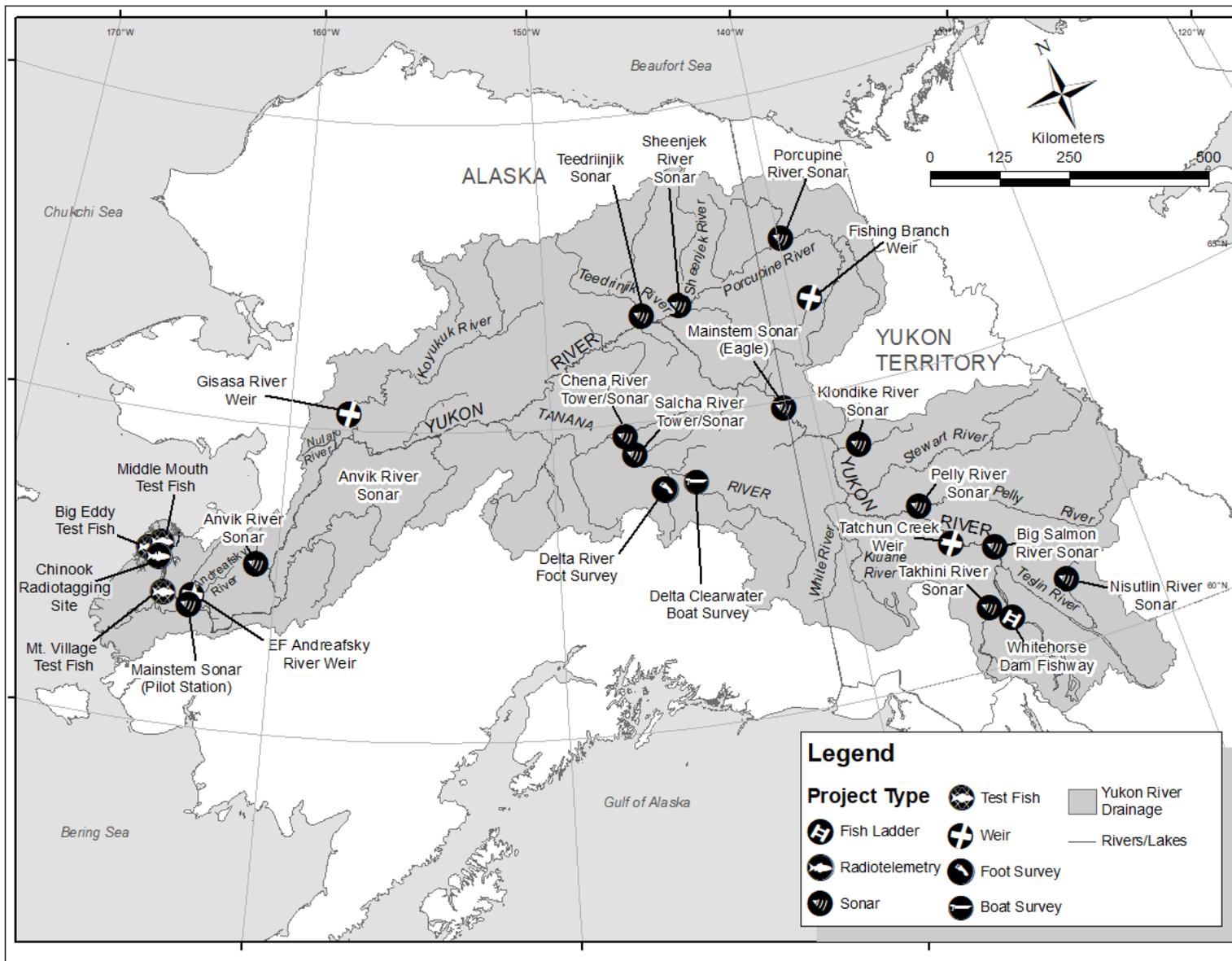


Figure 2.—Map of the Yukon River drainage showing select salmon monitoring projects. Does not show aerial surveys.

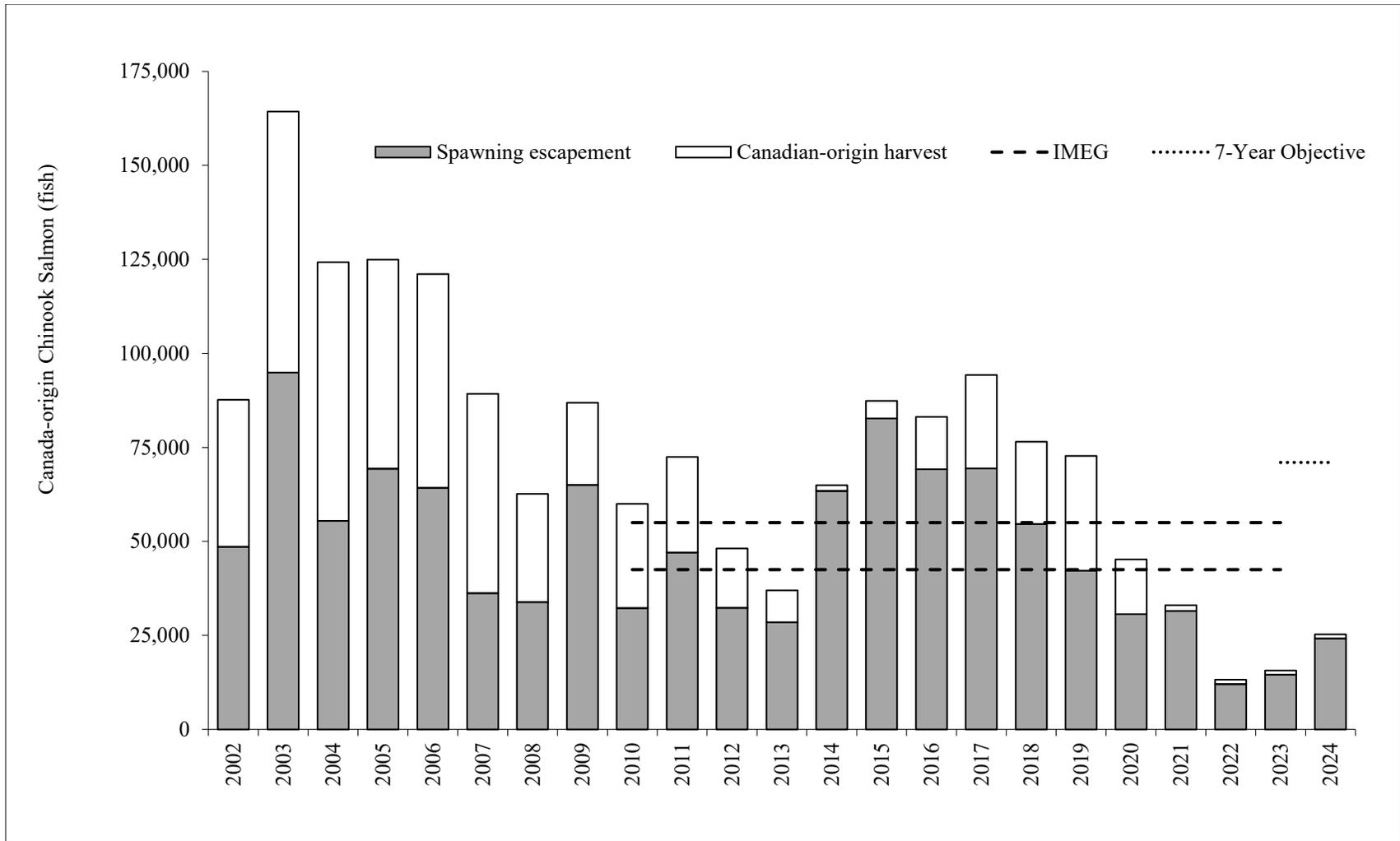


Figure 3.—Spawning escapement and harvest estimates for Canadian-origin Yukon River king salmon, 2002–2024.

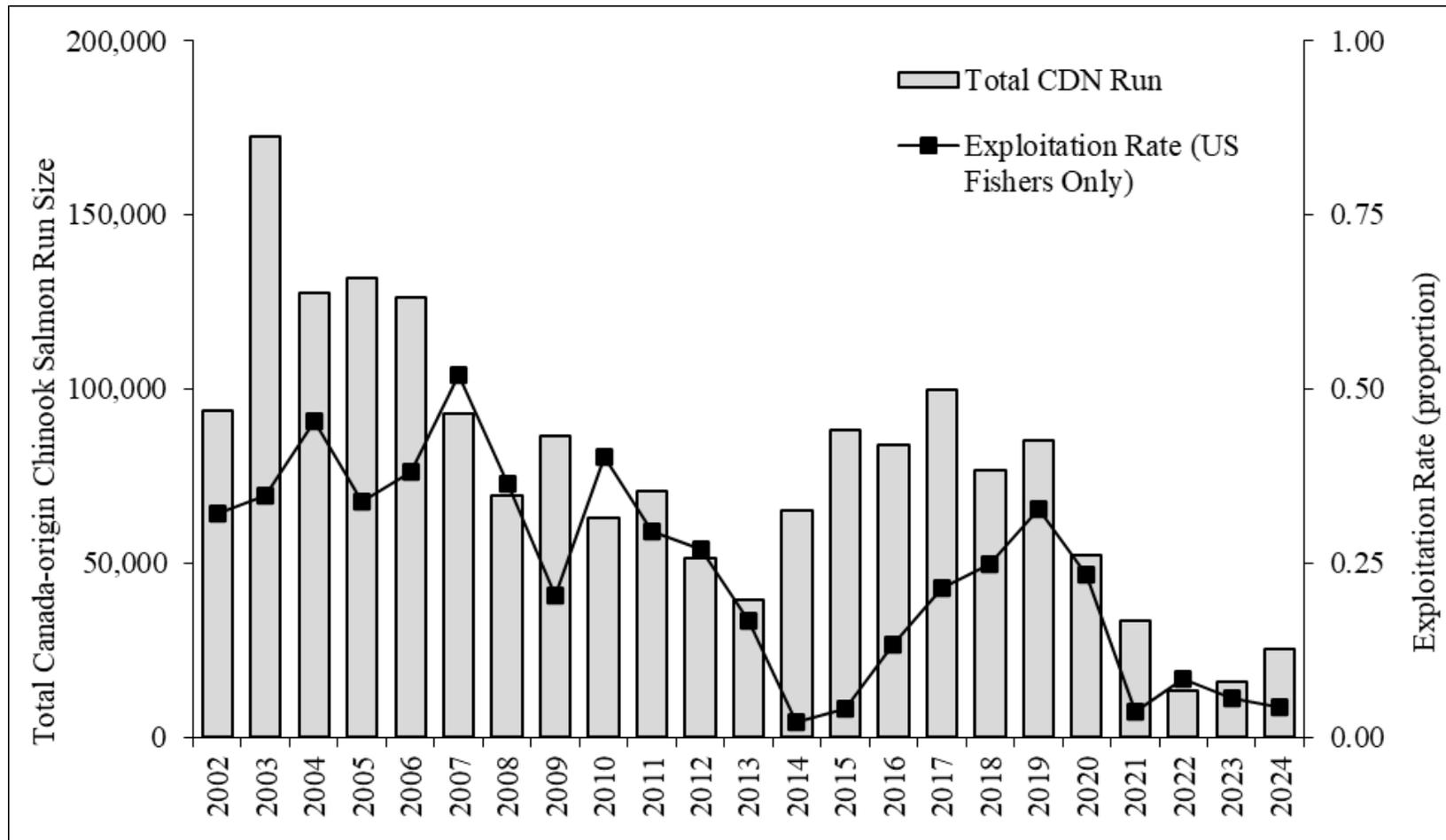


Figure 4.—Total Canadian-origin Yukon River king salmon run size and exploitation rate in U.S. fisheries, 2002–2024 (top), total lower and middle stocks Yukon River king salmon run size and exploitation within Alaska, 2002–2024 (bottom).

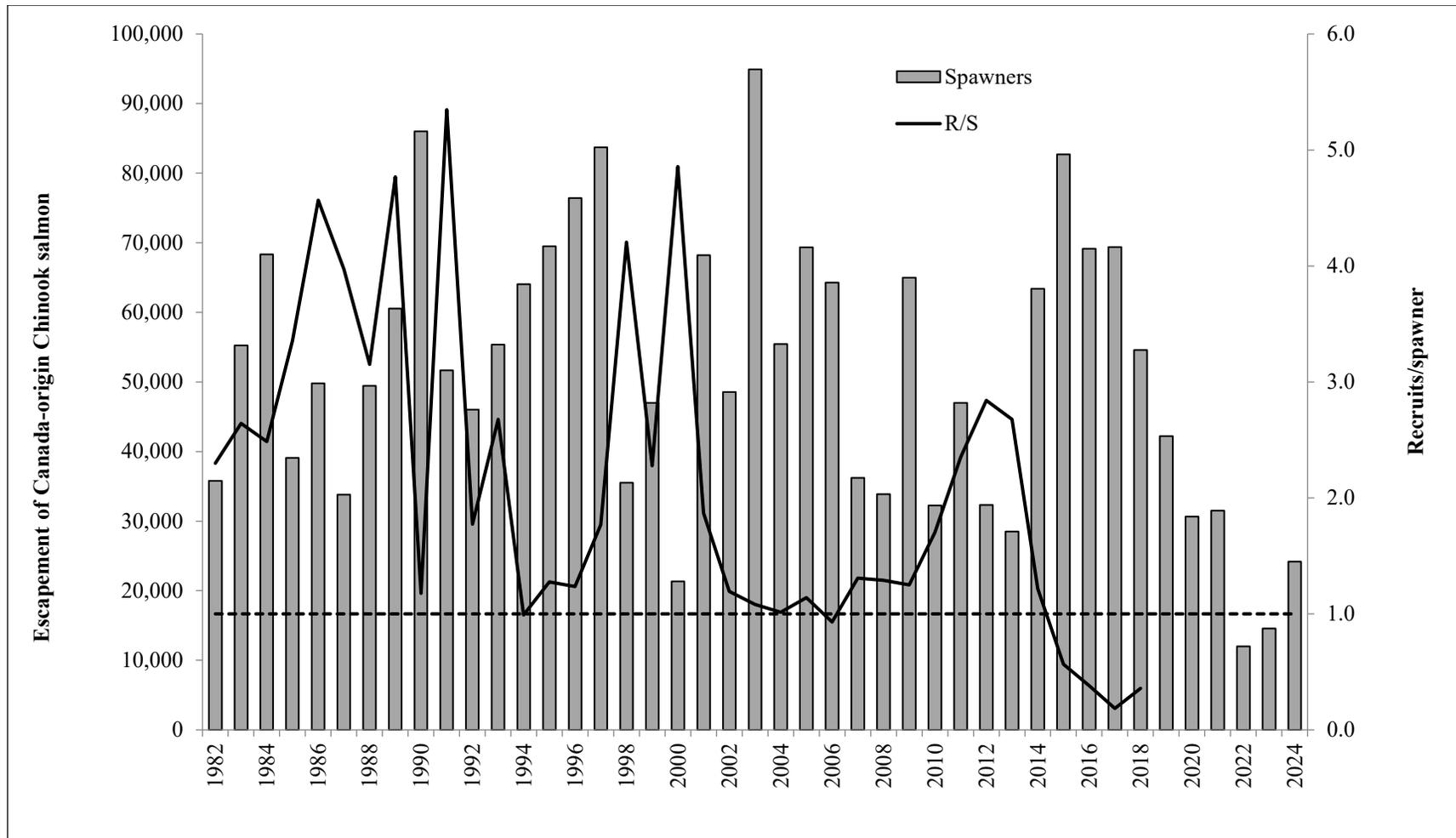


Figure 5.—Total escapement for Canadian-origin king salmon and returns per spawner (R/S) from each brood year with the age-3 through age-6 returns. (Age-7 returns do not change the R/S value considerably because they make up a relatively small proportion of the run).

Note: The dashed line indicates a necessary replacement level of recruits per spawner of 1.

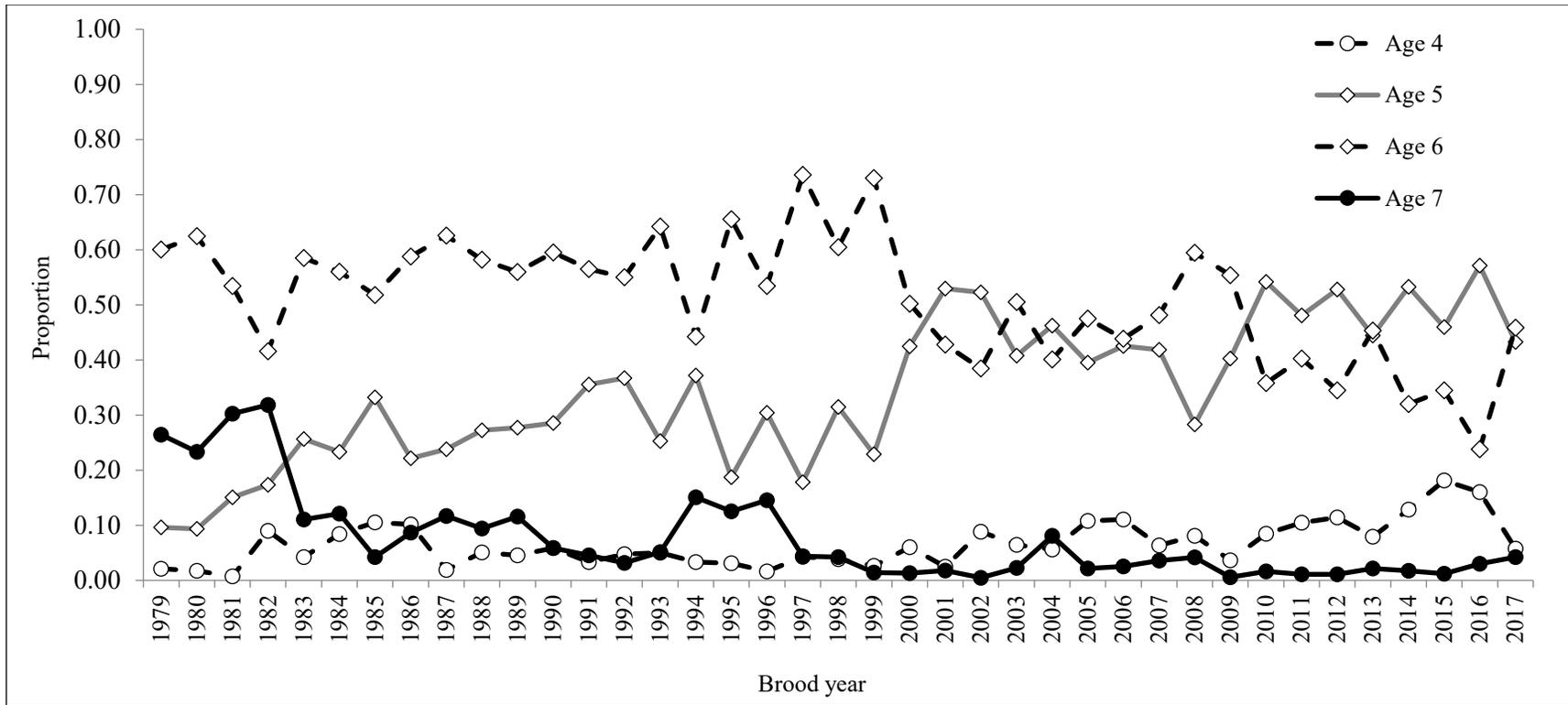


Figure 6.—King salmon proportion-at-age from brood years 1979 to 2017.

