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Subsistence Fisheries Harvest Monitoring Report, Kuskokwim Fisheries Management Area, Alaska, 2021

by
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and
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September 2022

Alaska Department of Fish and Game **Division of Subsistence**

Symbols and Abbreviations

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Weights and measures (metric)	
centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)	
cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
nautical mile	nmi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature	
day	d
degrees Celsius	°C
degrees Fahrenheit	°F
degrees kelvin	K
hour	h
minute	min
second	s

Physics and chemistry	
all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity (negative log of)	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General	
Alaska Administrative Code	AAC
all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.
all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.
at	@
compass directions:	
east	E
north	N
south	S
west	W
copyright	©
corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
District of Columbia	D.C.
et alii (and others)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.
Federal Information Code	FIC
id est (that is)	i.e.
latitude or longitude	lat. or long.
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S.C.	United States Code
U.S. state	use two-letter abbreviations (e.g., AK, WA)

Measures (fisheries)	
fork length	FL
mideye-to-fork	MEF
mideye-to-tail-fork	METF
standard length	SL
total length	TL

Mathematics, statistics	
all standard mathematical signs, symbols and abbreviations	
alternate hypothesis	H_A
base of natural logarithm	e
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	(F, t, χ^2, etc.)
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	E
greater than	>
greater than or equal to	?
harvest per unit effort	HPUE
less than	<
less than or equal to	?
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
minute (angular)	'
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

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The Division of Subsistence Technical Paper Series was established in 1979 and represents the most complete collection of information about customary and traditional uses of fish and wildlife resources in Alaska. The papers cover all regions of the state. Some papers were written in response to specific fish and game management issues. Others provide detailed, basic information on the subsistence uses of particular communities which pertain to a large number of scientific and policy questions.

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ABSTRACT

The Alaska Department of Fish and Game, in partnership with the Orutsararmiut Native Council in Bethel, conducted a voluntary survey program to estimate subsistence salmon harvest for the Kuskokwim River drainage and south Kuskokwim Bay in 2021. This study was a continuation of the Kuskokwim Management Area subsistence salmon monitoring program, which has documented annual subsistence salmon harvests since 1960. Similar to the 2020 survey season, the COVID-19 pandemic presented challenges during the 2021 survey season. As with the 2020 season, these challenges prompted various enhancements to methodologies in order to facilitate the collection of harvest information. Harvest information was collected primarily through postseason household surveys. Simple random sampling methods were used in the community of Bethel, stratified sampling methods were used for all other participating communities. Subsistence salmon harvest information was collected by Orutsararmiut Native Council Fisheries Technicians in the community of Bethel, and Alaska Department of Fish and Game staff surveyed the remaining communities. Households were surveyed in 27 communities, including most communities within the Kuskokwim River drainage and south Kuskokwim Bay. In 2021, subsistence salmon fishers reported harvesting five species of Pacific salmon, including Chinook *Oncorhynchus tshawytscha,* chum *O. keta,* sockeye *O. nerka,* coho *O. kisutch,* and pink salmon *O. gorbuscha*. Fewer than one-half of Kuskokwim River drainage area community Chinook salmon harvests exceeded their respective 10-year averages in 2021. Many of the remaining community Chinook salmon harvests were similar to each community's respective 10-year average, although some community Chinook harvests were considerably lower. For all surveyed communities, the 2021 chum salmon harvest was significantly less than each community's 10-year average. For many communities, chum salmon harvests fell by more than 75% compared to each community's 10-year average, and two communities reported no harvest. Nearly one-half of surveyed communities' sockeye salmon harvests surpassed their respective 10-year averages whereas only 4 of the 27 surveyed communities' coho salmon harvests were greater than their respective 10-year averages. Of the surveyed communities, 10 communities' Chinook salmon harvests exceeded each community's respective 5-year average, whereas no communities exceeded their 5-year average for chum salmon harvests. Lastly, over 40% of surveyed community sockeye salmon harvests exceeded each community's respective 5-year average, whereas over two-thirds of surveyed community coho salmon harvests fell below each community's respective 5-year average. Information from the Kuskokwim Management Area subsistence salmon monitoring program, including information recorded in 2021, are used by the Alaska Department of Fish and Game, U.S. Fish and Wildlife Service, Alaska Board of Fisheries, the Federal Subsistence Board, the North Pacific Fishery Management Council, the Kuskokwim River Salmon Management Working Group, the Kuskokwim River Intertribal Fish Commission, and numerous local organizations that advise these agencies in management of the fishery.

Key words: Chinook salmon *Oncorhynchus tshawytscha,* chum salmon *Oncorhynchus keta,* sockeye salmon *Oncorhynchus nerka,* coho salmon *Oncorhynchus kisutch,* pink salmon *Oncorhynchus gorbuscha,* subsistence, harvest, Bethel, Aniak, Kuskokwim River, Kuskokwim Bay, Kuskokwim Management Area

1. INTRODUCTION

Annual documentation of the subsistence salmon harvest is necessary to determine whether salmon are returning in sufficient numbers to a large portion of the Kuskokwim Management Area (KMA) rivers to meet escapement and subsistence needs. Since 1960, the Kuskokwim Area subsistence salmon monitoring program (Monitoring Program) has estimated salmon harvest primarily through household surveys and, to a lesser extent, harvest calendars and postcard surveys. This information has been used by Alaska Department of Fish and Game (ADF&G), U.S. Fish and Wildlife Service (USFWS), Alaska Board of Fisheries (BOF), and the Federal Subsistence Board (FSB) to manage and provide reasonable opportunity for continued customary and traditional uses of salmon throughout the area.

The purpose of this study was to quantitatively estimate the subsistence harvest of salmon, by species, among the majority of communities in the KMA using postseason subsistence salmon harvest surveys (Figure 1-1; Table 1-1). This study was a continuation of a project funded by the USFWS Office of Subsistence Management (OSM) Fisheries Resource Monitoring Program (FRMP) and the state of Alaska. Data were collected about the number and species of salmon harvested by area residents and analyzed to provide an estimate of the number of salmon harvested for subsistence purposes in 2021.

Project Goals

The goal of the survey is to provide a reliable annual estimate of subsistence salmon harvest, primarily as a management tool for management agencies, advisory bodies, and local organizations. Survey questions are designed to determine total subsistence harvest of salmon. In addition to salmon harvested for human consumption, estimates include the number of salmon harvested to feed dogs, salmon discarded as unfit for human consumption, salmon given away by fishing households to others, and whether households were able to meet their subsistence needs. The data collected during this survey support fisheries managers by expanding their ability to assess annual run strength of various salmon species, forecast the strength and age composition of future runs, set preseason management plans, and develop long-term management plans, including escapement goals. These data also help managers assess subsistence needs and identify whether harvestable surpluses will be available for subsistence, commercial, and sport fishing uses (Lipka et al. 2016).

Objectives

The objectives of this study were as follows:

1. Conduct subsistence salmon harvest surveys for the purpose of estimating the number of Chinook, chum, sockeye, coho, and pink salmon harvested for subsistence uses by residents of Bethel;
2. Conduct subsistence salmon harvest surveys for the purpose of estimating the number of Chinook, chum, sockeye, coho, and pink salmon harvested for subsistence uses by residents of Aniak;
3. Conduct subsistence salmon harvest surveys for the purpose of estimating the number of Chinook, chum, sockeye, coho, and pink salmon harvested for subsistence uses by residents of up to 26 KMA communities, in addition to Bethel and Aniak, including communities on South Kuskokwim Bay;
4. Estimate subsistence salmon harvest by community; and
5. Estimate total subsistence salmon harvests in the surveyed portion of the KMA.

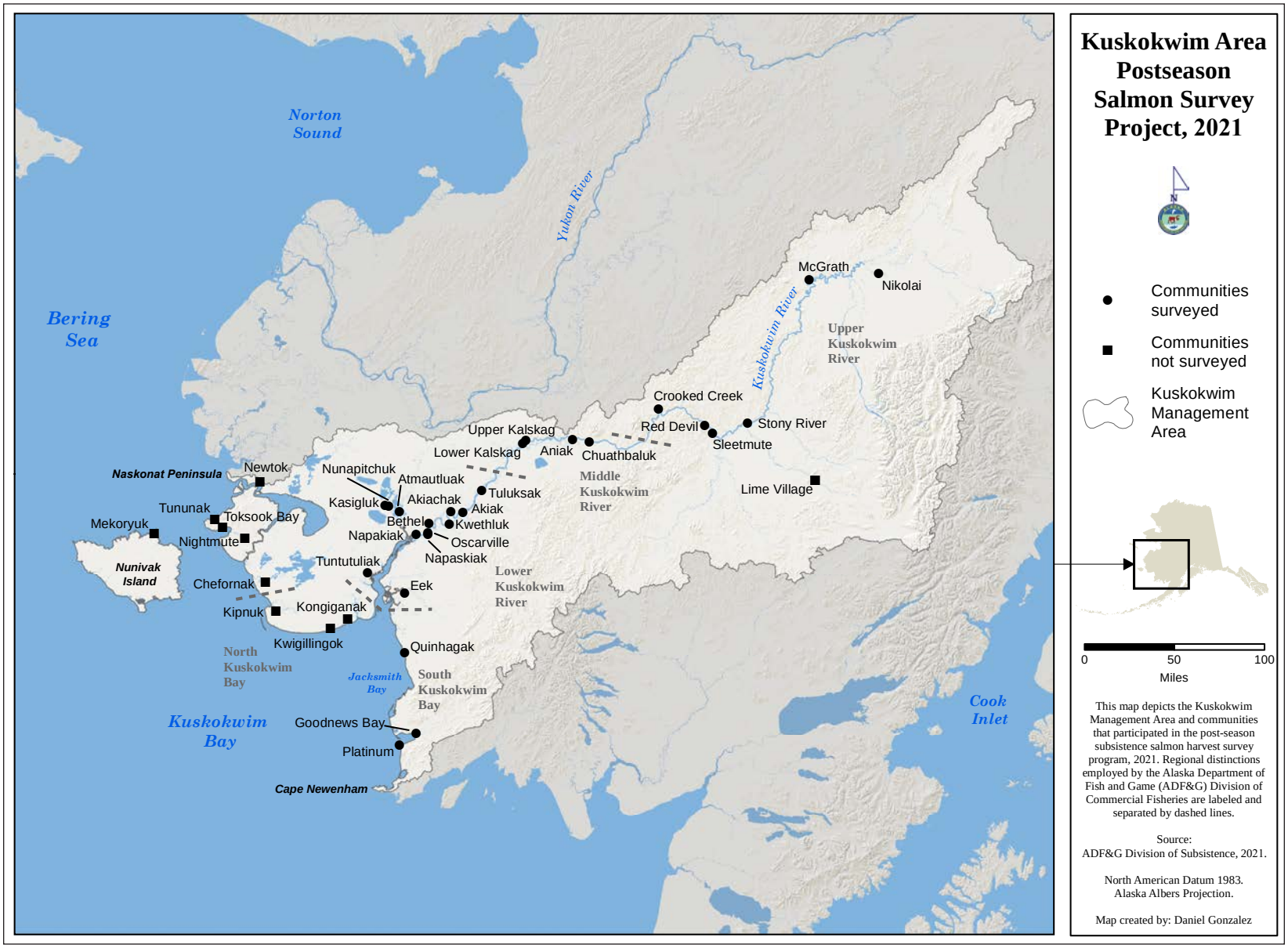

Figure 1-1.–Kuskokwim Management Area.

Table 1-1.–Kuskokwim Management Area communities by geographic location.

North Kuskokwim Bay
Kipnuk[a]
Kwigillingok[a]
Kongiganak[a]
Lower Kuskokwim River
Tuntutuliak
Eek
Kasigluk
Nunapitchuk
Atmautluak
Napakiak
Napaskiak
Oscarville
Bethel
Kwethluk
Akiachak
Akiak
Tuluksak
Middle Kuskokwim River
Lower Kalskag
Upper Kalskag
Aniak
Chuathbaluk

-continued-

Table 1-1.–Continued.

Upper Kuskokwim River
Crooked Creek
Red Devil
Sleetmute
Stony River
Lime Village[b]
McGrath
Takotna
Nikolai
Telida[c]
South Kuskokwim Bay
Quinhagak
Goodnews Bay
Platinum
Bering Sea Coast
Mekoryuk[d]
Newtok[d]
Nightmute[d]
Toksook Bay[d]
Tununak[d]
Chefornak[d]

Source ADF&G Division of Subsistence household surveys, 2021.

a. North Kuskokwim Bay communities have declined to participate in this study, and are not included in survey efforts.

b. Lime Village could not be reached for surveys.

c. Telida is only seasonally occupied and is not typically a part of this study.

d. Bering Sea coastal communities within the Kuskokwim Management Area are not included in the postseason survey.

Study Area

The KMA includes the Kuskokwim River drainage, all waters of Alaska that flow into the Bering Sea between Cape Newenham and the Naskonat Peninsula, and Nunivak and St. Matthew islands (Figure 1-1).[1] There are 38 communities consisting of approximately 4,600 households within the KMA.[2] Of those households, more than two-thirds are situated within the Kuskokwim River drainage (McDevitt et al. 2020). Much of the subsistence salmon fishing effort occurs within the mainstem Kuskokwim River. Therefore, the bulk of survey efforts are focused on communities located along the mainstem Kuskokwim River. In addition, subsistence fishing also occurs in many of the Kuskokwim River tributaries that contain salmon. Residents of Quinhagak, Goodnews Bay, and Platinum, which are located along the south shore of Kuskokwim Bay, harvest salmon stocks primarily from the Kanektok, Arolik, and Goodnews river systems. Residents of Kipnuk, Kwigillingok, and Kongiganak, which are located on north Kuskokwim Bay, harvest salmon from within the Kuskokwim River drainage and from local drainages that empty into Kuskokwim Bay. Residents of Toksook Bay, Nightmute, Tununak, Newtok, Chefornak, and Mekoryuk, which are situated on the Bering Sea coast, harvest salmon from coastal waters or salmon bound for nearby rivers (Figure 1-1; Tiernan et al. 2018:1).

Residents of the Kuskokwim River drainage identify the region's communities as being divided among three distinct areas that are commonly referred to as the lower, middle, and upper river. The lower Kuskokwim River includes the communities of Eek and Tuntutuliak and extends upstream approximately 125 river miles to the community of Tuluksak. From there, the area locally known as the middle Kuskokwim River extends roughly 260 miles upstream and includes all communities from Lower Kalskag to Stony River (including Lime Village). Lastly, the portion referred to as the upper Kuskokwim River begins near the community of Stony River upstream to the community of Nikolai, a distance of approximately 233 miles. In this report, the regional distinctions employed by the ADF&G Division of Commercial Fisheries (DCF) will be used in order to remain consistent with how the data are presented in the tables and figures. The locally known and DCF regional distinctions for the lower Kuskokwim River are identical. However, within this report, the DCF regional distinctions for the middle and upper portions of the river differ from the locally known regional distinctions. The DCF regional distinctions designate the middle Kuskokwim River to include all communities from Lower Kalskag upstream to Chuathbaluk and the upper Kuskokwim River to include all communities from Crooked Creek upstream to Nikolai.

The Kuskokwim River subsistence salmon fishery is one of the largest in the state in terms of the number of residents who participate and the number of salmon harvested (McDevitt et al. 2021a). Residents harvest five species of Pacific salmon (hereinafter *salmon*) for subsistence purposes: Chinook *Oncorhynchus tshawytscha,* chum *O. keta,* sockeye *O. nerka,* coho *O. kisutch,* and pink salmon *O. gorbuscha*. Between 2010 and 2014, the ADF&G Division of Subsistence conducted comprehensive subsistence harvest and use surveys in 23 KMA communities. The results indicate that on average salmon contribute 40% of the total subsistence resource harvest (in edible pounds) in the lower Kuskokwim River communities, 65% in the middle Kuskokwim River communities, and 25% in the upper Kuskokwim River communities (Brown et al. 2012; 2013; Ikuta et al. 2014, 2016; Runfola et al. 2017).

Salmon Stock Run Timing[3]

Chinook salmon are the first to arrive in the lower Kuskokwim River following breakup, which typically occurs in late spring. Chinook salmon are most abundant in the lower Kuskokwim River between mid- to late June. On average, the majority of Chinook salmon have passed through the lower Kuskokwim River by early to mid-July.[4] In the middle Kuskokwim River, Chinook salmon begin to arrive in smaller numbers

1. St. Matthew Island is not pictured in Figure 1-1.
2. U.S. Census Bureau, Washington D.C., n.d. "Explore Census Data." Accessed July 19, 2022. https://data.census.gov/cedsci/
3. All run timing information is based upon discussions with local Kuskokwim River subsistence fishers, C. McDevitt, field notes, July 2019 and May 2022.
4. C. McDevitt, field notes, Red Devil and Sleetmute, July 24, 2019.

approximately two to three weeks after they begin to pass through the Bethel area. The highest abundance of Chinook salmon in the middle Kuskokwim River generally occurs in late June and early July, and the run begins to decline during the second to third week of July. In the upper Kuskokwim River, small numbers of Chinook salmon are present in mid-June; the run strengthens towards the end of June and into early July then begins to diminish in mid-July.[5]

Both sockeye and chum salmon enter the lower Kuskokwim River by early to mid-June and run concurrently with Chinook salmon. Both runs begin to strengthen in late June. The sockeye salmon run declines in mid-July, and the chum salmon run diminishes at the end of July. Sockeye salmon begin to arrive in the middle Kuskokwim River approximately one week after they begin to pass through the Bethel area and peak around the second week of July. Chum salmon typically appear in the middle Kuskokwim River in smaller numbers roughly one week after sockeye salmon arrive in the area; the chum salmon run continues to strengthen following the peak of the sockeye salmon run. Chum salmon enter the upper Kuskokwim River in mid-July and peak towards the end of the month. Sockeye salmon are available for harvest as far upriver as the Stony, Swift, and Tatlawiksuk river drainages, a distance of over 300 river miles from the Kuskokwim River mouth. This species is generally not present in the Kuskokwim River drainage upstream of these tributaries; however, Chinook, chum, and coho salmon are.[6]

Coho salmon pass through the lower Kuskokwim River beginning in mid- to late July and can be found in the middle and upper Kuskokwim River in late July to early August. The coho salmon run peaks during early August in the lower Kuskokwim River and during the second and third weeks of August in the middle and upper Kuskokwim River. The run continues through August and declines during the latter part of the month and into early September, although harvests may occur into October.

Typically, salmon that are bound for tributaries in the headwaters of the Kuskokwim River drainage begin their migration earlier in the season. In addition, these fish generally travel at faster migration rates compared to other Chinook and coho salmon that are bound for less distant tributaries, such as those located in the lower and middle Kuskokwim River (Clark and Smith 2019; Smith and Liller 2017a; 2017b) Also, Chinook and coho salmon that begin their migration later in the season tend to travel faster than other salmon that begin their migration earlier in the season (Schaberg et al. 2010). Prior assessment projects have determined that Chinook salmon generally travel between 27 to 36 miles per day as they migrate upstream to their respective spawning areas (Clark and Smith 2019). A mark-recapture study conducted by DCF staff in 2004 documented travel speeds for chum, sockeye, and coho salmon (Pawluk et al. 2006). These travel speeds were based upon the distance between several different sampling sites as fish were tagged at one site and recaptured at a site further upstream. The majority of sockeye salmon recaptured during the study generally traveled a distance of 35 miles in one 24-hour period. Chum salmon that were tagged and recaptured typically traveled 35 miles in two days, and coho salmon traveled the same distance in approximately five days.

Salmon Harvesting

Salmon harvests typically occur June through October throughout the drainage. Each summer many families relocate to, or make frequent short trips to, seasonal fish camps situated along tributaries, sloughs, and the mainstem Kuskokwim River. Fish camps are bases for fishing excursions as well as centralized harvest processing sites. Although these seasonal movements continue today for some families, ADF&G Division of Subsistence research has shown that fewer families are using fish camps in comparison to earlier years (Godduhn et al. 2020). Many respondents attribute the decline in the use of fish camps to increased restrictions on fishing opportunity and an associated increase in fishing costs. Conducting harvest and processing activities from fish camps is less feasible now for some families because of the unpredictable nature of the fishing schedule and the increasingly high costs of gasoline, oil, gear, and other necessary items. For example, according to one lower Kuskokwim River fisher, “It used to be worth going [to] fish

5. C. McDevitt, field notes, Nikolai, July 18, 2019.
6. C. McDevitt, field notes, Nikolai, July 18, 2019; Red Devil and Sleetmute, July 24, 2019.

camp, long ago, but we're beginning to wonder whether it's worth it or not [nowadays]" due to fishing restrictions (Godduhn et al. 2020:42).

Many respondents throughout the drainage explained that basing their fishing and processing from their home communities tended to be more cost-effective and more aligned with conservation-based management initiatives. For example, a middle Kuskokwim River fisher explained "Now we built a smokehouse behind our house. So, we just cut the fish under the bank and then haul them up to dry 'em" (Godduhn et al. 2020:58–59).

One middle Kuskokwim River fisher said that fewer fishing opportunities caused an increase in the amount of work involved as well as a disruption of social networks and the transmission of knowledge to younger generations:

> When I was younger, we would all go to fish camp and we would just be there…when we weren't regulated on what we were doing. It was, you didn't have to cut 200 fish a day and make it be extreme work. You could cut 30 fish, the first day you get to fish camp, 20 fish, 10 fish, 50 fish. It wasn't a mad dash to get it done on your opening and make it not be a family gathering. Now it gets to be where you need to be there on time. And there is not a lot of time to stop and teach the younger ones because you gotta get all of that done and then in the smokehouse. I still, like mom taught me, teach my girl to cut the way mom has taught me to cut. But I can't spend time [teaching my daughter], like mom used to spend with me. (Godduhn et al. 2020:59)

Although thousands of residents throughout the drainage harvest salmon each season, several factors differentiate one region of the river to the next. These include differences in the physical nature of the river through its course, species distribution and abundance, types of gear used by fishers, and population sizes of communities.

Overall, annual subsistence salmon harvests are roughly proportional to population size among the different regions of the drainage. For example, approximately 81% of the Kuskokwim River drainage population resided in lower river communities in 2021 (Table 1-2), and from 1990 to 2021 lower river fishers harvested 78% of the total subsistence salmon harvest (Appendix A). Roughly 8% of the population resided in middle Kuskokwim River communities in 2021, and middle Kuskokwim River harvests accounted for approximately 10% of the total annual harvest from 1990 to 2021. Upper Kuskokwim River communities accounted for 5% of the total drainage population in 2021, and between 1990 and 2021 upper Kuskokwim River fishers harvested approximately 7% of the total annual harvest. Lastly, south Kuskokwim Bay communities accounted for approximately 5% of the surveyed area population in 2021. Between 1990 and 2021, South Kuskokwim Bay harvests accounted for 5% of the total harvest for all salmon.

Due to their physical location within the drainage, lower Kuskokwim River communities are positioned to harvest each of the four major species of returning salmon as soon as they enter the river.[7] As such, salmon abundance tends to be greater in the lower Kuskokwim River, and the fish are typically in better physical condition within this portion of the drainage early in the run. Further upstream in the drainage, both the physical quality of fish and abundance change. As a result, the harvest composition among communities changes. According to one middle Kuskokwim River fisher, some chum salmon that first arrive in the Aniak area in June are in good physical condition and are typically harvested by fishers. However, the fisher added that the quality of chum salmon deteriorates quickly as the season progresses (Godduhn et al. 2020). Similarly, according to one fisher from Sleetmute, early-arriving chum salmon are typically in good condition, but subsequent chum salmon "…get rotten too much going up to fresh water you know. So I let them…go" (Godduhn et al. 2020:62).

7. Although pink salmon are harvested by Kuskokwim River drainage fishers, the annual harvest is generally far less compared to the harvests of Chinook, chum, sockeye, and coho salmon.

Table 1-2.–Total households, surveyed households, and estimated population, surveyed communities, Kuskokwim Management Area, 2021.

Community	Total households	Surveyed households	Estimated population	CI (95%)
Kongiganak	90	0	–	–
North Kuskokwim Bay	**90**	**0**	–	–
Tuntutuliak	112	71	495	35
Eek	99	54	369	55
Kasigluk	119	57	648	71
Nunapitchuk	123	64	537	91
Atmautluak	76	39	387	67
Napakiak	99	51	301	44
Napaskiak	121	37	508	76
Oscarville	17	15	69	8
Bethel	1,750	535	5,901	251
Kwethluk	165	96	778	43
Akiachak	176	60	729	104
Akiak	94	43	473	59
Tuluksak	92	50	447	30
Lower Kuskokwim River	**3,043**	**1,172**	**11,642**	**328**
Lower Kalskag	85	32	331	83
Upper Kalskag	59	18	191	36
Aniak	163	64	576	73
Chuathbaluk	32	28	101	9
Middle Kuskokwim River	**339**	**142**	**1,199**	**114**
Crooked Creek	39	29	106	12
Red Devil	7	6	19	0
Sleetmute	36	25	73	7
Stony River	18	9	58	13
Lime Village	5	0	–	–
McGrath	119	54	295	39
Takotna	26	18	64	12
Nikolai	31	24	72	20
Upper Kuskokwim River	**281**	**165**	**687**	**47**
Kuskokwim River Total[a]	**3,663**	**1,479**	**13,528**	**350**

-continued-

Table 1-2.–Continued.

Community	Total households	Surveyed households	Estimated population	CI (95%)
Quinhagak	179	102	588	64
Goodnews Bay	87	49	232	53
Platinum	18	9	55	5
South Kuskokwim Bay	**284**	**160**	**875**	**83**
Kuskokwim Area Total	**4,037**	**1,639**	**14,403**	**359**

Source ADF&G Division of Subsistence household surveys, 2021.

Note Dashes indicate that data are unavailable. See Table 1-1 for community-specific details.

a. Kuskokwim River Total includes lower Kuskokwim River, middle Kuskokwim River, and upper Kuskokwim River.

Generally, salmon species are less abundant in the upper Kuskokwim River when compared to the abundance further downstream within the drainage. In addition, the quality of salmon in the upper portion of the drainage is generally less desirable. One upper Kuskokwim River fisher described the difference in quality:

> To eat fish strips from fish caught in McGrath or between McGrath and Nikolai, compared with fish strips from anywhere else in the state, it's amazing. It's a piece of dry beef jerky with zero oil to it. And they are light colored instead of that nice orange color that fish strips from everywhere else have. (Ikuta et al. 2014:36)

Upper river fishers do harvest some chum salmon, although some residents consider the quality of chum salmon in this region of the drainage to be less than desirable (Godduhn et al. 2020:2020). The primary targeted species are typically Chinook and coho salmon. Sockeye salmon are not prevalent in the upper reaches of the drainage. The upper extent of sockeye salmon distribution in the Kuskokwim River is roughly as far upstream as the Stony and Swift and river drainages, 133 and 233 river miles downstream from the communities of McGrath and Nikolai, respectively.[8] According to one upper Kuskokwim River fisher:

> Well, we don't get any reds [sockeye salmon]…they [some upper river residents] drift down there, go down to the Tatlawiksuk or go down Stony River and setnet for a while or fish with somebody down there. That's where all of this [sockeye] harvest is coming from is downstream. (Godduhn et al. 2020:86)

Despite the distance, some upper Kuskokwim River fishers make the journey to the middle Kuskokwim River area to harvest salmon. Although these trips provide additional opportunities for upper Kuskokwim River families to harvest certain salmon species that are otherwise absent or less abundant in the upper reaches of the drainage, the distance traveled incurs a great deal of cost for families in terms of time and fuel:

> Yeah, I haven't been going very far to catch the salmon. Like when I was growing up, we'd go way upstream or way downstream to get all our salmon. My costs, I [try to] keep them down. (Godduhn et al. 2020:87)

Another upper Kuskokwim River fisher added that the "Price of gas is crazy. It costs a fortune just to go down to [fish]. It's crazy. It's $7.59 a gallon" (Godduhn et al. 2020). Due to the high costs and long distances, some upper Kuskokwim River families combine their resources to make these downriver trips less expensive.

8. Google Earth Pro 7.3.4.8642. "Stony River, Alaska." 61°49'34.92" N and 156°22'05.99" W. CNES/Airbus, Maxar Technologies, Landsat/Copernicus. 2022. Accessed July 19, 2022.

The most common gear types for harvesting salmon include drift gillnets, set gillnets, fish wheels, and rod and reel. Although both set and drift gillnets are used drainage-wide, disparate physical characteristics between the three regions of the river typically demand different gear types in each region. For example, the lower Kuskokwim River's large width and depth coupled with less net-snagging debris in the river is generally conducive to the use of large drift and set gillnets: drift gillnets may be up to 300 feet long and over 22 feet deep. Middle Kuskokwim River fishers also utilize drift and set gillnets in the swifter, narrower middle Kuskokwim River, but these nets are typically shorter in length and shallower in depth than those used in the lower Kuskokwim River. For example, one middle Kuskokwim River fisher described why he preferred using a set gillnet as opposed to a drift gillnet:

> You don't know if you are gonna catch a snag on those drifts, on the bottom. And you get stuck and you will have a hell of a goddamn time to get it out…You gotta jerk it out sometimes with the motor. Tear your net and you have to fix the net again. Boy, that is bad. Lot of logs here [in the middle Kuskokwim River], you know. (Godduhn et al. 2020)

Middle Kuskokwim River fishers also deploy fish wheels, use rod and reel gear, and to a lesser degree dip nets. One middle Kuskokwim River fisher described the tradition of using fish wheels by his community:

> What I can remember that's how we always fished pretty much, fish wheels. That was our way of life. A lot of people like I said even back then we couldn't afford fish nets. So we used what nature provided: wood. And that's how we made our fish wheels. That's how my dad's dad and my dad did it. My dad's dad had a fish wheel. And that's where I learned it. (Godduhn et al. 2020)

Rod and reel fishing in the middle Kuskokwim River is especially popular when coho salmon are running. According to one Aniak respondent, "…silvers are…so many, you just rod and reel, you can get quite a bit" (Godduhn et al. 2020).

Upper Kuskokwim River fishers deploy shorter, shallower gillnets and also depend on fish wheels and rod and reel gear; some upper Kuskokwim River families exclusively use rod and reel gear to harvest both Chinook and coho salmon.

Regulatory Context

Statewide eligibility criteria require individuals to be Alaska residents for the preceding 12 months before harvesting salmon for subsistence uses. The majority of subsistence salmon fishers in the region are local residents; however, some subsistence fishers are domiciled in other parts of Alaska and return to assist family or friends with the harvesting or processing of salmon (Simon et al., 2007a:5).

Prior to 1990, there were additional restrictions on participation in the subsistence fishery related to the state's rural priority for subsistence, which the Alaska Supreme Court subsequently determined to be unconstitutional. In 1988, the State of Alaska Board of Fisheries formed the Kuskokwim River Salmon Management Working Group (Working Group) in response to requests from subsistence fishers in the KMA who sought a more active role in the management of salmon fishery resources (Bailey and Shelden 2014:1; Smith and Linderman Jr. 2008:1). The Working Group is composed of knowledgeable stakeholder representatives as well as ADF&G biologists and other staff. It acts in a representative fashion for communities throughout the Kuskokwim River drainage and met 12 times in 2021, from early May to mid-November.[9]

As a result of the passage of Alaska National Interest Lands Conservation Act (ANILCA) and considering a 1989 Alaska Supreme Court decision in the *McDowell* case,[10] the federal government established the federal subsistence program, which provides subsistence opportunity for qualified rural residents on applicable

9. ADF&G, n.d. "Commercial Salmon Fisheries, Kuskokwim Management Area: Kuskokwim River Salmon Management Working Group." Accessed May 31, 2022. https://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareakuskokwim.kswg
10. McDowell v. State of Alaska 785 P.2d 1 (1989)

federal public lands and in applicable federal public waters. Federal subsistence schedules, openings, closings, and fishing methods in much of the KMA are generally the same as those for state subsistence salmon fisheries, unless superseded by federal special action (50 CFR § 100.27). Regulatory authority for Kuskokwim River salmon management is shared by the FSB and the BOF. On the Kuskokwim River, ADF&G is responsible for implementing the Kuskokwim River Salmon Management Plan (5 AAC 07.365) and has inseason discretionary management authority of salmon in Alaska's navigable waters. The portion of the Kuskokwim River drainage from the Aniak River downstream to Kuskokwim Bay is within the boundaries of the Yukon Delta National Wildlife Refuge (YDNWR). As such, the U.S. Fish and Wildlife Service shares inseason subsistence fishing management decision-making with ADF&G in this part of the Kuskokwim River. The USFWS holds final decision-making authority over management of salmon in these waters if the federal subsistence program determines that subsistence uses by non-federally qualified users must be eliminated in order to meet the federal subsistence priority.

The highest priority in state and federal management of the Kuskokwim River's salmon populations is the biological sustainability of the resources based on principles of sustained yield. In seasons when returning salmon numbers are not sufficient to meet established escapement goals that will allow for the maintenance of future generations of salmon populations, consumptive uses of salmon may be restricted. Under conditions when there is a harvestable surplus beyond these minimum escapement levels, consumptive uses of salmon are prioritized for different user groups. Individuals must be local residents to participate in the Kuskokwim federal subsistence salmon fishery (50 CFR § 100.5).

Alaska Statute 16.05.258, "Subsistence use and allocation of fish and game," establishes the subsistence use priority (above sport, commercial, and personal use) when resources are not abundant enough to provide for all consumptive uses and while remaining in accordance with principles of sustained yield. Subsistence uses protected by the subsistence priority are those practices identified as customary and traditional practices as determined by the BOF. In 1993, the BOF made positive findings for customary and traditional uses of all salmon species in the entire KMA. As part of these findings, the BOF then determined the amount reasonably necessary for subsistence (ANS) in these respective areas as one means to provide reasonable opportunities for success in harvesting salmon for subsistence uses. Based on historical harvest information, an ANS of 192,000–242,000 for salmon of all species in the Kuskokwim Area was determined (5 AAC 01.286). In 2001, the BOF amended this ANS range for the Kuskokwim River using subsistence harvest data from the years 1990 to 1999. After reviewing various options, the BOF made new customary and traditional use and ANS findings for the Kuskokwim Area by species.

In January 2013, the BOF again modified ANS ranges by species for the Kuskokwim River drainage and other portions of the Kuskokwim Area. The current ANS ranges for salmon in the Kuskokwim Management Area are as follows (5 AAC 01.286(b)):

67,200–109,800	Chinook [king] salmon in the Kuskokwim River drainage;
41,200–116,400	chum salmon in the Kuskokwim River drainage;
32,200–58,700	sockeye salmon in the Kuskokwim River drainage;
27,400–57,600	coho salmon in the Kuskokwim River drainage;
500–2,000	pink salmon in the Kuskokwim River drainage;
6,900–17,000	salmon in Districts 4 and 5 combined; and
12,500–14,400	salmon in the remainder of the KMA

Also in 2013, the BOF updated and clarified the Kuskokwim River Salmon Management Plan (5 AAC 07.365). The new plan provides guidelines for managing the Kuskokwim River salmon fisheries to meet escapement goals and the subsistence priority; goals for KMA and other Arctic–Yukon–Kuskokwim (AYK) salmon stocks were reevaluated in 2015 (Conitz et al. 2015). During times when the amount of fish available for subsistence harvest is limited, the ADF&G Commissioner may open a fishing period during which

Chinook salmon may only be taken by persons 60 years of age or older; however, this system has not been implemented since 2015 (Poetter and Tiernan 2017).

Subsistence harvest of salmon species in the Kuskokwim River is allowed without a permit (5 AAC 01.280) and with generally no closed seasons (5 AAC 01.260), except as specified in the management plan or otherwise ordered for conservation purposes, as has been the case in recent years. However, in 2017, at the behest of fishers from communities in the middle and upper Kuskokwim River, the Board of Fisheries adopted a proposal that would provide fishers with additional opportunities to fish during times of Chinook salmon conservation and allow for the harvest of 10 Chinook salmon during fishing closures. The permit is voluntary, and its usage is confined to state waters upstream of the Yukon Delta National Wildlife Refuge boundary at Aniak.[11] Alaska regulations allow a variety of gear types to be used in the Kuskokwim River for subsistence salmon fishing and include specifications regarding the use of gillnets (5 AAC 01.270). There are no federal or state bag or possession limits for subsistence salmon harvests in the Kuskokwim River, except from June 1 through August 31, when subsistence fishing with a hook and line attached to a rod or pole in that portion of the Aniak River drainage upstream of Doestock Creek, the bag and possession limit is two Chinook salmon, and rainbow trout *O. mykiss* may not be retained (5 AAC 01.295). Federal regulations of all subsistence fish harvests on Alaska federal public lands and waterways are administered under 50 CFR §100.27, including seasons, gear types, and bag and possession limits on all salmon and nonsalmon species.

Until the recent sharp decline in Chinook salmon beginning in 2012, the subsistence salmon fishing season in the surveyed portion of the KMA was generally open unless a subsistence fishing schedule closure was implemented by emergency order prior to, during, and after commercial fishing periods. In addition, closures to the fishery were implemented by emergency order for conservation purposes (see 5 AAC 01.260 and 5 AAC 07.365). In the Kuskokwim River, a subsistence fishing schedule with periodic fishing closures (openings between these closures were often referred to as "windows" or "openers") was implemented from 2001–2006. In recent years, an early season closure has closed all salmon fishing prior to June 12. Subsequently, a fishing schedule is implemented which includes timed openings during the Chinook salmon run: this limits fishing opportunities for Chinook salmon as well as other species. Fishing regulations and restrictions specific to the 2021 season will be discussed further in the Results section.

11. For more information, see Runfola et al. (2018).

2. METHODS

Study Design

The 2021 survey season was characterized by numerous challenges as a result of the ongoing COVID-19 pandemic and associated community health and safety guidelines and travel restrictions. Similar to the 2020 season, these challenges prompted a variety of methodological modifications in order to fulfill project objectives. These adjustments were cooperatively developed and thoroughly discussed among project management staff, regional fisheries management staff, and Orutsararmiut Native Council (ONC) staff prior to implementation.

In 2021, household surveys were attempted in 27 of the 38 communities within the Kuskokwim Management Area, including most communities along the Kuskokwim River and all communities within south Kuskokwim Bay. The postseason subsistence harvest survey was designed based on stratified random sampling methodology (Cochran 1977) in all communities except Bethel, where a simple random sample was implemented. In the stratified random sampling design, each household was the primary sampling unit. A household generally consists of one or more persons living together in a dwelling and sharing the same mailing address. Multiple generations living in one dwelling would be considered a single household. Each household was classified into one of five strata based on the household's recent harvest history. The five strata of participation in the subsistence fishery are as follows:

- High harvester: a household that has averaged a harvest of more than 200 salmon per year in any of the previous three years;
- Medium harvester: a household that has averaged a harvest of 101–200 salmon per year in any of the previous three years;
- Light harvester: a household that has averaged a harvest of 1–100 salmon per year in any of the previous three years;
- Usually does not fish: a household that did not participate in subsistence fishing activities in any of the previous three years;
- Unknown: a household that has no harvest record within any of the past five years or is new to the community.

For this study, a fishing household was defined as a household that participated in subsistence fishing activities, including both harvesting or processing salmon. The household stratification was updated prior to the survey and was not reassigned during the survey year (i.e., no postsurvey reclassification), with the exception of unknown fishing households. In a typical year, survey households are selected in each community randomly in the following percentages for each stratum:

- High harvester: 100%;
- Medium harvester: 100%;
- Light harvester: 50%;
- Usually do not fish: 30%;
- Unknown: 100%.

When the number of households in each stratum within a community was fewer than five, all households in the stratum were selected for sample. Likewise, when the total number of households in a community was fewer than or equal to 40, all households in the community were selected for sample and the survey method became a census (100% surveyed). This protocol was followed in 2021 for the 6 communities outside Bethel that were surveyed in person: Akiak, Aniak, Chuathbaluk, Crooked Creek, Sleetmute, and

Stony River. Due to ongoing community lockdowns and closures, the remaining villages outside Bethel were surveyed by telephone and a census of each stratum was attempted. For communities contacted by telephone only, a sample was also drawn according to the established percentages in order to compare the performance and results from the attempted census to what would have been achieved if the standard sampling regime had been adhered to.

In Bethel, an abbreviated version of the survey tool was deployed to conduct in-person surveys under a simple random sampling regime. The abbreviated form was used at the request of ONC Tribal Council members. Each dwelling (physical location instead of household) was the primary sampling unit. Bethel is a main hub community in western Alaska, and people often change dwellings, making it difficult to maintain an accurate and complete household list with unique identifiers that contains household fishing histories. However, ADF&G maintains a dwelling list for Bethel and updates it annually. Dwelling maps are developed from maps provided by the Bethel city planner's office. The map and list are compared and updated both prior to the season and during the season based on surveyor notes. Based on the updated list, occupied dwellings were randomly selected for the survey. Households randomly selected for the survey in Bethel were pursued using rigorous protocols to minimize bias. For each selected dwelling, surveyors were required to attempt to contact the household at least three separate times. Attempts were made on separate days and different times of day with at least one visit made after 5:00 PM. Exceptions included obviously abandoned or derelict dwellings, or when contact was made and the occupant declined to be surveyed. In these cases, the selected dwelling was removed from the sample and replaced by another dwelling selected at random from those not previously selected. The final number of surveyed households was approximately 31% of the total number of occupied dwellings (Table 1-2).

Postseason subsistence harvest surveys were conducted in early autumn after the majority of salmon fishing had ended. Fishers were still likely able to recall their harvest numbers immediately following the end of their subsistence salmon fishing season. In Bethel, surveys were conducted by ONC Fisheries Technicians; all other communities were surveyed by ADF&G Fish & Wildlife Technicians and locally hired research assistants.

Prior to survey work, ADF&G and ONC technicians underwent training to familiarize them with project goals and the survey instrument. Technicians were trained on all aspects of surveying, which included how to properly conduct the survey as well as effective surveying techniques. Technicians also participated in role-playing exercises that emphasized critical thinking skills and being both cognizant of and properly addressing logic errors. Surveyors were trained in salmon species name identification and were also briefed on fishery issues and concerns from the recent subsistence salmon fishing season, to improve understanding of community members' responses during surveys (Table 2-1). In addition, technicians were provided with personal protective equipment—latex gloves, facemasks, and hand sanitizer—in order stay in compliance with community health and safety guidelines.

Before the survey, ADF&G project management staff contacted community tribal officials to request approval to conduct surveys. Of the 27 contacted communities, seven communities approved in-person survey work[1]; surveys were conducted by telephone among the remaining 20 communities. The household lists were annotated and corrected as the surveyors completed the survey process. Surveyors were responsible for attempting contact with each selected household, asking questions consistently and understandably, and fostering a cooperative atmosphere. Surveyors attempted to interview a member of each selected household, preferably the primary harvester. Occasionally, interviews were conducted with households not preselected for the survey. Those households either 1) were new or previously unknown households found by surveyors or 2) voluntarily provided surveyors with their harvest information.

All survey data were entered into the ADF&G subsistence harvest database, and harvest estimates were generated for the surveyed communities. All subsistence harvest data were treated as confidential, such that

1. Bethel, Akiak, Aniak, Chuathbaluk, Crooked Creek, Sleetmute, and Stony River.

Table 2-1.–Project staff, 2021.

Task	Name	Organization
Northern Regional Program Manager	Alida Trainor	ADF&G Division of Subsistence
Principal Investigator	Chris McDevitt	ADF&G Division of Subsistence
Administrative support	Pam Amundson	ADF&G Division of Subsistence
	Tamsen Coursey-Willis	ADF&G Division of Subsistence
	Deanne Lincoln	ADF&G Division of Subsistence
	Stephanie Wilson	ADF&G Division of Subsistence
Data Management Lead	David Koster	ADF&G Division of Subsistence
Programmer	David Koster	ADF&G Division of Subsistence
	Gayle Neufeld	ADF&G Division of Subsistence
Data Entry	Margaret Cunningham	ADF&G Division of Subsistence
	Loraine Navarro	ADF&G Division of Subsistence
	Halia Valdez	ADF&G Division of Subsistence
	Devin Anderson	ADF&G Division of Subsistence
	Cassidy Somerville	ADF&G Division of Subsistence
Data Cleaning/Validation	Loraine Navarro	ADF&G Division of Subsistence
	Margaret Cunningham	ADF&G Division of Subsistence
Data Analysis	David Koster	ADF&G Division of Subsistence
	Loraine Navarro	ADF&G Division of Subsistence
Cartography	Gayle Neufeld	ADF&G Division of Subsistence
Editorial Review Lead	Rebecca Dunne	ADF&G Division of Subsistence
Production Lead	Rebecca Dunne	ADF&G Division of Subsistence
Field Research Staff	Chris McDevitt	ADF&G Division of Subsistence
	Morgan Macconnell	ADF&G Division of Subsistence
	Cassidy Somerville	ADF&G Division of Subsistence
	Kathleen Roush	ADF&G Division of Subsistence
	Danielle Lowrey	Orutsararmiut Native Council
Local Research Assistant	WG Anaruk	Orutsararmiut Native Council
	Jeremy Lee	Orutsararmiut Native Council
	Darren Evans	Orutsararmiut Native Council
	Trina Wassilie	Orutsararmiut Native Council
	Mary Hikkila	Orutsararmiut Native Council

Source ADF&G Division of Subsistence, 2021.

individual household harvest data were not shared, and all analyses were aggregate and anonymous. The study was conducted in accordance with the Alaska Federation of Natives' Guidelines for Research.[2]

Survey Instrument

Due to pandemic-related travel restrictions and to remain in compliance with local community health and safety mandates, data collection tool modifications made for the 2020 season were continued for a second year. These modifications included the abbreviated form and an online survey tool. Appendix B includes examples of all three survey instruments. The following is a description of the different survey formats used and made available for the 2021 season. Details regarding the number of responses for each survey format can be found in the Households Selection and Survey portion of the Results chapter (Table 3-2).

Full-length Survey

In 2021, ADF&G technicians administered full-length surveys in-person and via telephone to participating households in all surveyed communities except Bethel. The full-length survey used in 2021 was identical to the survey instrument used in 2020. After a minimum of three unsuccessful attempts were made to contact a household, an abbreviated form was sent to the mailing address on file for that household.

Abbreviated Survey

The abbreviated survey form was sent to households that ADF&G was unable to contact in-person or via telephone. In addition, ONC Fisheries Technicians administered this form in Bethel instead of the full-length form used prior to 2020. The abbreviated form was designed to accommodate shortened in-person surveys and was used at the request of ONC Tribal Council members so that the surveying effort could be expedited. Like the full-length survey instrument, the abbreviated version asked the standard household information questions. Unlike the full-length survey form, the abbreviated survey form did not query harvest locations, gear types, lost salmon, shared or received salmon, household salmon needs, nonsalmon fish harvests, dog ownership, or salmon harvested and fed to dogs. Instead, the abbreviated survey form consisted of three primary questions:

- Did anyone in your household go salmon fishing in the Kuskokwim River area in 2021?
- Did you fish in a group with other households? This question was accompanied by questions asking how many salmon (by species) were harvested.
- Did you go fishing on your own? This question was accompanied by questions asking how many salmon (by species) were harvested.

Online Survey

As part of 2021 outreach efforts, notices of remotely administered survey options, including an online form, were posted on social media and posted as ads in local newspapers. Further, door-hanging placards were left at selected Bethel households if no contact was made. These placards included a QR code and URL to the online survey form, as well as contact phone numbers.

Survey Questions

For all survey instrument formats, most of the questions were designed to provide a quantitative assessment of each household's subsistence salmon harvest. Question 3 in the full-length survey and Question 1 in the abbreviated survey identified fishing households by asking whether anyone in the surveyed household harvested salmon for subsistence uses. The surveyor was instructed to clarify that harvest includes any participation in the subsistence fishery, including cutting fish. Household harvest was defined to include salmon that members of the household gave away, ate fresh or processed for later use, fed to dogs, or lost to

2. Alaska Federation of Natives. 2013. "Alaska Federation of Natives Guidelines for Research." Alaska Native Knowledge Network. Accessed December 11, 2019. http://www.ankn.uaf.edu/IKS/afnguide.html

spoilage. To avoid double-counting between households, salmon received from other households (outside the fishing group) were not considered part of the household harvest.

Individual household harvest forms the basis of salmon harvest estimates for this study; therefore, an effort was made to differentiate group harvest (two or more households fishing together) from individual household harvest to prevent bias. Households were asked about their harvest activities and whether they participated in group harvests or fished alone (Question 6 in full-length survey and Question 2 in the abbreviated survey). If surveyors identified a group harvest, they next asked what portion of the group harvest the individual household had kept for itself (Question 8 in full-length survey and a follow-up to Question 2 in the abbreviated survey). This helped to prevent the possibility that a single large harvest might be reported by more than one household in the fishing group defined in questions 6 in the full-length survey and 2 in the abbreviated survey.

In the full-length survey, households were also asked whether they had given salmon to other families (outside of the fishing group), and whether they had received salmon from other subsistence households (outside of the fishing group) or from a test fishery project. In addition, households were asked how many salmon they harvested for dog food.

Fishers who did not know the actual number of fish they harvested occasionally reported harvest in alternative terms, such as the number of five-gallon buckets, plastic bags, gunny sacks, or pounds. ADF&G devised a conversion sheet to estimate fish numbers in these circumstances (Table 2-2).

To assess whether a household's subsistence needs were met, the full-length survey and online formats asked respondents whether their needs were met, or if they had no need, by species. If needs were not met, respondents were asked to provide information about why. Responses about why needs were not met were coded into categories. Response categories were summarized by stratum and expanded by the total number of households in a stratum divided by the number of valid responses and then summed to a community-wide estimate. For final reporting, these estimates were divided by the total number of community households to get a percentage of households indicating reasons for not getting enough fish weighted by stratum group.

After the households were interviewed, ADF&G project staff reviewed the survey forms. During this process, forms from fishing group members were compared to identify discrepancies, and project staff made follow-up calls to try to settle discrepancies. Occasionally, fishing group members simply did not agree on numbers for salmon harvest. In this event, ADF&G project staff made a judgment on how to best represent the fish harvest on the appropriate survey forms, and priority was always given to ensuring the accuracy of the *household* harvest over the *group* harvest. Data from all full surveys were checked and entered into the Kuskokwim Annual Post-Season Survey (KAPSS) database. Abbreviated forms were entered into the online survey tool by ADF&G Fish and Wildlife Technicians and ONC staff. Each record was then rechecked by a different individual to assure accuracy. Records collected online or entered into the online form were extracted, manually reviewed, and reformatted for automatic upload into the database with all other harvest survey data.

Harvest Calendars

Subsistence salmon harvest calendars (Appendix C) are distributed in late April or early May each year by mass mailing to households identified as those who usually fish. This ensures that calendars are available to fishers prior to the start of the salmon fishing season. ONC also assisted with distribution of calendars to fish camps in the Bethel area during the 2021 fishing season.[3] Calendar mailings were based on the most current household lists used in the harvest monitoring program. Extra calendars were kept at the Bethel ADF&G office for distribution as needed or upon request.

The purpose of the harvest calendar is to provide households with a means of recording their salmon and nonsalmon fish harvests during the fishing season. The department requests that calendar recipients record their daily subsistence fishing harvest totals of all species, primarily salmon, and return their completed calendars to the department either by mail or in person to an ADF&G surveyor when completing the

3. D. Lowrey, ONC Fisheries Partner Biologist, personal communication with C. McDevitt, February 16, 2022.

Table 2-2.–Conversion factors.

Reported amount	Converted amount	Description
Chinook salmon		
1 Chinook salmon	5–8 lb	dried and smoked Chinook salmon strips
1 gal Ziploc	5 lb	dried and smoked Chinook salmon strips
1 qt Ziploc	2 lb	dried and smoked Chinook salmon strips
6 gal bucket	4–5 fish	dried Chinook salmon
Chum salmon		
5 gal "poke fish"	25–30 fish	dried chum salmon in seal oil
30 gal barrel	150–180 fish	dried chum salmon in seal oil
1 gal Ziploc	2–3 fish	dried chum salmon filets
5 gal bucket	25 fish	chum salmon filets, tightly packed
1 chum salmon for dog food	2/3 lb	dried summer chum salmon for dog food
1 bundle for dog food	50 fish	dried summer chum salmon for dog food
salmon per dog per winter	300 fish	summer chum salmon for dog food
1 chum salmon	1.25–1.33 lb	dried summer or fall chum salmon
Pink salmon		
1 pink salmon	3 lb	pink salmon
Nonsalmon fish		
1 small whitefish	1 lb	round whitefish, least cisco, Bering cisco, or Arctic cisco caught in whitefish net (4 inches or smaller mesh) or fish wheel
1 large whitefish	4 lb	broad whitefish or humpack whitefish caught in chum salmon net (5 inches or larger mesh) or fish wheel
5 gal bucket	125 fish	smelts
1 gunny sack	50–100 lb (ask fisher)	"tomcod," whitefish, or herring
14 Alaska blackfish	1 lb	Alaska blackfish
5 gal bucket	350 fish	Alaska blackfish
25 lb	350 fish	Alaska blackfish
1 "eel"	1/3 lb	Arctic lamprey

Source ADF&G Division of Subsistence, 2018.

postseason household survey. The calendar has been helpful for examination of subsistence harvest timing and assists fishermen in keeping track of their daily salmon harvest for reference during postseason surveys. Because harvest calendars may contain harvest information from one or multiple households, data from returned calendars were not used to compare to or complete harvest surveys. However, on occasion a survey respondent would instruct surveyors to take harvest numbers directly from a calendar, either returned during the survey or mailed to ADF&G prior to the survey.

Permits

Division of Subsistence staff distributed permit packets to select vendors throughout middle and upper Kuskokwim River communities during the spring of 2021. Permits were also made available at the Bethel and Anchorage ADF&G offices. As described earlier in this report, Kuskokwim River fishers have experienced severe declines in Chinook salmon run sizes and subsistence Chinook salmon harvests since at least 2010. Decreasing Chinook salmon abundance has resulted in several years of the most restrictive management actions in the history of the Kuskokwim River salmon fishery (Runfola et al. 2018). Fishery management advisory groups such as the Kuskokwim River Salmon Management Working Group and the Kuskokwim River Inter-Tribal Fish Commission as well as members of the public have consistently expressed concern regarding the need for additional opportunities to harvest some Chinook salmon. In response to declines in Chinook salmon abundance, severe fishing restrictions, and widespread public concern, Kuskokwim River fishers collaborated with ADF&G through the Alaska Board of Fisheries (BOF) regulatory process to develop options for increased Chinook salmon fishing opportunities in times of conservation.

The BOF established a household subsistence Chinook salmon fishing permit at its March 2017 meeting (Runfola et al. 2018). Public support of a permit system for subsistence Chinook salmon fishing was mixed: many individuals and advisory committees expressed opposition. However, the BOF recognized the potential benefit to middle and upper Kuskokwim River fishers who testified about a need for greater fishing opportunity and a more equitable distribution of the subsistence Chinook salmon harvest.

Subsistence salmon fishing permits were implemented in the Kuskokwim Area for the first time in June 2018 with the regulation including a "sunset clause" to revisit the permit system after the 2021 salmon fishing season (Runfola et al. 2018).[4] Because this was the first time that a subsistence fishing permit was offered for the Kuskokwim River, the BOF decided to establish the sunset clause with the intention of revisiting the efficacy of the program over a four-year period. The BOF requested that the Division of Subsistence manage the permit system. Division staff developed a permit document and informational materials and distributed them to middle and upper Kuskokwim River communities from Lower Kalskag to Nikolai. The Division of Subsistence will continue to administer the Kuskokwim River household subsistence Chinook salmon permits through the end of the program, after which the division will provide a complete review of permit use and effectiveness.

The permit system was implemented using the same approach taken by the Division of Subsistence for the Bristol Bay management area. Local vendors were recruited in ten communities upriver of Aniak to distribute the permits (Runfola et al. 2018). Additionally, permits were made available in the Anchorage, Bethel, and McGrath ADF&G offices. Vendors were provided materials on regulations covering the permit along with instructions for issuing. At the end of the season, vendors were instructed to return a log of issued permits. This log was used to develop reminder letters to households not returning their permits to the Anchorage ADF&G office.

The intent of the household permit system is for the department to provide fishers with opportunities to harvest a small number (10) of Chinook salmon. The permit also allows fishers to retain harvests of any number of other salmon and nonsalmon fish within state waters of the Kuskokwim River drainage

4. Due to the COVID-19 pandemic, the BOF postponed the 2022 Arctic-Yukon-Kuskokwim (AYK) meeting to 2023. As a result, ADF&G submitted an agenda change request (ACR) to the BOF to extend the sunset date to December 31, 2022. The BOF accepted the request and extended the sunset date at its November 2021 Prince William Sound meeting.

during times of Chinook salmon conservation and the typically consequent widespread subsistence fishing closures (Runfola et al. 2018). Because fishing permits are expected to be valid only during a portion of the subsistence fishing season each year, data recorded from permits do not represent a complete harvest estimate for participating households, and as such cannot be incorporated into total harvest estimates for the surveyed portion of the KMA. Thus, harvest data from permit returns do not replace or supplement postseason household harvest survey data collection efforts, and all eligible households within the surveyed portion of the KMA are invited to complete a survey regardless of their enrollment in the permit program.

Data Analysis

Harvest Estimation

Expanded Community Harvest

Subsistence salmon harvests reported by sampled households were expanded to estimate total community harvest, by species, using a stratified random sampling expansion technique (Scheaffer, Mendenhall, and Ott 1990). The stratified expansion procedure was performed for a community only if a sufficient number of households were sampled.

For harvests of each stratum, if ten or fewer households were surveyed and the proportion of surveyed households was less than 0.25 (for non- and light harvesters) or 0.30 (for other strata), then harvest expansion was not conducted. For estimates of community harvest, if the total number of surveyed households in each stratum was fewer than 50 and the proportion of surveyed households was less than 0.30, total community harvest was not estimated using this method (see section *Harvest estimation of nonsurveyed and undersurveyed communities*).

Mean household response in the stratum of the community ($\bar{y}_{kj}$) was calculated as:

$$\bar{y}_{kj} = \frac{\sum_{i=1}^{n_{kj}} y_{kji}}{n_{kj}} \tag{1}$$

Standard error of mean household response (SE_{kj}) was calculated as:

$$SE_{kj} = \sqrt{\frac{s_{kj}^2}{n_{kj}}\left(\frac{N_{kj}-n_{kj}}{N_{kj}}\right)} \text{ where } s_{kj}^2 = \frac{\sum_{i=1}^{n_{kj}}\left(y_{kji}-\bar{y}_{kj}\right)^2}{n_{kj}-1} \tag{2}$$

The estimate of total harvest of the community ($\hat{T}_k$) was calculated as:

$$\hat{T}_k = \sum_{j=1}^{5} N_{kj}\bar{y}_{kj} \tag{3}$$

The 95% confidence interval of total community harvest (95% CI_k) was calculated as:

$$95\%\text{CI}_k = t_{(0.025,df=n-1)} \cdot \sqrt{\hat{V}(T_k)} \text{ where } \hat{V}(T_k) = \sum_{j=1}^{5} N_{kj}^2\left(\frac{N_{kj}-n_{kj}}{N_{kj}}\right)\left(\frac{s_{kj}^2}{n_{kj}}\right) \tag{4}$$

When a single stratum was not surveyed, total harvest of a community ($\hat{T}_k$) was calculated as:

$$\hat{T}_k = \left(\frac{\sum_{j=1}^{5} N_{kj}}{\sum_{j=1}^{4} N_{kj}} \right) \sum_{j=1}^{4} N_{kj} \bar{y}_{kj} \tag{5}$$

The 95% confidence interval of total community harvest when a single stratum was not surveyed (95% CI_k) was calculated as:

$$95\%\mathrm{CI}_k = t_{(0.025, df=n-1)} \cdot \sqrt{\hat{V}(T_k)} \text{ where } \hat{V}(T_k) = \left(\frac{\sum_{j=1}^{5} N_{kj}}{\sum_{j=1}^{4} N_{kj}} \right)^2 \sum_{j=1}^{4} N_{kj}^2 \left(\frac{N_{kj} - n_{kj}}{N_{kj}} \right) \left(\frac{s_{kj}^2}{n_{kj}} \right) \tag{6}$$

Denote that:

N_{kj} is the number of households in the stratum (j = 5: unknown, usually do not harvest, light harvest, medium harvest, and heavy harvest) of the community (k);

n_{kj} is the number of surveyed households in the stratum of the community (k);

y_{kji} is response of surveyed household (i) (i = 1 … n_{kj}) in the stratum (j) of the community (k); e.g., the number of fish harvested by a household.

The above methods were used for estimation of salmon harvests (Question 7) and the number of people participating in the fishery (Question 2). For the number of fish needed/usually harvested (Question 13), only harvests of those who subsistence fished were used.

For estimation of the number of subsistence fishing households in each community, the following expansion method was used. In the first step, the proportion of households who subsistence fish in the stratum (j) of the community (k) ($\hat{p}_{kj(s)}$) was calculated as:

$$\hat{p}_{kj(s)} = \frac{n_{kj(s)}}{n_{kj}} \tag{7}$$

Estimated number of households that subsistence fish in the community ($\hat{N}_{k(s)}$) was calculated as:

$$\hat{N}_{k(s)} = \sum_{j=1}^{5} N_{kj} \hat{p}_{kj(s)} \tag{8}$$

The 95% confidence interval (95% CI_k) was calculated as:

$$95\%\mathrm{CI}_k = t_{(0.025, df=n-1)} \cdot \sqrt{\hat{V}(\hat{N}_{k(s)})} \text{ where } \hat{V}(\hat{N}_{k(s)}) = \sum_{j=1}^{5} N_{kj}^2 \left(\frac{N_{kj} - n_{kj}}{N_{kj}} \right) \left(\frac{\hat{p}_{kj(s)}(1 - \hat{p})_{kj(s)}}{n_{kj} - 1} \right) \tag{9}$$

Denote that:

$n_{kj}(s)$ is the number of surveyed households that subsistence fish in the stratum (j) of the community (k); and

n_{kj} is the number of surveyed households in the stratum (j) of the community (k).

Harvest Estimation of Nonsurveyed and Undersurveyed Communities

Harvests of several communities were not estimated in some years either because surveys were not conducted or survey data were insufficient. Harvests of those communities were estimated by employing a Bayesian hierarchical multiple imputation method (Honaker and King 2010; King et al. 2001). In this method, we assumed that:

- Events that cause missing harvest data follow a missing at random process (MAR); and
- Harvest data possess multivariate normal distribution.

Under these conditions, the harvest in a given year and community can be estimated from the harvest estimates of that community in previous years and harvest estimates of surrounding communities during the same time period. For instance, the 2008 harvest of the community of Tuntutuliak (nonsurveyed in that year) was estimated using its known harvests during 1990–2007 and harvests of other lower Kuskokwim River communities during the entire period 1990–2008. This estimation method applies only for communities with several years of annual harvest estimates. It is further based on assumptions that fishing characteristics of communities (e.g., proportion of fishing households, demand, and effort) are constant over time, and changes in average household harvests are primarily due to abundance of fish or fishing regulations affecting all communities. Communities were grouped according to geographic subareas within the Kuskokwim Management Area, on the assumption that harvests within each subarea would be more similar than harvests in other subareas. The four geographic subareas were: 1) lower Kuskokwim River and Kongiganak; 2) middle Kuskokwim River; 3) upper Kuskokwim River; and 4) south Kuskokwim Bay.

For the K communities within a given geographic subarea, we let $D_{kl.obs}$ denote the observed data (average harvest per household) for community ($k = 1, \ldots, K$) in year (l). In application, the average household harvest $D_{kl.obs}$ was the log-transformed average household harvest, $D_{kl.obs} = \log(T_{kl} / N_{kl}+1)$, where T_{kl} was the total community harvest and N_{kl} was the total number of households in community (k) during year (l).

We assumed that the $D_{kl.obs}$ arose from an underlying multivariate normal distribution in which $\boldsymbol{\mu}_K$ is a vector of mean annual household harvest in the communities (K) within the subarea and $\boldsymbol{\Sigma}$ is a K x K covariance matrix:

$$D_{kl.obs} \sim \mathbf{N}(\boldsymbol{\mu}_K, \boldsymbol{\Sigma}) \tag{10}$$

In the Bayesian hierarchical model, we further assumed that $\boldsymbol{\mu}_K$ and $\boldsymbol{\Sigma}$ themselves arose from some other, unknown distribution. We assigned a normal prior distribution for $\boldsymbol{\mu}_K$, with mean μ and variance σ^2, and a Wishhart distribution with K x K dimensions for $\boldsymbol{\Sigma}$:

$$\begin{aligned} \boldsymbol{\mu}_K &\sim N(\mu, \sigma^2) \\ \boldsymbol{\Sigma} &\sim W(I_K, K) \end{aligned} \tag{11}$$

Then, the posterior distributions for $\boldsymbol{\mu}_K$ and $\boldsymbol{\Sigma}$ were derived as:

$$\tilde{\boldsymbol{\mu}}_K, \tilde{\boldsymbol{\Sigma}} \sim P(\boldsymbol{\mu}_K, \boldsymbol{\Sigma} \mid D_{kl.obs}) \tag{12}$$

A predicted value for missing data, $D_{kl.mis}$, was derived from random draws from the posterior distribution for $\boldsymbol{\mu}_K$ and $\boldsymbol{\Sigma}$:

$$\widetilde{D}_{kl.mis} \sim P(D_{kl.mis} \mid D_{kl.obs}, \widetilde{\boldsymbol{\mu}}_K, \widetilde{\boldsymbol{\Sigma}}) \tag{13}$$

For the Bayesian estimation, WinBUGS 1.4.3 (Lunn et al. 2000) was used, with default initial values. A total of 55,000 imputations were generated (after discarding 5,000 initial burn-in iterations) and the mean value of these imputations was calculated. The resulting mean household harvest was back-transformed and multiplied by the number of households in the community during the survey year to estimate the unknown total community harvest. Total community harvest was calculated as:

$$\widetilde{T}_{kl} = N_{kl} \exp(\widetilde{D}_{kl.mis}) \tag{14}$$

and its 95% confidence interval was estimated as:

$$95\%\text{CI} = N_{kl} \exp\left(1.96 \cdot \sqrt{V(\widetilde{D}_{kl.mis})}\right) \tag{15}$$

where $V(\widetilde{D}_{kl.mis})$ is the standard deviation of the Bayesian estimate. Estimation of missing data within a given subarea was independent of estimates in other subareas.

Total Kuskokwim Area Harvest

Total number of salmon harvested in the Kuskokwim Area ($\hat{T}$) was estimated by summing harvest estimates of all communities (across all geographic subareas):

$$\hat{T} = \sum_{k=1} \hat{T}_k \tag{16}$$

and its 95% confidence interval (95% CI) was calculated as:

$$95\%\text{CI} = t_{(0.025, df=n-1)} \cdot \sqrt{\hat{V}(T)} \text{ where } \hat{V}(T) = \sum_{k=1} \hat{V}(T_k) \tag{17}$$

3. RESULTS

The 2021 Season

Forecast

In the spring of 2021, ADF&G managers forecasted the Chinook salmon return to include 95,000–155,000 fish (Smith and Gray 2021). This estimate fell within the drainagewide escapement goal of 65,000–120,000, but was significantly less than the 2020 forecast of 193,000–261,000 salmon (McDevitt et al. 2021b). The preseason forecast range is equal to ±25% of the prior season total run amount. Uncertainty in the forecast is based on the 7-year average percent error between the forecasted run estimate and the actual run estimate. The pre-season forecast is typically produced during the spring after managers receive and analyze harvest information collected through use of the postseason survey (Larson 2021).[1]

Escapement

The ADF&G Division of Commercial Fisheries, the USFWS, and Kuskokwim River drainage area tribal organizations conducted various inseason assessment projects at several different sites throughout the Kuskokwim River drainage in 2021. The two primary assessment projects used by ADF&G to facilitate in-season management decisions were the Bethel Test Fishery (BTF), which was in operation from May 26 to August 24, and the Kuskokwim River sonar project, which was conducted from June 1 to August 26. Data collected through the BTF were used to inform managers about run timing and salmon species catch-per-unit-effort (CPUE; see Molyneaux 1997); the Kuskokwim River sonar project provided managers with passage estimates for salmon and nonsalmon species (Smith and Gray 2021). In addition to the aforementioned assessment projects, weirs were in operation in six major salmon-spawning tributaries: the George, Salmon (Aniak River tributary), Kogrukluk, Telaquana, Takotna, and Pitka Fork (Salmon River) rivers. Aerial surveys were not conducted in the Kuskokwim River drainage in 2021 due to poor weather and lack of pilot availability. However, aerial surveys were conducted along two south Kuskokwim Bay river systems: Kanektok and Goodnews rivers. Aerial surveys are primarily utilized for Chinook and sockeye salmon assessment, because both chum and coho salmon are typically less visible by this method (Tiernan et al. 2018).

The 2021 Kuskokwim River Chinook salmon run timing was considered average based on BTF data (Smith and Gray 2021). The drainagewide run for Chinook salmon in 2021 was estimated to be 129,000 fish (95% confidence interval [CI]: 94,000–178,000). The drainagewide Chinook salmon escapement estimate included 101,000 fish (95% CI: 66,000–150,000), which fell within the drainagewide escapement goal of 65,000–120,000 fish.

Chum salmon run timing was slightly later than previous years (Smith and Gray 2021). The chum salmon run size was an estimated 25,689 fish (95% CI: 14,549–36,829). Chum salmon escapement at all weir sites was the lowest on record, and none of the escapement goals were met for chum salmon.

Sockeye salmon run timing was slightly later than previous years, and the run included nearly 745,037 fish (95% CI: 696,236–793,838), according to data collected through the Bethel sonar project (Smith and Gray 2021). Sockeye salmon escapement was considered above average for lake-spawning fish, but near to slightly below average for river-spawning fish throughout the drainage. In addition, the Telaquana River weir observed the fifth highest escapement since operations began in 2010.

Estimates regarding coho salmon run timing and run size were incomplete in 2021 because the coho salmon run was still progressing after the sonar and BTF projects ceased operations at the end of August (Smith and Gray 2021). However, the sonar operation estimated a cumulative run size of 237,285 fish (95% CI:

1. For more information on how ADF&G develops salmon forecasts, see A. Carroll, 2006. "Salmon Forecasting in Alaska: Who Needs to Know?" Alaska Fish & Wildlife News. Accessed July 6, 2022. http://www.adfg.alaska.gov/index.cfm?adfg=wildlifenews.view_article&articles_id=193

209,317–265,253). Coho salmon escapement on the George River included over 31,400 fish and surpassed the most recent 10-year average of 22,462 fish. Coho salmon escapement on the Kogrukluk River was 14,373 fish and fell within the goal range of 13,000–28,000 fish.

Management Actions

The early season salmon closure began on June 1, 2021 from the Yukon Delta National Wildlife Refuge (YDNWR) boundary at the mouth of the Kuskokwim River upstream to the YDNWR boundary at Aniak (Smith and Gray 2021). On June 9, the closure was extended from the YDNWR boundary at Aniak upstream to the mouth of the Holitna River, and on June 11, the closure extended from the Holitna River mouth to the Kuskokwim River headwaters. Additional restrictions during this time included tributary closures and live release requirements for Chinook salmon. During the early season closure, ADF&G held three 16-hour, 6-inch set gillnet opportunities on June 2, 5, and 9. The Federal Subsistence Board adopted a Special Action to close the Kuskokwim River Chinook salmon fishery to non-federally qualified users within the boundary of the YDNWR June 1 through July 22. During this time, USFWS provided 6-inch set gillnet opportunities that ran concurrent to the June 2, 5, and 9 opportunities issued by ADF&G. In addition, USFWS provided a total of six 12-hour, 6-inch mesh gillnet opportunities on June 12, 15, and 19; and July 2, 9, and 16. These opportunities allowed for the use of set or drift gillnets no greater than 25 fathoms (150 feet) in length from above the mouth of the Johnson River to the refuge boundary at Aniak and no more than 50 fathoms (300 feet) in length from below the mouth of the Johnson River to the refuge boundary at the Kuskokwim River mouth. The USFWS also provided two 48-hour set gillnet fishing opportunities on July 10 and 17. On June 19, USFWS opened the section of the Kuskokwim River mainstem for the remainder of the season beginning at the Kalskag bluffs to the refuge boundary at Aniak to the use of 25-fathom, 6-inch or less mesh gillnets. ADF&G managers implemented the same actions concurrently and also included an additional opportunity on June 28. Lastly, ADF&G provided a 16-hour gillnet opportunity on July 23 and a 50-hour setnet fishing opportunity on July 23–25.

On June 12, ADF&G managers implemented the Chinook salmon permit by emergency order for the waters upstream of the YDNWR boundary at Aniak to the Kuskokwim River headwaters. On June 16 and June 19, ADF&G managers opened the Kuskokwim River mainstem from the Holitna River mouth to the Kuskokwim River headwaters and from the YDNWR boundary to the Holitna River mouth, respectively. On July 31, ADF&G managers opened the entire Kuskokwim River mainstem to subsistence salmon fishing, and they lifted tributary restrictions on August 31.

Household Selection and Survey

In 2021, project staff surveyed 27 communities (Table 3-1), seven of which were visited in-person[2]; households in the remaining 20 communities were contacted by phone. Of the 2,500 selected households, 1,304 households were surveyed. Further, an additional 335 unselected households were also surveyed. In all, researchers completed 1,639 household surveys. Surveyed households represented 41% of households in the Kuskokwim River drainage and south Kuskokwim Bay portions of the KMA. This sample size was similar to the sample size in prior years. Staff were unable to conduct surveys in the community of Lime Village (5 households) due to logistical issues.

Bethel households composed one-third of the 1,639 surveyed households. Surveyors employed by Orutsrararmiut Native Council (ONC) contacted a simple random sample of dwellings in Bethel. In all, 1,186 Bethel households were selected to be surveyed, and 535 households (31%) were surveyed.

Of the 1,639 surveys conducted (Table 3-2), 687 surveys were completed in-person (184 full-length, 503 abbreviated), 861 were completed over the phone, 67 were completed online, and 24 were self-administered and mailed in to ADF&G offices.

2. Bethel, Akiak, Aniak, Chuathbaluk, Crooked Creek, Sleetmute, and Stony River.

Table 3-1.–Households selected and surveyed by user group, surveyed communities, Kuskokwim Management Area, 2021.

Community	Total households	Households selected for survey	Selected households surveyed[a]	Unselected households surveyed	Percentage of selected households surveyed	Households refusing survey	Households surveyed	Percentage of households surveyed
Kongiganak[b]	90	–	–	–	0%	–	–	0%
North Kuskokwim Bay	**90**	**–**	**–**	**–**	**0%**	–	**–**	**0%**
Tuntutuliak	112	69	46	25	67%	7	71	63%
Eek	99	49	30	24	61%	17	54	55%
Kasigluk	119	66	35	22	53%	2	57	48%
Nunapitchuk	123	70	35	29	50%	6	64	52%
Atmautluak	76	49	30	9	61%	3	39	51%
Napakiak	99	53	26	25	49%	9	51	52%
Napaskiak	121	74	24	13	32%	8	37	31%
Oscarville	17	17	15	0	88%	1	15	88%
Bethel[c]	1,750	1,186	535	0	45%	208	535	31%
Kwethluk	165	89	58	38	65%	8	96	58%
Akiachak	176	97	40	20	41%	10	60	34%
Akiak	94	58	42	1	72%	5	43	46%
Tuluksak	92	51	26	24	51%	1	50	54%
Lower Kuskokwim River	3,043	1,928	942	230	49%	285	1,172	39%
Lower Kalskag	85	40	18	14	45%	1	32	38%
Upper Kalskag	59	29	13	5	45%	3	18	31%
Aniak	163	89	63	1	71%	3	64	39%
Chuathbaluk	32	32	28	0	88%	0	28	88%
Middle Kuskokwim River	339	190	122	20	64%	7	142	42%
Crooked Creek	39	39	29	0	74%	0	29	74%
Red Devil	7	7	6	0	86%	0	6	86%
Sleetmute	36	36	25	0	69%	1	25	69%
Stony River	18	18	9	0	50%	2	9	50%
Lime Village[b]	5	5	–	–	–	–	–	0%

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Table 3-1.–Page 2 of 2.

Community	Total households	Households selected for survey	Selected households surveyed[a]	Unselected households surveyed	Percentage of selected households surveyed	Households refusing survey	Households surveyed	Percentage of households surveyed
McGrath	119	50	27	27	54%	9	54	45%
Takotna	26	26	18	0	69%	0	18	69%
Nikolai	31	31	24	0	77%	0	24	77%
Upper Kuskokwim River	281	212	138	27	65%	12	165	59%
Kuskokwim River Total[d]	**3,663**	**2,330**	**1,202**	**277**	**52%**	**304**	**1,479**	**40%**
Quinhagak	179	107	65	37	61%	7	102	57%
Goodnews Bay	87	45	28	21	62%	8	49	56%
Platinum	18	18	9	0	50%	6	9	50%
South Kuskokwim Bay	**284**	**170**	**102**	**58**	**60%**	**21**	**160**	**56%**
Kuskokwim Area Total	**4,037**	**2,500**	**1,304**	**335**	**52%**	**325**	**1,639**	**41%**

Source ADF&G Division of Subsistence household surveys, 2021.

Note Dashes indicate that data are not available.

a. For the 2021 survey, telephone contacts were attempted for 100% of each stratum. A sample was drawn according to the sampling design for the project. The numbers of unselected households represent the number of households contacted that would not have been in the sample under normal circumstances.

b. No surveys were conducted in these communities.

c. The sampling strategy for Bethel remained at 25% for the 2021 study period. The difference between total selected households and a combination of those refusing and those contacted represent households that did not respond to three attempts or the opportunity to complete a survey online.

d. Kuskokwim River Total includes lower Kuskokwim River, middle Kuskokwim River, and upper Kuskokwim River.

Table 3-2.–Number of surveys by collection method and community, surveyed communities, Kuskokwim Management Area, 2021.

Community	Full-length survey		Abbreviated survey			Total number of surveys
	In-person	Telephone	In-person	Online	Mailed	
Tuntutuliak	0	61	0	9	1	71
Eek	0	52	0	2	0	54
Kasigluk	0	50	0	5	2	57
Nunapitchuk	0	57	0	1	6	64
Atmautluak	0	34	0	2	3	39
Napakiak	0	45	0	3	3	51
Napaskiak	0	35	0	1	1	37
Oscarville	0	15	0	0	0	15
Bethel	0	0	503	32	0	535
Kwethluk	0	94	0	1	1	96
Akiachak	0	60	0	0	0	60
Akiak	43	0	0	0	0	43
Tuluksak	0	50	0	0	0	50
Lower Kalskag	0	31	0	1	0	32
Upper Kalskag	0	18	0	0	0	18
Aniak	60	4	0	0	0	64
Chuathbaluk	26	2	0	0	0	28
Crooked Creek	29	0	0	0	0	29
Red Devil	0	6	0	0	0	6
Sleetmute	17	6	0	2	0	25
Stony River	9	0	0	0	0	9
McGrath	0	48	0	4	2	54
Takotna	0	18	0	0	0	18
Nikolai	0	23	0	0	1	24
Quinhagak	0	94	0	4	4	102
Goodnews Bay	0	49	0	0	0	49
Platinum	0	9	0	0	0	9
Total	**184**	**861**	**503**	**67**	**24**	**1639**

Source ADF&G Division of Subsistence 2021.

Harvest and Use of Salmon

Harvest Estimates

The total combined estimated harvest by species for the surveyed communities in the surveyed portion of the KMA was 31,837 (95% CI ±2,505) Chinook salmon; 10,690 (95% CI ±1,453) chum salmon; 50,048 (95% CI ±4,563) sockeye salmon; 24,324 (95% CI ±2,462) coho salmon; and 794 (95% CI ±376) pink salmon (Table 3-3). Overall, an estimated 117,692 salmon were harvested in 2021 for subsistence uses. Lower Kuskokwim River fishers harvested the bulk (81%) of the total subsistence salmon harvest in 2021 (Table 3-3). Lower Kuskokwim River fishers harvested 80% of all Chinook salmon, 86% of all chum salmon, 79% of all sockeye salmon, 82% of all coho salmon, and 88% of all pink salmon in 2021. The Middle Kuskokwim River fishers harvested 8% of all Chinook salmon, 4% of all chum salmon, 5% of all sockeye salmon, 5% of all coho salmon, and 4% of all pink salmon. Upper Kuskokwim River fishers harvested 3% of all Chinook salmon, 1% of all chum salmon, 5% of all sockeye salmon, 7% of all coho salmon, and 2% of all pink salmon. Fishers in south Kuskokwim Bay harvested 10% of all Chinook salmon, 9% of all chum salmon, 11% of all sockeye salmon, 6% of all coho salmon, and 7% of all pink salmon. Expanded harvest results by community can be found in Appendix D.

Bethel, a regional hub with the largest population in the Kuskokwim River drainage, is located in the lower Kuskokwim River region. Bethel's relatively high population naturally puts more harvest pressure on each run of salmon. Of the salmon caught by lower Kuskokwim River communities, Bethel harvested 34% of Chinook, chum, and sockeye salmon in 2021, and 56% and 84% of coho and pink salmon in that same year, respectively (Table 3-3). Of the salmon caught by all surveyed communities, Bethel's harvest represented 27% of the total Chinook salmon harvested in 2021, 29% of the total chum salmon harvest, and 27%, 46%, and 74% of the total sockeye, coho, and pink salmon harvested, respectively, in that year. Bethel's location and population size do influence the community's large harvest in comparison to other Kuskokwim River area communities. However, although Bethel does harvest more salmon than other communities, Bethel households do not harvest more, on average, than households in other communities or regions. In fact, the average per household harvest is slightly lower than the average per household harvest across the region. For example, the average harvest for Chinook salmon among lower Kuskokwim River households in 2021 was eight fish per household, whereas the average harvest among Bethel households was five fish; Bethel had the lowest per household harvest of Chinook salmon of any community in the surveyed portion of the lower Kuskokwim River. Bethel also had the lowest per household average harvest for sockeye salmon, and one of the lowest per household average harvest for chum salmon.

As noted in the Methods chapter, an abbreviated survey form was used in Bethel, whereas the full-length survey form was used in all other communities. The abbreviated form did not ask respondents about harvest location, gear types, loss of harvest, sharing or receiving salmon, nonsalmon fish harvests, number of dogs, salmon harvested for dogs, and whether or not a household met their salmon needs. Therefore, the following information excludes Bethel.

Harvest by Gear Type

As mentioned in the Introduction chapter, some gear types are more effective than others in the different sections of the river because of both the fishers' knowledge and the physical nature of fishing locations in each section of the drainage. For example, productive fishing locations near the middle Kuskokwim River communities of Lower Kalskag and Upper Kalskag are limited due to a smaller number of fishable eddies as well as the the high prevalence of net-snagging debris in this area of the river. As a result, fishers commonly line up their boats and wait for their turn to deploy their drift gillnets in the few select areas known to be most productive (McDevitt et al. 2021b). In contrast, fishers in the lower Kuskokwim River generally have more options for fishing locations, and these locations typically have less net-snagging debris present.

In 2021, among communities where the gear type question was asked, 82% of households (907 of 1,104) reported drift gillnets as the primary gear type used for subsistence salmon fishing (Table 3-4). The next most common gear type was hook and line (10%, or 115) followed by set gillnets (10%, or 113 responses).

Table 3-3.–Total estimated subsistence salmon harvest by species and community, surveyed communities, Kuskokwim Management Area, 2021

Community	Households			Salmon species																
				Chinook			Chum			Sockeye			Coho			Pink				
	Total households	Households surveyed	Percentage of households surveyed	Estimated average harvest per household	Estimated total harvest	CI (95%)	Estimated average harvest per household	Estimated total harvest	CI (95%)	Estimated average harvest per household	Estimated total harvest	CI (95%)	Estimated average harvest per household	Estimated total harvest	CI (95%)	Estimated average harvest per household	Estimated total harvest	CI (95%)
Kongiganak[a]	90	0	0%	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
North Kuskokwim Bay	**90**	**0**	**0%**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
Tuntutuliak	112	71	63%	19	2,173	375	7	739	164	23	2,571	415	3	378	129	0	1	0		
Eek	99	54	55%	11	1,091	385	3	316	103	15	1,505	517	7	652	147	0	16	11		
Kasigluk	119	57	48%	8	917	333	6	744	407	17	2,020	664	2	285	191	0	2	3		
Nunapitchuk	123	64	52%	10	1,277	317	4	496	164	26	3,166	1,026	3	394	137	0	13	9		
Atmautluak	76	39	51%	8	643	509	3	219	54	32	2,394	1,804	4	300	199	0	1	1		
Napakiak	99	51	52%	8	755	182	2	208	140	13	1,241	343	4	371	197	0	0	0		
Napaskiak	121	37	31%	17	2,110	840	6	766	405	33	3,968	1,099	15	1,776	688	0	4	6		
Oscarville	17	15	88%	6	105	24	2	27	10	12	212	68	5	81	20	0	0	0		
Bethel	1,750	535	31%	5	8,511	1,564	2	3,153	1,017	8	13,454	2,622	6	11,161	2,025	0	586	368		
Kwethluk	165	96	58%	11	1,799	283	4	706	200	14	2,309	413	7	1,141	313	0	13	16		
Akiachak	176	60	34%	16	2,827	988	4	707	242	22	3,836	2,385	9	1,613	686	0	56	69		
Akiak	94	43	46%	24	2,264	947	8	743	693	20	1,922	505	13	1,218	697	0	4	3		
Tuluksak	92	50	54%	10	882	171	4	349	137	12	1,110	295	5	490	199	0	0	0		
Lower Kuskokwim River	**3,043**	**1,172**	**39%**	**8**	**25,354**	**2,398**	**3**	**9,173**	**1,413**	**13**	**39,708**	**4,358**	**7**	**19,860**	**2,397**	**0**	**696**	**375**		
Lower Kalskag	85	32	38%	6	513	229	1	86	42	6	521	243	1	80	49	0	0	0		
Upper Kalskag	59	18	31%	8	454	228	2	89	69	4	217	143	3	164	109	0	20	0		
Aniak	163	64	39%	8	1,325	449	1	235	178	9	1,463	492	6	950	373	0	10	9		
Chuathbaluk	32	28	88%	6	180	27	2	51	12	9	274	38	3	95	7	0	0	0		
Middle Kuskokwim River	**339**	**142**	**42%**	**7**	**2,472**	**542**	**1**	**461**	**192**	**7**	**2,475**	**559**	**4**	**1,289**	**386**	**0**	**30**	**9**		

-continued-

Table 3-2.–Page 2 of 2.

Community	Households			Salmon species																
				Chinook			Chum			Sockeye			Coho			Pink		
	Total households	Households surveyed	Percentage of households surveyed	Estimated average harvest per household	Estimated total harvest	CI (95%)	Estimated average harvest per household	Estimated total harvest	CI (95%)	Estimated average harvest per household	Estimated total harvest	CI (95%)	Estimated average harvest per household	Estimated total harvest	CI (95%)	Estimated average harvest per household	Estimated total harvest	CI (95%)
Crooked Creek	39	29	74%	4	153	63	1	28	23	8	328	75	4	170	78	0	5	0
Red Devil	7	6	86%	8	55	0	1	5	0	14	98	0	5	35	0	0	0	0
Sleetmute	36	25	69%	4	140	106	1	23	3	19	687	361	8	288	178	0	0	0
Stony River	18	9	50%	8	137	83	2	42	21	40	726	454	8	135	39	1	11	13
Lime Village[b]	5	0	0%	2	12	5	4	21	7	51	255	4	3	15	8	–	–	–
McGrath	119	54	45%	1	83	44	0	0	0	2	229	109	8	901	10	0	0	0
Takotna	26	18	69%	0	0	0	–	0	0	–	0	0	–	0	0	–	0	0
Nikolai	31	24	77%	8	237	85	0	6	0	1	28	30	4	115	104	0	0	0
Upper Kuskokwim River	**281**	**165**	**59%**	**3**	**817**	**166**	**0**	**125**	**29**	**8**	**2,351**	**542**	**6**	**1,659**	**214**	**0**	**16**	**11**
Kuskokwim River Total[c]	**3,663**	**1,479**	**40%**	**19**	**28,643**	**2,463**	**5**	**9,759**	**1,425**	**29**	**44,534**	**4,425**	**16**	**22,808**	**2,436**	**0**	**742**	**375**
Quinhagak	179	102	57%	15	2,728	445	5	842	286	18	3,170	856	6	1,105	336	0	28	29
Goodnews Bay	87	49	56%	4	388	128	0	26	22	19	1,684	709	3	222	103	0	6	6
Platinum	18	9	50%	4	78	6	4	63	9	37	660	244	11	189	91	1	18	3
South Kuskokwim Bay	**284**	**160**	**56%**	**11**	**3,194**	**460**	**3**	**931**	**285**	**19**	**5,514**	**1,121**	**5**	**1,516**	**358**	**0**	**52**	**30**
Kuskowkim Area Total	**4,037**	**1,639**	**41%**	**30**	**31,837**	**2,505**	**8**	**10,690**	**1,453**	**48**	**50,048**	**4,563**	**22**	**24,324**	**2,462**	**1**	**794**	**376**

Source ADF&G Division of Subsistence household surveys, 2021.

Note Bold, italic text indicates Bayesian estimates.

Note Dashes indicate that data are unavailable.

a. Community was not surveyed. Harvest was not estimated due to lack of recent data.

b. Bayesian imputation was used to develop estimates.

c. Kuskokwim River Total includes the lower Kuskokwim River, middle Kuskokwim River, and upper Kuskokwim River.

Table 3-4.–Primary fishing gear used by households, surveyed communities, Kuskokwim Management Area, 2021.

Community	Total households	Surveyed households	Gear types					
			Setnet	Driftnet	Fish wheel	Hook and line	Dip net	Other
Kongiganak[a]	90	–	–	–	–	–	–	–
North Kuskokwim Bay	**90**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
Tuntutuliak	112	71	0	60	0	0	0	0
Eek	99	54	3	52	0	3	0	0
Kasigluk	119	57	0	66	0	0	0	0
Nunapitchuk	123	64	0	71	0	0	0	0
Atmautluak	76	39	5	40	0	0	0	0
Napakiak	99	51	2	47	0	0	0	0
Napaskiak	121	37	5	74	0	0	0	0
Oscarville	17	15	1	6	0	1	0	0
Bethel[b]	1,750	–	–	–	–	–	–	–
Kwethluk	165	96	0	73	0	1	0	0
Akiachak	176	60	14	94	0	13	0	0
Akiak	94	43	10	69	0	1	0	0
Tuluksak	92	50	0	36	0	0	0	0
Lower Kuskokwim River	**3,043**	**637**	**40**	**688**	**0**	**19**	**0**	**0**
Lower Kalskag	85	32	0	24	0	0	0	0
Upper Kalskag	59	18	3	15	0	5	0	0
Aniak	163	64	6	54	0	34	0	0
Chuathbaluk	32	28	2	14	1	2	0	0
Middle Kuskokwim River	**339**	**142**	**11**	**107**	**1**	**41**	**0**	**0**
Crooked Creek	39	29	5	5	0	1	0	0
Red Devil	7	6	4	2	0	0	0	0
Sleetmute	36	25	2	7	7	5	0	0
Stony River	18	9	9	1	3	2	0	0
Lime Village[a]	5	0	–	–	–	–	–	–
McGrath	119	54	9	4	0	5	0	0
Takotna	26	18	0	0	0	2	0	0
Nikolai	31	24	6	4	0	4	0	0
Upper Kuskokwim River	**281**	**165**	**35**	**23**	**10**	**19**	**0**	**0**
Kuskokwim River Total[c]	**3,663**	**944**	**86**	**818**	**11**	**79**	**0**	**0**
Quinhagak	179	102	0	68	0	19	0	0
Goodnews	87	49	23	17	0	11	0	0
Platinum	18	9	4	4	0	6	0	0
South Kuskokwim Bay	**284**	**160**	**27**	**89**	**0**	**36**	**0**	**0**
Kuskokwim Area Total	**4,037**	**1,104**	**113**	**907**	**11**	**115**	**0**	**0**

Source ADF&G Division of Subsistence household surveys, 2021.

Note Dashes indicate that data are unavailable.

a. Communites were not contacted during 2021.

b. Harvest method questions were not asked for Bethel in 2021.

c. Kuskokwim River Total includes the lower Kuskokwim River, middle Kuskokwim River, and upper Kuskokwim River.

At the management area level, drift gillnets were the most commonly used gear type among lower and middle Kuskokwim River households as well as south Kuskokwim Bay households, whereas set gillnets were the most commonly used gear type in the upper Kuskokwim River. Many households in Aniak and in south Kuskokwim Bay used hook and line. Many Aniak residents use hook and line gear to fish for coho salmon at or slightly downstream of the mouth of the Aniak River; fishers in south Kuskokwim Bay communities may use hook and line gear to target coho salmon as well as nonsalmon species such as Dolly Varden (Ikuta et al. 2016). Gear type estimates were not expanded.

Estimated Fishing Households and Region Population Size

An estimated 1,815 Kuskokwim area households participated in the Kuskokwim area salmon subsistence fishery in 2021 (Table 3-5). The total estimate of individual people living in surveyed communities of the KMA in 2021 was 14,403 living in 4,037 households (Table 1-2). The average number of people per household was four individuals (tables 1-2 and 3-1).

Households Receiving Salmon

Sharing and receiving salmon is an integral component of the annual harvest. In 2021, based on answers provided by nearly 1,100 households that were asked about salmon they received, households received an estimated 2,300 (95% CI ± 380) Chinook salmon (Table 3-6), or 7% of the total subsistence Chinook salmon harvest (tables 3-2 and 3-6). Households received approximately 592 (95% CI ± 291) chum salmon; 3,887 (95% CI ± 970) sockeye salmon; 1,306 (95% CI ± 289) coho salmon; and no pink salmon (Table 3-6).

In addition, households received salmon from various enumeration projects throughout the drainage. These included the test fisheries projects operated by ADF&G in Bethel and by the Native Village of Napaimute (NVN) in Aniak. The ADF&G Kuskokwim River sonar project also made fish available at the sonar camp on a first-come-first-served basis and also delivered fish to nearby Kwethluk for distribution.[3] The ADF&G Bethel test fishery reported a total harvest of 2,000 fish, 1,938 of which were salmon.[4] The harvest included 390 Chinook, 134 chum, 730 sockeye, 672 coho, and 12 pink salmon. The remaining harvest was composed of various nonsalmon fish species. ONC staff distributed a portion of fish harvested in the BTF to elderly, widowed, or disabled residents throughout Bethel and several elders in Tuluksak.[5] Fish distributed by ONC staff included 379 Chinook, 29 chum, 163 sockeye salmon and 12 nonsalmon fish. The remaining BTF harvest was made available to Bethel residents on a first-come-first-served basis through use of the BTF "free fish bin." ADF&G sonar project staff reported a total harvest of 5,421 fish (60% of which were salmon).[6] Nearly 2,500 salmon and nonsalmon fish were retained and were made available at the sonar camp. Sonar staff also delivered fish to the nearby community of Kwethluk. The Native Village of Napaimute (NVN) Aniak test fishery reported catches of 286 Chinook salmon, 41 chum salmon, and 38 sockeye salmon.[7] The majority of these fish were released alive, but a small portion of the catch was placed in the free fish bin at the Aniak beach where residents could come and take what they needed.

Subsistence Use of Salmon for Dog Food

Historically, the dog sled was the primary mode of transportation in the area. As such, many area residents maintained dog teams and harvested large amounts of salmon to feed their dogs. The introduction of the snowmachine, however, changed the way people traveled. As a result, far fewer families maintain dog teams today. Notwithstanding, some Kuskokwim River drainage area residents still do own dog teams. Many of these individuals actively participate in a variety of annual dog sled races on the Kuskokwim River each winter, and presumably harvest salmon for dogs (Godduhn et al. 2020).

3. K. Birchfield, ADF&G Fisheries Biologist, personal communication, February 14, 2022.
4. N. Smith, ADF&G Kuskowim Management Area Biologist, personal communication, February 9, 2022.
5. D. Lowrey, ONC Fisheries Partner Biologist, personal communication, February 24, 2022.
6. K. Birchfield, ADF&G Fisheries Biologist, personal communication, February 14, 2022.
7. D. Gillikin, NVN Fisheries Biologist, personal communication, February 11, 2022.

Table 3-5.–Estimated number of fishing households, surveyed communities, Kuskokwim Management Area, 2021.

Community	Total households	Households sampled	Estimated number of fishing households	95% CI
Kongiganak[a]	90	0	–	–
North Kuskokwim Bay	**90**	**0**	–	–
Tuntutuliak	112	71	60	7
Eek	99	54	59	9
Kasigluk	119	57	66	10
Nunapitchuk	123	64	71	10
Atmautluak	76	39	45	9
Napakiak	99	51	49	9
Napaskiak	121	37	79	12
Oscarville	17	15	8	1
Bethel	1,750	535	664	60
Kwethluk	165	96	75	8
Akiachak	176	60	122	22
Akiak	94	43	80	13
Tuluksak	92	50	36	6
Lower Kuskokwim River	**3,043**	**1,172**	**1,414**	**71**
Lower Kalskag	85	32	24	10
Upper Kalskag	59	18	24	9
Aniak	163	64	94	20
Chuathbaluk	32	28	20	2
Middle Kuskokwim River	**339**	**142**	**162**	**24**
Crooked Creek	39	29	12	3
Red Devil	7	6	6	0
Sleetmute	36	25	21	2
Stony River	18	9	15	3
Lime Village[a]	5	0	–	–
McGrath	119	54	18	8
Takotna	26	18	2	2
Nikolai	31	24	14	3
Upper Kuskokwim River	**281**	**165**	**88**	**10**
Kuskokwim River Total[b]	**3,663**	**1,479**	**1,664**	**75**
Quinhagak	179	102	87	10
Goodnews Bay	87	49	50	7
Platinum	18	9	14	4
South Kuskokwim Bay	**284**	**160**	**151**	**12**
Kuskokwim Area Total	**4,037**	**1,639**	**1,815**	**76**

Source ADF&G Division of Subsistence household surveys, 2021.

Note Dashes indicate that data are unavailable or undefined.

a. No surveys were conducted in these communities

b. Kuskokwim River Total includes the lower Kuskokwim River, middle Kuskokwim River, and upper Kuskokwim River.

Table 3-6.–Estimated number of salmon received from subsistence fisheries, surveyed communities, Kuskokwim Management Area, 2021.

Community	Total households	Salmon species														
		Chinook			Chum			Sockeye			Coho			Pink		
		Valid responses	Estimate	CI (95%)	Valid responses	Estimate	CI (95%)	Valid responses	Estimate	CI (95%)	Valid responses	Estimate	CI (95%)	Valid responses	Estimate	CI (95%)
Kongiganak[a]	90	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
North Kuskokwim Bay	**90**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
Tuntutuliak	112	66	199	72	68	5	7	65	196	85	71	9	7	71	0	0
Eek	99	52	69	58	50	0	0	50	301	57	52	161	167	52	0	0
Kasigluk	119	57	23	26	57	35	45	56	72	58	57	81	112	57	0	0
Nunapitchuk	123	63	53	42	64	62	41	63	231	143	64	59	50	64	0	0
Atmautluak	76	39	128	105	38	0	0	39	80	31	39	47	15	39	0	0
Napakiak	99	49	191	116	50	10	9	49	136	55	50	23	19	51	0	0
Napaskiak	121	35	77	91	37	16	19	37	253	128	37	105	96	37	0	0
Oscarville	17	15	21	10	14	1	0	14	26	6	15	2	0	15	0	0
Bethel[b]	1,750	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Kwethluk	165	89	247	78	93	24	23	89	322	103	93	137	71	95	0	0
Akiachak	176	59	185	261	58	146	233	58	470	781	59	124	109	59	0	0
Akiak	94	42	33	15	43	0	0	42	35	22	42	13	8	42	0	0
Tuluksak	92	49	209	79	49	23	28	49	149	98	50	105	54	50	0	0
Lower Kuskokwim River	**3,043**	**615**	**1,435**	**345**	**621**	**322**	**240**	**611**	**2,271**	**811**	**629**	**866**	**264**	**632**	**0**	**0**
Lower Kalskag	85	30	186	85	32	140	157	29	278	236	32	33	38	32	0	0
Upper Kalskag	59	18	66	19	18	50	52	18	84	32	18	35	54	18	0	0
Aniak	163	63	61	41	63	0	0	63	454	463	63	104	70	63	0	0
Chuathbaluk	32	27	3	2	28	0	0	27	4	2	28	5	3	28	0	0
Middle Kuskokwim River	**339**	**138**	**316**	**93**	**141**	**190**	**160**	**137**	**820**	**513**	**141**	**177**	**94**	**141**	**0**	**0**

-continued-

Table 3-5.–Page 2 of 2.

Community	Total households	Salmon species														
		Chinook			Chum			Sockeye			Coho			Pink		
		Valid responses	Estimate	CI (95%)	Valid responses	Estimate	CI (95%)	Valid responses	Estimate	CI (95%)	Valid responses	Estimate	CI (95%)	Valid responses	Estimate	CI (95%)
Crooked Creek	39	28	35	8	28	5	6	28	45	17	28	9	8	28	0	0
Red Devil	7	6	5	0	6	0	0	6	0	0	6	0	0	6	0	0
Sleetmute	36	25	1	1	25	0	0	25	48	29	25	0	0	25	0	0
Stony River	18	9	3	4	9	0	0	9	9	12	9	18	24	9	0	0
Lime Village[a]	5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
McGrath	119	54	33	15	54	0	0	54	110	71	54	17	14	54	0	0
Takotna	26	18	0	0	18	0	0	18	5	5	18	0	0	18	0	0
Nikolai	31	22	6	3	22	2	2	22	1	1	22	2	2	22	0	0
Upper Kuskokwim River	**281**	**162**	**83**	**17**	**162**	**7**	**6**	**162**	**218**	**78**	**162**	**46**	**26**	**162**	**0**	**0**
Kuskokwim River Total[c]	**3,663**	**915**	**1,834**	**–**	**924**	**519**	–	**910**	**3,309**	–	**932**	**1,089**	–	**935**	**0**	–
Quinhagak	179	98	438	130	101	57	42	99	362	113	102	158	62	102	0	0
Goodnews Bay	87	47	28	19	47	16	18	47	189	79	47	41	29	48	0	0
Platinum	18	9	0	0	9	0	0	9	27	15	9	18	3	9	0	0
South Kuskokwim Bay	**284**	**154**	**466**	**130**	**157**	**73**	**45**	**155**	**578**	**137**	**158**	**217**	**68**	**159**	**0**	**0**
Kuskokwim Area Total	**4,037**	**1,069**	**2,300**	**380**	**1,081**	**592**	**291**	**1,065**	**3,887**	**970**	**1,090**	**1,306**	**289**	**1,094**	**0**	**0**

Source ADF&G Division of Subsistence household surveys, 2021.

Note Dashes indicate data are unavailable.

a. No surveys were conducted in these communities.

b. Questions about receiving fish not asked in Bethel for the 2021 fishing season.

c. Kuskokwim River Total includes the lower Kuskokwim River, middle Kuskokwim River, and upper Kuskokwim River.

In 2021, for communities where questions about subsistence use of salmon for dog food were asked, 1,495 respondents reported owning a combined total of 3,273 dogs (Table 3-7). Households with dogs owned an average of two dogs per household. Twenty-eight households fed whole salmon to dogs (2% of households with dogs), and these households fed an average of 57 salmon per household to dogs.

Communities that harvested the highest numbers of salmon that were used for dog food included the lower Kuskokwim River community of Akiachak and the upper Kuskokwim River community of McGrath. Akiachak residents reported harvesting 367 salmon for dog food in 2021, and McGrath fishers harvested 870 salmon for dog food.

Lost Fish

In 2021, for communities where questions about lost fish were asked (all surveyed communities except Bethel), 308 of 1,041 respondents indicated that they lost fish during the 2021 season (Table 3-8). Area residents reported 5,389 salmon as lost (i.e., not edible due to spoilage, animals, or other reasons). The 308 households that reported losing fish provided 141 responses as to the reasons for the losses. Of these reasons, 85% were related to weather (e.g., rainy weather prevented adequate drying) and 10% were related to diseased fish (e.g., parasites). Reported numbers of lost salmon were not expanded.

Subsistence Salmon Needs

In an effort to gain a better understanding of harvest at the household level and the various factors that may affect household harvest goals, respondents were asked if they were able to achieve their household harvest goals for each salmon species during the 2021 season. The following discussion focuses on the proportion of households within the surveyed communities (excluding Bethel) that achieved or did not achieve their harvest goals by species and the factors that affected reaching these goals.

Chinook Salmon

Respondents from 1,021 households provided valid responses to researchers when asked if the household achieved their Chinook salmon harvest goals in 2021 (Table 3-9). Of these households, 37% met their Chinook salmon goals, and 50% of households did not. An additional 14% responded that they did not need Chinook salmon. Households that did not reach their harvest goals for Chinook salmon most commonly cited management actions (e.g., closures, gear restrictions), followed by personal reasons (e.g., health, work obligations) and lastly, equipment issues (e.g., inoperable motor, no fishing gear). In addition, 9% of households indicated that they did not fish for Chinook salmon.

At the regional level, 581 lower Kuskokwim River households provided valid responses to researchers who asked if the household achieved their subsistence harvest goals for Chinook salmon in 2021 (Table E1). Of these households, one-third met 100% of their Chinook salmon goals, and 58% of households did not. The communities of Akiak, Kwethluk, and Napakiak had the highest percentages of households that achieved their Chinook salmon harvest goals. For lower Kuskokwim River households that did not achieve their harvest goals, the most common reasons were management actions, followed by personal reasons and equipment issues. In addition, 9% of lower Kuskokwim River households indicated that they had no need for Chinook salmon.

In middle Kuskokwim River communities, 140 households provided valid responses to researchers who asked if the household achieved their subsistence harvest goals for Chinook salmon in 2021. Of these households, 37% met their Chinook salmon harvest goals, and 42% did not. Nearly one-half of Chuathbaluk households achieved their Chinook salmon harvest goals, and over one-half of Lower Kalskag households did not. Households that did not reach their harvest goals for Chinook salmon most often cited personal reasons, followed by equipment issues and management actions. In addition, 21% of households indicated that they had no need for Chinook salmon.

In upper Kuskokwim River communities, a total of 151 household respondents provided responses to researchers who asked if the household achieved their subsistence harvest goals for Chinook salmon in 2021. Of these households, 40% met their Chinook salmon harvest goals, and 39% did not meet their

Table 3-7.–Estimated use of salmon for dog food, surveyed communities, Kuskokwim Management Area, 2021.

Community	Households		Total number of dogs	Total number of whole salmon fed to dogs
	Own dogs	Fed whole salmon to dogs		
Kongiganak[a]	–	–	–	–
North Kuskokwim Bay	–	–	–	–
Tuntutuliak	95	0	165	0
Eek	55	6	91	109
Kasigluk	91	0	234	0
Nunapitchuk	96	0	178	0
Atmautluak	55	0	181	0
Napakiak	70	0	103	0
Napaskiak	80	2	191	6
Oscarville	8	0	18	0
Bethel[b]	–	–	–	–
Kwethluk	138	2	339	90
Akiachak	97	5	240	367
Akiak	72	0	365	0
Tuluksak	77	0	131	0
Lower Kuskokwim River	**934**	**15**	**2,236**	**572**
Lower Kalskag	70	2	103	18
Upper Kalskag	42	0	91	0
Aniak	104	3	213	33
Chuathbaluk	25	0	45	0
Middle Kuskokwim River	**241**	**5**	**452**	**51**
Crooked Creek	30	2	66	12
Red Devil	6	0	14	0
Sleetmute	23	0	44	0
Stony River	4	2	6	23
Lime Village[a]	–	–	–	–
McGrath	69	1	137	870
Takotna	16	0	28	0
Nikolai	22	0	46	0
Upper Kuskokwim River	**170**	**5**	**341**	**905**
Kuskokwim River Total[c]	**1,345**	**25**	**3,029**	**1,528**
Quinhagak	104	1	144	18
Goodnews Bay	34	2	78	48
Platinum	12	0	22	0
South Kuskokwim Bay	**150**	**3**	**244**	**66**
Kuskokwim Area Total	**1,495**	**28**	**3,273**	**1,594**

Source ADF&G Division of Subsistence household surveys, 2021.

Note Dashes indicate that data are unavailable.

a. No surveys were collected in these communities. Households could not be reached.

b. Questions about fish for dogs were not asked for Bethel in 2021.

c. Kuskokwim River Total includes the lower Kuskokwim River, middle Kuskokwim River, and upper Kuskokwim River.

Table 3-8.–Reported number of salmon lost and reasons for losses, surveyed communities, Kuskokwim Management Area, 2021.

Community	Households			Total number of salmon lost	Reason given for loss							
	Total	Surveyed	Estimated lost salmon		Weather	Disease	Animal	Equipment	Human	Management	Personal	River conditions
Kongiganak[a]	90	–	–	–	–	–	–	–	–	–	–	–
North Kuskokwim Bay	**90**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
Tuntutuliak	112	60	11	217	5	0	0	0	0	0	0	0
Eek	99	52	9	79	3	2	0	0	0	0	0	0
Kasigluk	119	50	30	647	14	0	0	0	0	0	0	0
Nunapitchuk	123	57	35	393	14	0	0	0	0	0	0	0
Atmautluak	76	32	26	929	9	0	0	0	1	0	0	0
Napakiak	99	43	20	230	9	0	0	0	0	0	0	0
Napaskiak	121	35	36	1,046	13	0	0	0	0	0	0	0
Oscarville	17	15	6	47	5	0	0	0	0	0	0	0
Bethel[b]	1,750	–	–	–	–	–	–	–	–	–	–	–
Kwethluk	165	94	27	255	15	0	1	0	0	0	0	0
Akiachak	176	60	65	1,150	22	1	0	0	0	0	0	0
Akiak	94	43	6	122	4	1	0	0	0	0	0	0
Tuluksak	92	50	5	89	3	0	0	0	0	0	0	0
Lower Kuskokwim River	**3,043**	**591**	**276**	**5,204**	**116**	**4**	**1**	**0**	**1**	**0**	**0**	**0**
Lower Kalskag	85	31	2	27	1	0	0	0	0	0	0	0
Upper Kalskag	59	17	5	10	0	1	0	0	0	0	0	0
Aniak	163	64	2	4	0	1	0	0	0	0	0	0
Chuathbaluk	32	28	2	6	1	0	1	0	0	0	0	0
Middle Kuskokwim River	**339**	**140**	**11**	**47**	**2**	**2**	**1**	**0**	**0**	**0**	**0**	**0**

-continued-

Table 3-8.–Page 2 of 2.

Community	Households			Total number of salmon lost	Reason given for loss							
	Total	Surveyed	Estimated lost salmon		Weather	Disease	Animal	Equipment	Human	Management	Personal	River conditions
Crooked Creek	39	29	1	3	0	1	0	0	0	0	0	0
Red Devil	7	6	0	0	0	0	0	0	0	0	0	0
Sleetmute	36	23	1	1	1	0	0	0	0	0	0	0
Stony River	18	9	0	0	0	0	0	0	0	0	0	0
Lime Village[a]	5	–	–	–	–	–	–	–	–	–	–	–
McGrath	119	48	0	0	0	0	0	0	0	0	0	0
Takotna	26	18	0	0	0	0	0	0	0	0	0	0
Nikolai	31	24	0	0	0	0	0	0	0	0	0	0
Upper Kuskokwim River	**281**	**157**	**2**	**4**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**
Kuskokwim River Total[c]	**3,663**	**888**	**289**	**5,255**	**119**	**7**	**2**	**0**	**1**	**0**	**0**	**0**
Quinhagak	179	95	3	21	1	0	1	0	0	0	0	0
Goodnews Bay	87	49	12	53	1	6	0	0	0	0	0	0
Platinum	18	9	4	60	2	1	0	0	0	0	0	0
South Kuskokwim Bay	**284**	**153**	**19**	**134**	**4**	**7**	**1**	**0**	**0**	**0**	**0**	**0**
Kuskokwim Area Total	**4,037**	**1,041**	**308**	**5,389**	**123**	**14**	**3**	**0**	**1**	**0**	**0**	**0**

Source ADF&G Division of Subsistence household surveys, 2021.

Note Dashes indicated that data are unavailable.

a. No surveys were conducted in these communities.

b. Questions about lost salmon were not asked in Bethel for the 2021 fishing season.

c. Kuskokwim River Total includes the lower Kuskokwim River, middle Kuskokwim River, and upper Kuskokwim River.

harvest goals. The community of Stony River had the highest percentage of households (59%) that achieved their Chinook salmon harvest goals. For the households that did not reach their harvest goals for Chinook salmon, the most common response was that the household did not fish for Chinook salmon. Personal reasons were the second most commonly cited reason for households that did not meet their Chinook salmon harvest goals. Communities with the highest percentages of households that did not achieve their Chinook salmon harvest goals included Takotna, Crooked Creek, and Nikolai. Lastly, 28% of surveyed households from Crooked Creek to Nikolai expressed no need for Chinook salmon.

One half of south Kuskokwim Bay households achieved their Chinook salmon harvest goals, and Quinhagak had the highest percentage of households to do so. For the households that did not reach their harvest goals for Chinook salmon, the most common responses were personal reasons and equipment issues. Finally, 13% of south Kuskokwim Bay households expressed no need for Chinook salmon.

The 2021 drainagewide Chinook salmon harvest was considerably less than that of 2020 (Table A1). In only three communities—Akiak, Stony River, and Quinhagak—did 50% or more households meet their Chinook salmon harvest goals (Table E1). In contrast, in 14 communities 50% or more of households did not meet their Chinook salmon harvest goals, including 11 of 12 lower river communities.

Chum Salmon

Based on responses from 1,021 households, only 16% of households achieved their chum salmon harvest goals in 2021, whereas 56% of households did not (Table 3-9). Households that did not reach their harvest goals for chum salmon most commonly reported run dynamics, followed by personal reasons and equipment issues. In addition, 29% of households indicated that they had no need for chum salmon.

Only 16% of surveyed lower Kuskokwim River households (excluding Bethel) met their chum salmon harvest goals whereas 65% did not (Table E2). The most commonly cited reasons for lower Kuskokwim River community households that did not achieve their chum salmon harvest goals were run dynamics, followed by personal reasons, equipment issues, and management decisions. The lower Kuskokwim River communities of Oscarville and Tuntutuliak had the highest percentages of households that did not achieve their chum salmon harvest goals (88% and 80%, respectively). The communities of Eek and Akiak had the highest percentages of households that met their chum salmon harvest goals, but less than one-third of households in each community were able to do so. Lastly, 19% of lower river households indicated no need for chum salmon.

In the middle Kuskokwim River, 12% of surveyed households achieved their chum salmon harvest goals and 45% did not. Although the middle Kuskokwim River community of Aniak had the second lowest percentage of households that met their chum salmon harvest goals (9%), the community also had the highest percentage of households that expressed no need for chum salmon (58%). The primary reasons that middle Kuskokwim River households did not achieve their chum salmon harvest goals were run dynamics, personal reasons, and equipment issues.

Seventeen percent of upper Kuskokwim River households met their chum salmon harvest goals, 38% of households did not, and 44% indicated that they had no need for chum salmon. Over one quarter of the households in the communities of McGrath and Stony River achieved their chum salmon harvest goals, but no households in Takotna and only 5% of Nikolai households achieved their harvest goals.[8] Upper Kuskokwim River households that did not achieve their chum harvest goals cited not fishing, personal reasons, and run dynamics as to why they were unable to meet their harvest goals.

For south Kuskokwim Bay communities, 19% of households achieved their chum salmon harvest goals and 41% did not. In addition, 40% of households expressed no need for chum salmon. Platinum had the highest percentage of households that achieved their chum salmon harvest goals, and Goodnews Bay had the lowest percentage. Goodnews Bay also had the highest percentage of households that expressed no need for chum

8. The upper Kuskokwim River communities of McGrath reported no chum salmon harvests in 2021. Responding households that achieved their chum salmon harvest goals in 2021 may have been referring to fish they received.

Table 3-9.–Comments provided by survey respondents regarding whether or not their subsistence needs for salmon were met by region and subarea, Kuskokwim Management Area, 2021.

		Households				
		Number		Percentage		
Region	Salmon species	Total households	Valid responses	Needs met	No need	Needs not met
North Kuskokwim Bay[a]	Chinook		0	–	–	–
	Chum		0	–	–	–
	Sockeye	90	0	–	–	–
	Coho		0	–	–	–
	Pink		0	–	–	–
Lower Kuskokwim River[b,c]	Chinook		581	33%	9%	58%
	Chum		581	16%	19%	65%
	Sockeye	3,043	584	46%	9%	45%
	Coho		573	28%	33%	39%
	Pink		560	5%	89%	7%
Middle Kuskokwim River	Chinook		140	37%	21%	42%
	Chum		140	12%	43%	45%
	Sockeye	339	140	36%	25%	39%
	Coho		139	28%	38%	34%
	Pink		138	1%	96%	3%
Upper Kuskokwim River[c]	Chinook		151	38%	26%	36%
	Chum		151	17%	44%	38%
	Sockeye	281	151	36%	28%	36%
	Coho		151	27%	37%	36%
	Pink		150	15%	68%	17%
Kuskokwim River Total[c,d]	Chinook		872	34%	14%	52%
	Chum		872	16%	27%	58%
	Sockeye	3,663	875	43%	14%	43%
	Coho		863	28%	34%	38%
	Pink		848	6%	87%	8%
South Kuskokwim Bay	Chinook		149	50%	13%	37%
	Chum		149	19%	40%	41%
	Sockeye	284	151	57%	12%	31%
	Coho		148	30%	37%	34%
	Pink		146	3%	95%	2%
Kuskokwim Area Total[c]	Chinook		1,021	36%	14%	50%
	Chum		1,021	16%	29%	56%
	Sockeye	4,037	1,026	45%	14%	41%
	Coho		1,011	28%	35%	37%
	Pink		994	5%	88%	7%

Source ADF&G Division of Subsistence household surveys, 2021.

Note Dashes indicate that data are unavailable.

a. No surveys were conducted in North Kuskokwim Bay communities

b. Questions about needs being met were not asked in Bethel for the 2021 fishing season.

c. Percentages in subtotals only include communities where data is available.

d. Kuskokwim River Total includes the lower Kuskokwim River, middle Kuskokwim River, and upper Kuskokwim River.

salmon. The most commonly cited reasons for households that did not achieve their chum salmon harvest goals were run dynamics, personal reasons, and equipment issues.

Sockeye Salmon

Based on responses from 1,026 household respondents, 45% of households achieved their sockeye salmon harvest goals in 2021, and 41% of households did not (Table 3-9). For the households that did not reach their harvest goals for sockeye salmon, the most common responses were personal reasons followed by management actions and equipment issues. In addition, 14% of households indicated that they had no need for sockeye salmon.

Nearly one-half of lower Kuskokwim River households achieved their sockeye salmon harvest goals, while over one-third did so in the middle and upper Kuskokwim River (Table E3). The most common responses cited by lower and middle Kuskokwim River households that did not meet their sockeye salmon harvest goals were personal reasons, management actions, and equipment issues. For upper Kuskokwim River communities, the most common responses were not fishing, personal reasons, and equipment issues. In the lower Kuskokwim River, the community of Akiak had the highest percentage of households that achieved their harvest goals, and Tuluksak had the highest percentage of households that did not achieve their harvest goals. In the middle Kuskokwim River, the communities of Chuathbaluk and Aniak had the highest percentages of households that met their sockeye salmon harvest goals, and Lower Kalskag had the highest percentage of households that did not achieve their harvest goals. In the upper portion of the drainage, Stony River and Red Devil had the highest percentages of households that achieved their sockeye salmon harvest goals. In south Kuskokwim Bay communities, 57% of households achieved their sockeye salmon harvest goals. Similar to responses from lower, middle, and upper Kuskokwim River households, south Kuskokwim Bay households that did not meet their sockeye salmon harvest goals most frequently cited personal reasons and equipment issues.

Coho Salmon

Slightly over 1,000 respondents provided valid responses to researchers when asked if their households were able to achieve their coho salmon harvest goals in 2021 (Table 3-9). More than one-quarter of households achieved their harvest goals for coho salmon, and 38% did not. Common responses among households that did not achieve their coho salmon harvest goals included personal reasons and equipment issues. In addition, over one-third of households expressed no need for coho salmon.

Twenty-eight percent of surveyed lower Kuskokwim River community households achieved their household harvest goals for coho salmon in 2021 (Table E4). Lower Kuskokwim River communities with the highest percentages of households that achieved their harvest goals were Akiak, Napaskiak, and Eek. Communities with the highest percentages of households that did not achieve their harvest goals were Tuluksak and Atmautluk. The middle Kuskokwim River community of Aniak had the highest percentage of households that achieved their coho salmon harvest goals in that region, and Lower Kalskag had the lowest percentage of households that achieved their harvest goals. Lower Kalskag also had the highest percentage of households that expressed no need for coho salmon. In the upper Kuskokwim River, the community of Stony River had the highest percentage of households that achieved their harvest goals, nearly half of all surveyed households. In contrast, of the 18 surveyed households in Takotna, none met their harvest goals for coho salmon. Lastly, 30% of south Kuskokwim Bay community households achieved their coho salmon harvest goals, but 34% did not. Platinum had the highest percentage of households that achieved their harvest goals (and also the highest percentage of households that did not meet their goals), whereas Quinhagak had the lowest percentage of households that achieved their harvest goals.

Pink Salmon

Nearly 1,000 respondents provided valid responses to researchers when asked if their households were able to achieve their pink salmon harvest goals in 2021 (Table 3-9). Of the 994 responses, 875 indicated no need for pink salmon. For those respondents who did not meet their pink salmon harvest goals, the most common responses were that they did not fish for pink salmon, personal reasons, and equipment issues.

Estimated Harvests of Nonsalmon Species

Although salmon typically constitute a large percentage of the annually harvested wild resources for many households throughout the Kuskokwim area, nonsalmon fish also make substantial contributions to household harvests (Brown et al. 2013; Ikuta et al. 2016). Both the harvest amounts and the variety of nonsalmon species harvested in 2021 indicate that these species are highly sought-after resources.

In terms of numbers of fish, the most heavily harvested nonsalmon fish in the surveyed portion of the KMA included smelts (family *Osmeridae*), Alaska blackfish (*Dallia pectoralis*) and northern pike (*Esox lucius*), and two species of whitefishes: humpback (*Coregonus pidschian*) and broad whitefish (*C. nasus*; Table 3-10). The combined total harvest of these five nonsalmon resources included nearly 198,000 fish. In addition, Kuskokwim River area households harvested over 6,200 burbot (*Lota lota*) in 2021.

Lower Kuskokwim River communities harvested the majority (89%) of the total drainagewide nonsalmon fish harvest by number of fish, including 99% of of all burbot and 98% of all Alaska blackfish. More than one-half (52%) of all Arctic grayling (*Thymallus arcticus*) were harvested in the upper portion of the river, and the bulk of Arctic char/Dolly Varden (*Salvelinus* spp.) harvests occurred among south Kuskokwim Bay communities (97%), primarily Quinhagak.

Chinook Salmon Harvest Permits

A total of 475 permits were distributed to middle and upper Kuskokwim River community vendors from Lower Kalskag to Nikolai. In addition, 150 permits were made available at the Bethel ADF&G office and 50 were made available at the Anchorage ADF&G office. The total number of permits issued was 128. The harvest data collected through returned permits was insufficient for analysis.

Harvest Calendars

In 2021, ADF&G staff sent 1,993 subsistence harvest calendars to Kuskokwim River drainage and South Kuskokwim Bay area households (Appendix C). In addition, ONC staff distributed several dozen subsistence harvest calendars to lower Kuskokwim River area fish camps during the summer of 2021.[9] Because surveyors did not conduct surveys in-person in all communities outside of Bethel in 2021, harvest calendars could not be collected in person. Some survey respondents use the calendars to aid them in their memory of their harvests during survey administration. A total of 67 calendars (3%) were returned to ADF&G offices (Table 3-11).

Local Comments

At the end of each survey, respondents were asked to share comments or concerns they had to ADF&G staff. Responses gathered in this final portion of the survey were qualitative in nature. The following discussion will focus on these comments and concerns shared by household respondents from all surveyed regions of the drainage.

Lower River

Numerous household respondents from several different lower Kuskokwim River communities expressed concerns about management actions. These included comments about too few fishing opportunities ("openers"), openers coinciding with poor drying weather, and crowded conditions during openers. Several respondents also expressed concerns about commercial bycatch in the high seas and indicated that poor Chinook and chum salmon returns are directly related to bycatch. A few respondents commented on the poor chum salmon return, and a small number of respondents expressed satisfaction with their household harvests.

9. D. Lowrey, ONC Fisheries Partner Biologist, personal communication, February 16, 2022.

Table 3-10.–Estimated harvests of nonsalmon fish, including those caught in the winter prior to the survey season, surveyed communities, Kuskokwim Management Area, 2021.

	Nonsalmon fish											
	Humpback whitefish		Broad whitefish		Ciscoes[a]		Sheefish		Burbot		Northern pike	
Community	Total	CI (95%)	Total	CI (95%)	Total	CI (95%)	Total	CI (95%)	Total	CI (95%)	Total	CI (95%)
Kongiganak[b]	–	–	–	–	–	–	–	–	–	–	–	–
North Kuskokwim Bay	–	–	–	–	–	–	–	–	–	–	–	–
Tuntutuliak	1,244	557	1,282	454	0	0	93	51	285	124	3,074	911
Eek	237	212	263	221	203	155	33	42	332	189	2,768	1,758
Kasigluk	1,558	723	3,158	2,220	58	51	13	21	64	46	5,091	2,089
Nunapitchuk	2,014	815	1,697	638	79	64	43	29	448	227	10,874	4,806
Atmautluak	601	406	682	374	63	68	0	0	98	117	1,798	814
Napakiak	165	108	455	174	0	0	144	68	489	190	1,808	597
Napaskiak	540	536	149	103	0	0	15	15	261	255	3,666	2,465
Oscarville	327	236	9	3	7	6	4	2	17	14	808	279
Bethel[c]	–	–	–	–	–	–	–	–	–	–	–	–
Kwethluk	391	222	599	213	0	0	77	45	387	244	702	258
Akiachak	2,199	2,387	960	689	333	275	163	102	1,511	662	5,373	4,900
Akiak	728	513	377	172	34	33	265	136	2,165	1,082	4,004	3,794
Tuluksak	582	688	700	449	0	0	23	16	108	53	1,084	928
Lower Kuskokwim River	**10,586**	**2,858**	**10,331**	**2,486**	**777**	**328**	**873**	**199**	**6,165**	**1,340**	**41,050**	**8,623**
Lower Kalskag	91	59	129	85	0	0	20	13	18	19	55	50
Upper Kalskag	20	0	317	252	27	28	68	45	1	0	20	0
Aniak	344	253	55	22	78	65	153	118	22	19	79	62
Chuathbaluk	64	6	20	0	0	0	37	6	16	0	2	2
Middle Kuskokwim River	**519**	**256**	**521**	**251**	**105**	**70**	**278**	**125**	**57**	**26**	**156**	**78**
Crooked Creek	4	5	28	7	0	0	73	30	0	0	3	2
Red Devil	6	0	30	0	12	0	18	0	0	0	35	0
Sleetmute	36	38	33	38	56	57	25	16	0	0	27	8
Stony River	623	454	89	24	263	119	0	0	0	0	0	0
Lime Village[b]	–	–	–	–	–	–	–	–	–	–	–	–
McGrath	85	72	74	55	46	70	126	109	6	9	263	103
Takotna	0	0	0	0	0	0	0	0	0	0	0	0
Nikolai	79	52	80	52	0	0	46	30	0	0	118	77
Upper Kuskokwim River	**833**	**400**	**334**	**85**	**377**	**136**	**288**	**115**	**6**	**9**	**446**	**126**
Kuskokwim River Total[d]	**11,938**	**2,896**	**11,186**	**2,500**	**1,259**	**361**	**1,439**	**261**	**6,228**	**1,340**	**41,652**	**8,622**
Quinhagak	122	127	59	44	174	109	0	0	0	0	103	100
Goodnews Bay	0	0	24	34	18	15	0	0	0	0	0	0
Platinum	2	0	0	0	51	29	0	0	0	0	0	0
South Kuskokwim Bay	**124**	**127**	**83**	**55**	**243**	**112**	**0**	**0**	**0**	**0**	**103**	**99**
Kuskokwim Area Total	**12,062**	**2,898**	**11,269**	**2,500**	**1,502**	**378**	**1,439**	**261**	**6,228**	**1,340**	**41,755**	**8,622**

-continued-

Table 3-10.–Page 2 of 3.

Community	Nonsalmon fish											
	Alaska blackfish		Arctic grayling		Char/Dolly Varden		Pacific herring		Smelts		Rainbow trout	
	Total	CI (95%)	Total	CI (95%)	Total	CI (95%)	Total	CI (95%)	Total	CI (95%)	Total	CI (95%)
Kongiganak[b]	–	–	–	–	–	–	–	–	–	–	–	–
North Kuskokwim Bay	–	–	–	–	–	–	–	–	–	–	–	–
Tuntutuliak	1,201	1,541	0	0	0	0	0	0	864	874	0	0
Eek	5,515	5,742	63	32	0	0	1,201	908	1,652	1,601	67	78
Kasigluk	16,173	14,689	0	0	0	0	0	0	1,320	950	0	0
Nunapitchuk	5,452	4,189	0	0	0	0	0	0	5,242	3,188	0	0
Atmautluak	313	451	0	0	0	0	0	0	5,240	4,503	0	0
Napakiak	3,562	3,310	0	0	0	0	0	0	6,230	2,144	0	0
Napaskiak	5,300	1,754	5	8	0	0	0	0	6,617	3,171	0	0
Oscarville	1,128	688	0	0	0	0	0	0	1,660	256	2	2
Bethel[c]	–	–	–	–	–	–	–	–	–	–	–	–
Kwethluk	0	0	0	0	0	0	0	0	5,872	4,116	1	2
Akiachak	16,716	9,964	12	13	7	11	0	0	15,784	7,517	24	26
Akiak	970	914	35	61	4	3	0	0	14,061	5,394	365	601
Tuluksak	0	0	0	0	0	0	0	0	3,394	1,268	0	0
Lower Kuskokwim River	**56,330**	**19,146**	**115**	**69**	**11**	**11**	**1,201**	**887**	**67,936**	**12,098**	**459**	**590**
Lower Kalskag	0	0	0	0	0	0	0	0	0	0	0	0
Upper Kalskag	1,120	0	0	0	0	0	0	0	875	1,179	0	0
Aniak	0	0	41	33	19	17	0	0	0	0	40	25
Chuathbaluk	0	0	4	3	0	0	0	0	0	0	0	0
Middle Kuskokwim River	**1,120**	**0**	**45**	**33**	**19**	**17**	**0**	**0**	**875**	**1,105**	**40**	**25**
Crooked Creek	0	0	6	6	0	0	0	0	0	0	0	0
Red Devil	0	0	2	0	0	0	0	0	0	0	0	0
Sleetmute	10	11	10	11	0	0	0	0	0	0	0	0
Stony River	0	0	20	24	0	0	0	0	0	0	0	0
Lime Village[b]	–	–	–	–	–	–	–	–	–	–	–	–
McGrath	0	0	242	206	0	0	0	0	0	0	0	0
Takotna	0	0	25	10	0	0	0	0	0	0	0	0
Nikolai	0	0	1	1	0	0	0	0	0	0	0	0
Upper Kuskokwim River	**10**	**11**	**306**	**204**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**400**
Kuskokwim River Total[d]	**57,460**	**19,142**	**466**	**217**	**30**	**20**	**1,201**	**887**	**68,811**	**12,145**	**499**	**590**
Quinhagak	0	0	110	71	858	366	1	2	4,826	1,549	58	42
Goodnews Bay	0	0	13	10	121	82	1,217	1,206	993	523	204	137
Platinum	0	0	0	0	101	34	7,013	57	802	566	0	0
South Kuskokwim Bay	**0**	**0**	**123**	**72**	**1,080**	**375**	**8,231**	**1,187**	**6,621**	**1,698**	**262**	**141**
Kuskokwim Area Total	**57,460**	**19,140**	**589**	**228**	**1,110**	**372**	**9,432**	**1,475**	**75,432**	**12,260**	**761**	**607**

-continued-

Table 3-10.–Page 3 of 3.

Source ADF&G Division of Subsistence household surveys, 2021.

Note Dashes indicate that data is unavailable.

a. Includes least cisco, Bering cisco, and round whitefish.

b. No surveys were conducted in these communities.

c. Questions about nonsalmon fish were not asked in Bethel for the 2021 fishing season.

d. Kuskokwim River Total includes the lower Kuskokwim River, middle Kuskokwim River, and upper Kuskokwim River.

Middle River

Comments shared by household respondents living in middle Kuskokwim River communities were similar in nature to those shared by lower Kuskokwim River respondents. These included comments about management actions: specifically, the need for more fishing opportunities. Several respondents also expressed concerns about low chum salmon numbers, and one respondent suggested that high seas commercial bycatch was responsible for poor returns.

Upper River

Comments from respondents living in upper Kuskokwim River communities were similar to those shared by lower and middle Kuskokwim River respondents. Several respondents also expressed concerns about low numbers of salmon. Some respondents also commented on the fishing schedule and requested that the lower portion of the river be closed prior to the middle and upper portions. Some respondents added that closing the lower portion of the river allows the fish to pass and be more readily available for harvest in the middle and upper portions. Other respondents indicated that they had had a good fishing season.

South Kuskokwim Bay

Several household respondents in south Kuskokwim Bay communities spoke positively about their fishing season and expressed that they met their needs for salmon. Some respondents shared concerns about commercial fishing bycatch in the Bering Sea and the effect it may have on salmon runs in local rivers. Several respondents said that Chinook salmon were small in 2021 and that the run was later and more spread out (less concentrated). Two respondents attributed both fewer salmon and sick-looking salmon to the Fukushima nuclear disaster of 2011. Respondents also commented about the need for commercial fishing opportunities be more closely monitored.

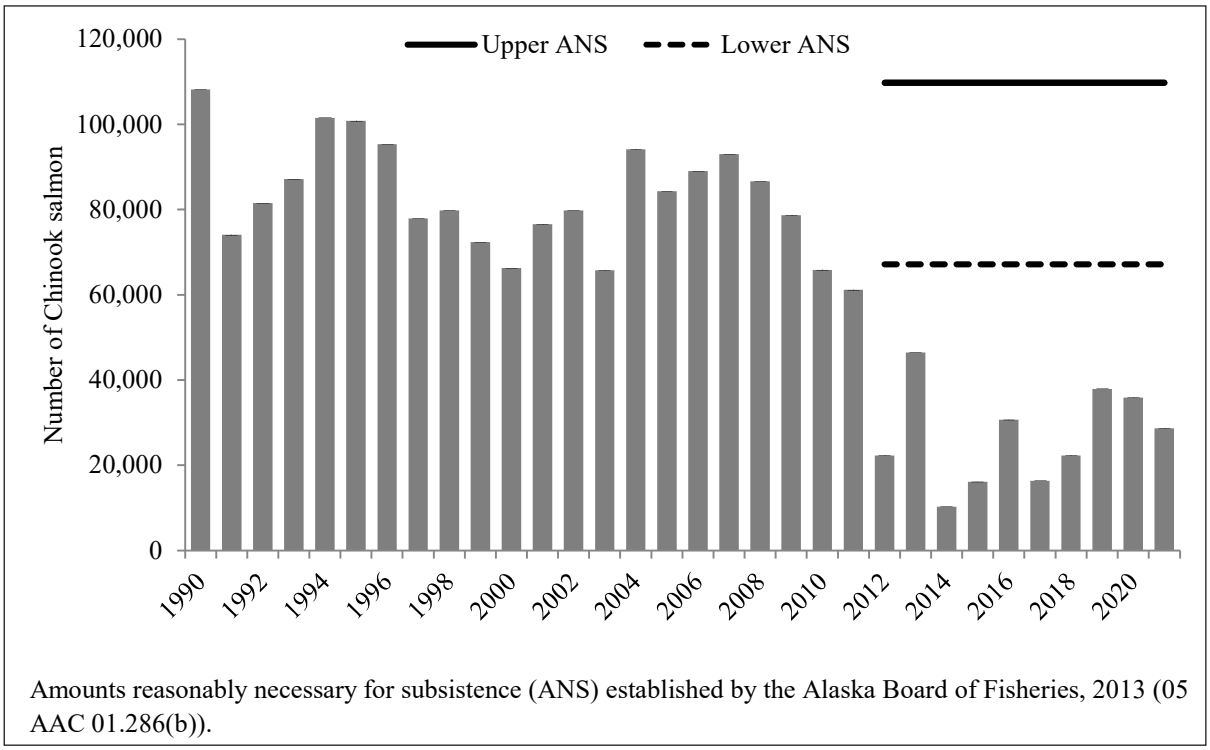
The most common themes expressed by residents in the Kuskokwim drainage in 2021 included concerns about management decisions, low salmon numbers, and high seas commercial fishing bycatch.

4. DISCUSSION

Historical Harvest Estimates

Subsistence salmon fishers throughout the Kuskokwim River drainage have experienced considerable harvest declines over the past three decades; the most substantial declines began in 2012. Every region of the river has been affected by this trend. Although most communities have experienced the most substantial decreases to Chinook salmon harvests, the harvests of other salmon species have also declined. Previous Division reports have documented these changes in the fishery, as well as their effects on families living throughout the Kuskokwim River drainage. For more detailed information, refer to Godduhn et al. (2020).

Historical subsistence harvest estimates of Chinook salmon indicate that harvests have declined throughout the entire surveyed portion of the KMA following a high harvest of over 114,000 Chinook salmon in 1990 (Figure 4-1; Table A1). Harvest averages for Chinook salmon during the period 1990 to 2020 have consistently decreased over time: the most substantial decrease occurred during the past 12 years. The 2000 season marked the first time on record that the run size fell below 150,000 Chinook salmon. As a result, the State of Alaska declared an economic disaster on the Kuskokwim River (Lipka and Tiernan 2018). Slightly over 71,000 Chinook salmon were harvested for subsistence in 2000, and many fishers were not able to reach their Chinook salmon harvest goals. In response, ADF&G implemented a conservative subsistence fishing schedule in 2001 in an attempt to improve escapement while also providing limited subsistence fishing opportunities (Burkey, Jr. et al. 2002). In addition, federal and state management agencies along with several local Alaska Native tribal organizations issued a drainagewide "joint appeal for subsistence users to conserve Chinook" salmon in 2001 (Burkey, Jr. et al. 2002:106). Harvest decreases continued into the 2014 season, which marked the lowest Chinook subsistence salmon harvest on record for Kuskokwim River subsistence fishers. (Figure 4-1; Table A1). Figures 4-2 and 4-3 show Chinook salmon harvests by subarea for 1990–2021.



Amounts reasonably necessary for subsistence (ANS) established by the Alaska Board of Fisheries, 2013 (05 AAC 01.286(b)).

Figure 4-1.–Estimated Chinook salmon subsistence harvests,1990–2021, and ANS range 2012–2021, Kuskokwim River.

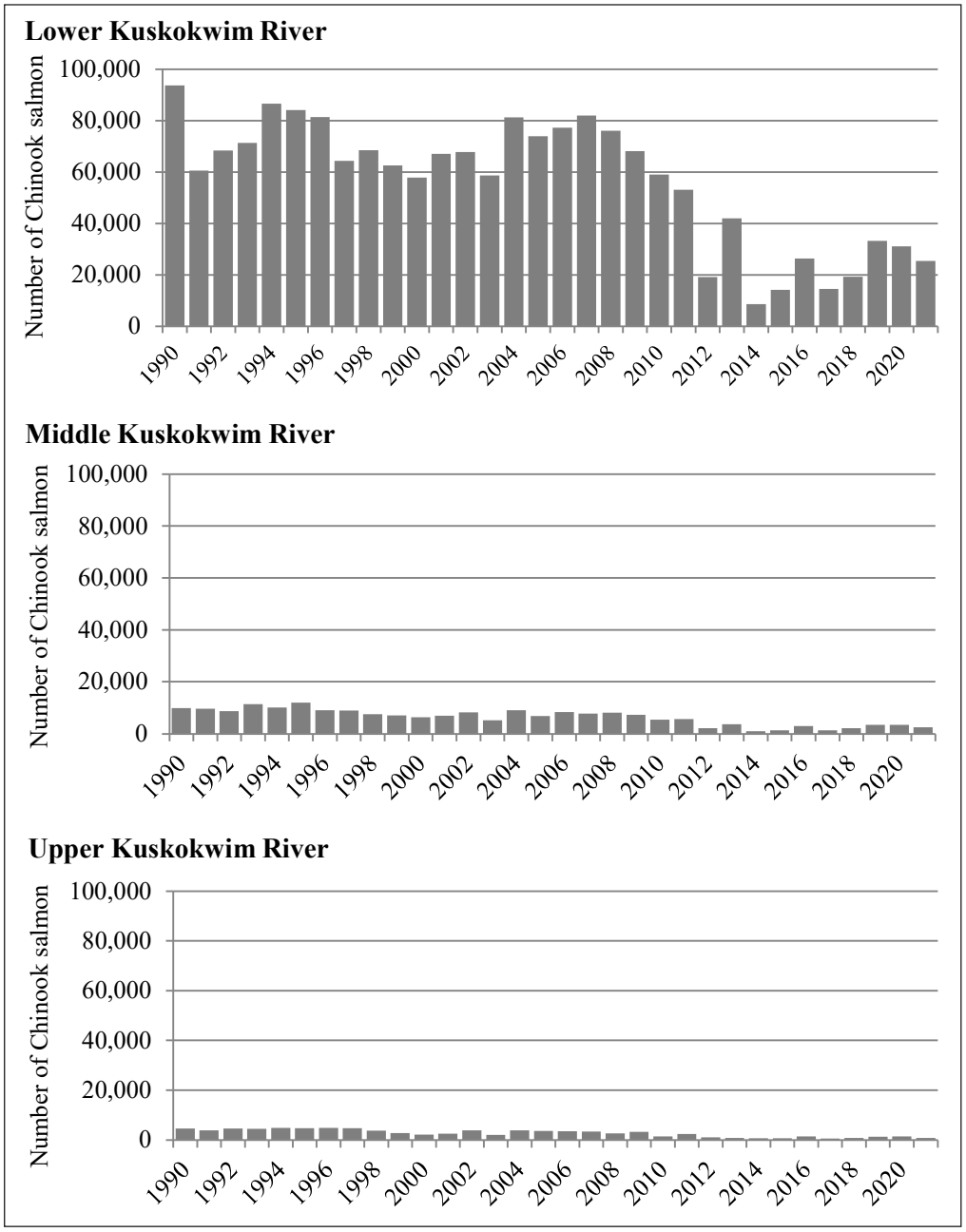


Figure 4-2.–Estimated Chinook salmon subsistence harvests by subarea, Kuskokwim River, 1990–2021.

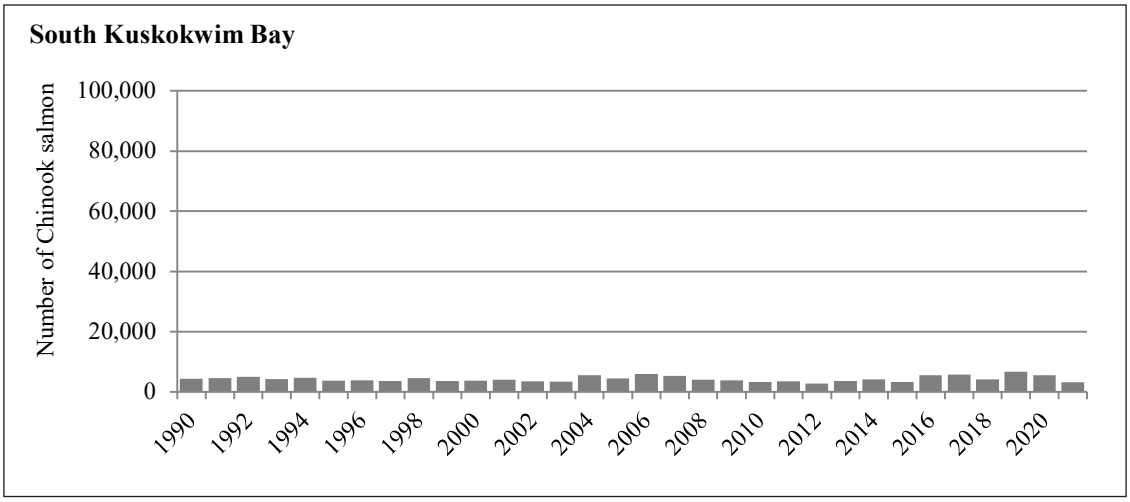


Figure 4-3.–Estimated Chinook salmon subsistence harvests, Kuskokwim Bay, 1990–2021.

Kuskokwim River area chum salmon subsistence harvests have also declined during the past three decades (figures 4-4 and 4-5; Table A2). Similar to Chinook salmon harvests, chum salmon harvests included several high harvests during the period 1990–1999, when the average harvest was close to 83,000 fish. However, this period also included the fourth lowest chum salmon harvest on record, in 1997 (38,477 fish). Increased fishing restrictions and low run abundance may have contributed to the overall chum salmon harvest decline among Kuskokwim River communities over the period 1990–2020. Many Kuskokwim Riverdrainage area residents and local organizations attribute poor chum salmon returns to bycatch associated with high seas large-scale commercial fishing operations.[1] Chum salmon run concurrently with Chinook salmon each season. As a result, restrictions in place to protect Chinook salmon stocks—namely, fewer fishing opportunities—directly affect fishers' ability to harvest chum salmon.

Overall, Kuskokwim River drainage area sockeye salmon subsistence harvests have remained relatively stable for the period 1990–2020 (figures 4-6 and 4-7; Table A3). The annual harvest for the period averaged over 45,600 sockeye salmon.

Historical subsistence harvest estimates for coho salmon indicate that harvests have gradually decreased at the drainage level during the period 1990–2020 (Figure 4-8; Table A4). Harvest decreases for coho salmon may be attributed to a number of factors, including low abundance or less fishing effort targeting the species. Because coho salmon is the last species to enter the river, restrictions associated with Chinook salmon and other salmon species generally do not affect fishers' abilities to harvest coho salmon. Figure 4-9 shows coho salmon harvests by subarea for 1990–2020.

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https://www.ktoo.org/2022/02/18/bycatch-task-force-works-to-refine-mission-ahead-of-november-deadline/
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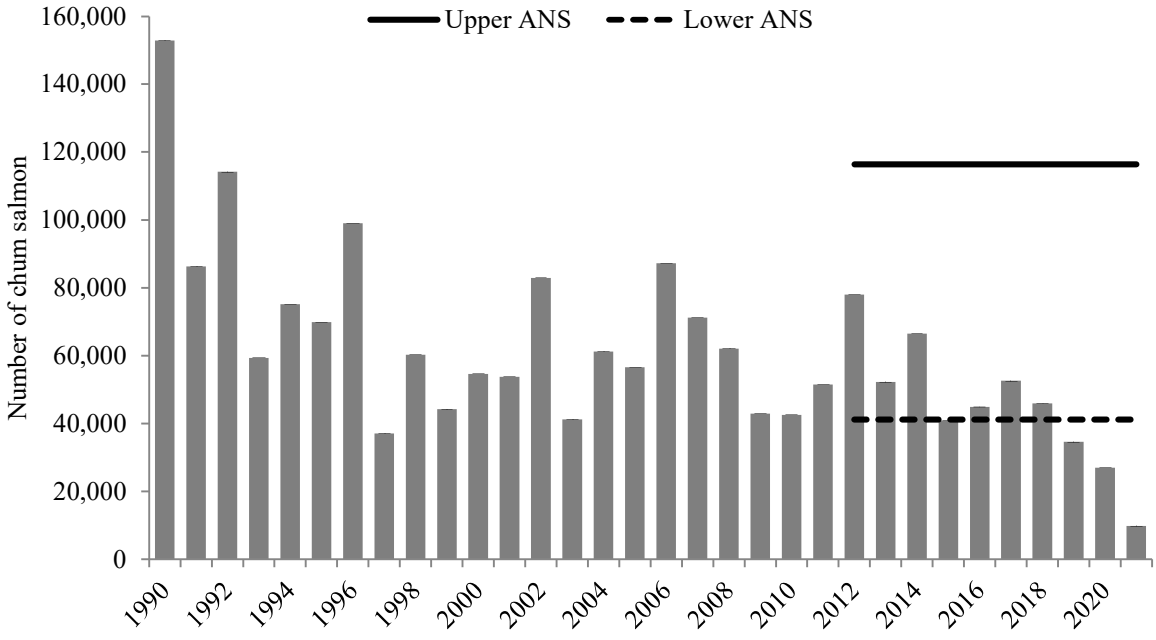
Kim, G., 2021. Kuskokwim River Salmon Management Working Group tackles trawler salmon bycatch. KYUK, Bethel. Accessed May 16, 2022. https://www.kyuk.org/hunting-fishing



Amounts reasonably necessary for subsistence (ANS) established by the Alaska Board of Fisheries, 2013 (05 AAC 01.286(b)).

Figure 4-4.–Estimated chum salmon subsistence harvests, 1990–2021, and ANS ranges, 2012–2021, Kuskokwim River.

Comparison of 2021 Season to Prior Seasons

During the 2021 season, the pattern of very low Chinook salmon harvests in Kuskokwim River communities continued from the previous seasons dating back to 2012 (Table A1). The 2021 drainagewide Chinook salmon harvest (31,837) was considerably less than the 2020 harvest (41,475). At the regional level, the 2021 lower Kuskokwim River Chinook salmon harvest was slightly greater than the region's 5- and 10-year average harvests, whereas the middle Kuskokwim River Chinook salmon harvest was similar to the region's 5- and 10- year averages. However, the harvests for each region still remained far below historical harvest levels prior to the Chinook salmon crash in 2012. The Chinook salmon harvests for the upper Kuskokwim River and south Kuskokwim Bay regions were considerably lower than both the 5- and 10-year average harvests for each region. At the community level, 22 of the 27 surveyed communities' 2021 Chinook salmon harvests were less than their 2020 harvests, and most of the remaining five communities minimally exceeded their 2020 harvests.

The 2021 chum salmon harvest (10,690) represented a 62% decrease compared to the 2020 harvest and was the lowest recorded drainagewide harvest since ADF&G started estimating harvests in 1990 (Table A2). Since 1990, three of the four record low harvests (<39,000 fish) have occurred during the past three seasons. All region-level harvests were significantly below each region's 5- and 10-year average harvests, as were harvests for all 27 surveyed communities. Nearly one-half of the 27 surveyed communities' chum salmon harvests fell by 75% or more compared to their 2020 harvests: for example, the upper Kuskokwim River communities of McGrath and Takotna reported 0 chum salmon harvests in 2021.

The total drainagewide 2021 sockeye salmon harvest was slightly greater than the 2020 harvest as well as the most recent 5- and 10-year averages (Table A3). On the regional level, lower Kuskokwim River community sockeye salmon harvests exceeded the region's 5- and 10-year average harvests, but middle Kuskokwim River community harvests fell considerably below that region's 5- and 10-year averages.

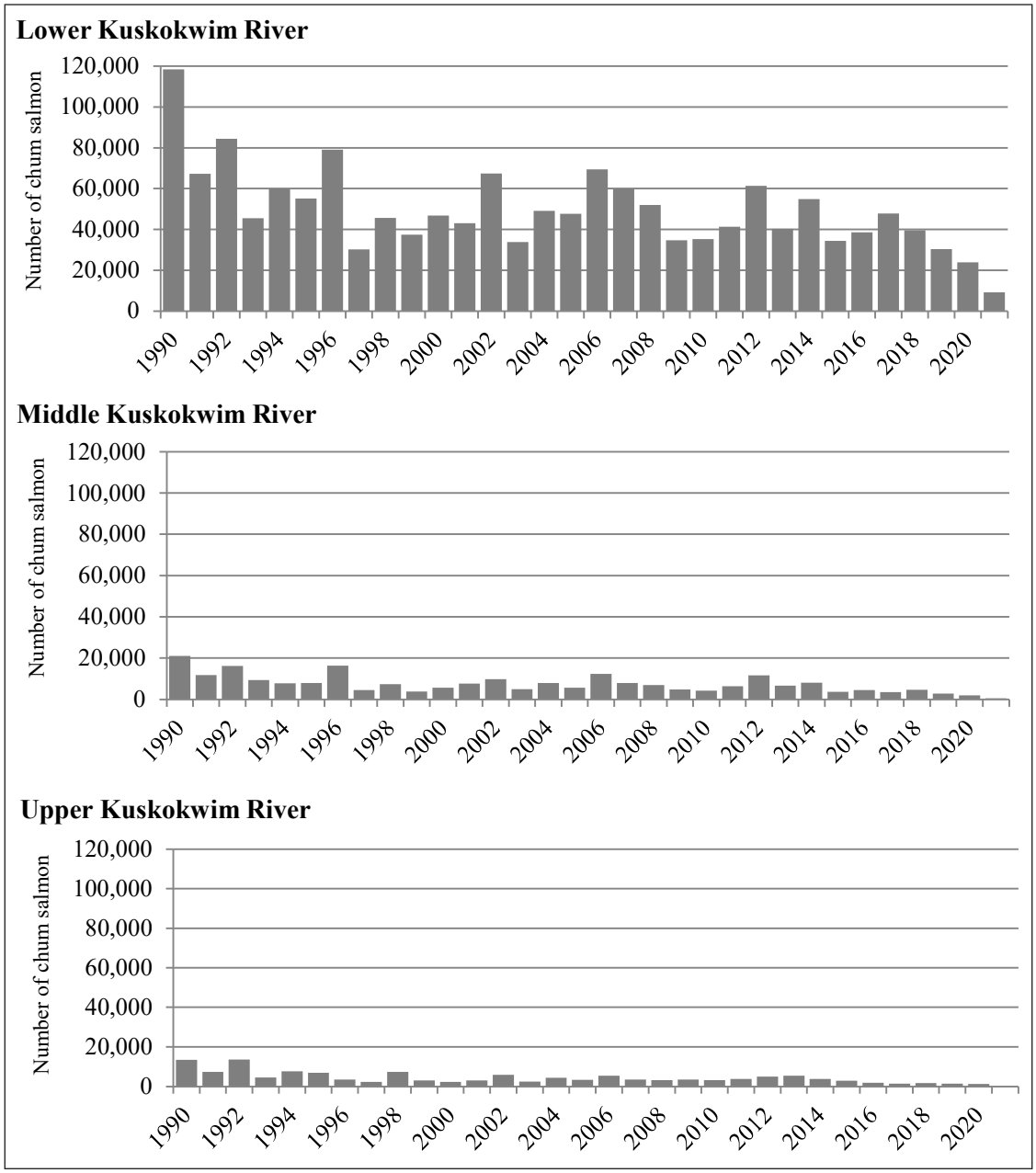


Figure 4-5.–Estimated chum salmon subsistence harvests by subarea, Kuskokwim River, 1990–2021.

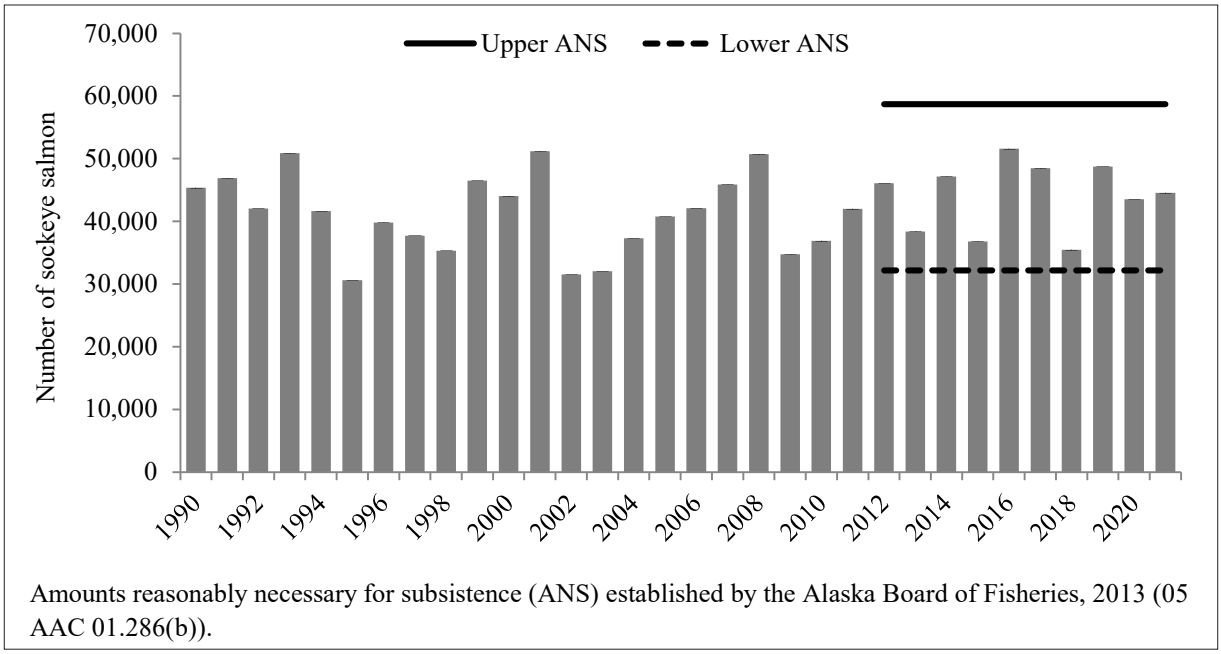


Figure 4-6.–Estimated sockeye salmon subsistence harvests, 1990–2021, and ANS range, 2012–2021, Kuskowkim River.

Upper Kuskokwim River and south Kuskokwim Bay community sockeye salmon harvests were similar to each region's 5- and 10-year average harvests. Nearly one-half of the surveyed communities' sockeye salmon harvests increased in 2021 compared to 2020. For these communities, increased harvests may have been in response to low Chinook and chum salmon harvests.

The drainagewide 2021 coho salmon harvest was the second lowest on record dating back to 1990, and both low harvest seasons occurred within the past five years. The 2021 harvest was considerably less than the drainage's 5- and 10- year averages (Table A4) and represented a 29% decrease compared to 2020. Harvests among all regions of the river, including south Kuskokwim Bay, were less than each region's 5- and 10- year average harvests. More than one-half of lower Kuskokwim River community harvests fell by one-quarter or more, as did all but one middle Kuskokwim River community, and five of the eight upper Kuskokwim River communities, compared to each community's 2020 harvest.

Amounts Reasonably Necessary for Subsistence

As mentioned in the Introduction chapter of this report, the BOF revised ANS levels for the KMA in 2013 (Table 4-1). The current ANS ranges for the Kuskokwim River drainage are as follows: 67,200–109,800 Chinook, 41,200–116,400 chum, 32,200–58,700 sockeye, 27,400–57,600 coho, and 500–2,000 pink salmon (5 AAC 01.286(b)).[2]

The 2021 subsistence Chinook salmon harvest represented the eleventh consecutive season when harvest levels fell below the lower range of the ANS for the Kuskokwim River drainage. The drainagewide harvest of Chinook salmon has not exceeded the lower bound of the ANS range since 2010. The 2021 chum salmon harvest also fell far below the lower bound of its respective ANS range for the third consecutive season since ANS levels were revised in 2013. Furthermore, the 2021 chum salmon harvest included fewer fish than the 1997 harvest, which was the lowest recorded harvest until the 2019 season.

2. These ANS ranges are specific to the Kuskokwim River drainage proper. A separate ANS range exists for communities in District 4 (south Kuskokwim Bay) and District 5 (Goodnews Bay). The ANS range for these areas combined is 6,900–17,000 salmon (all species).

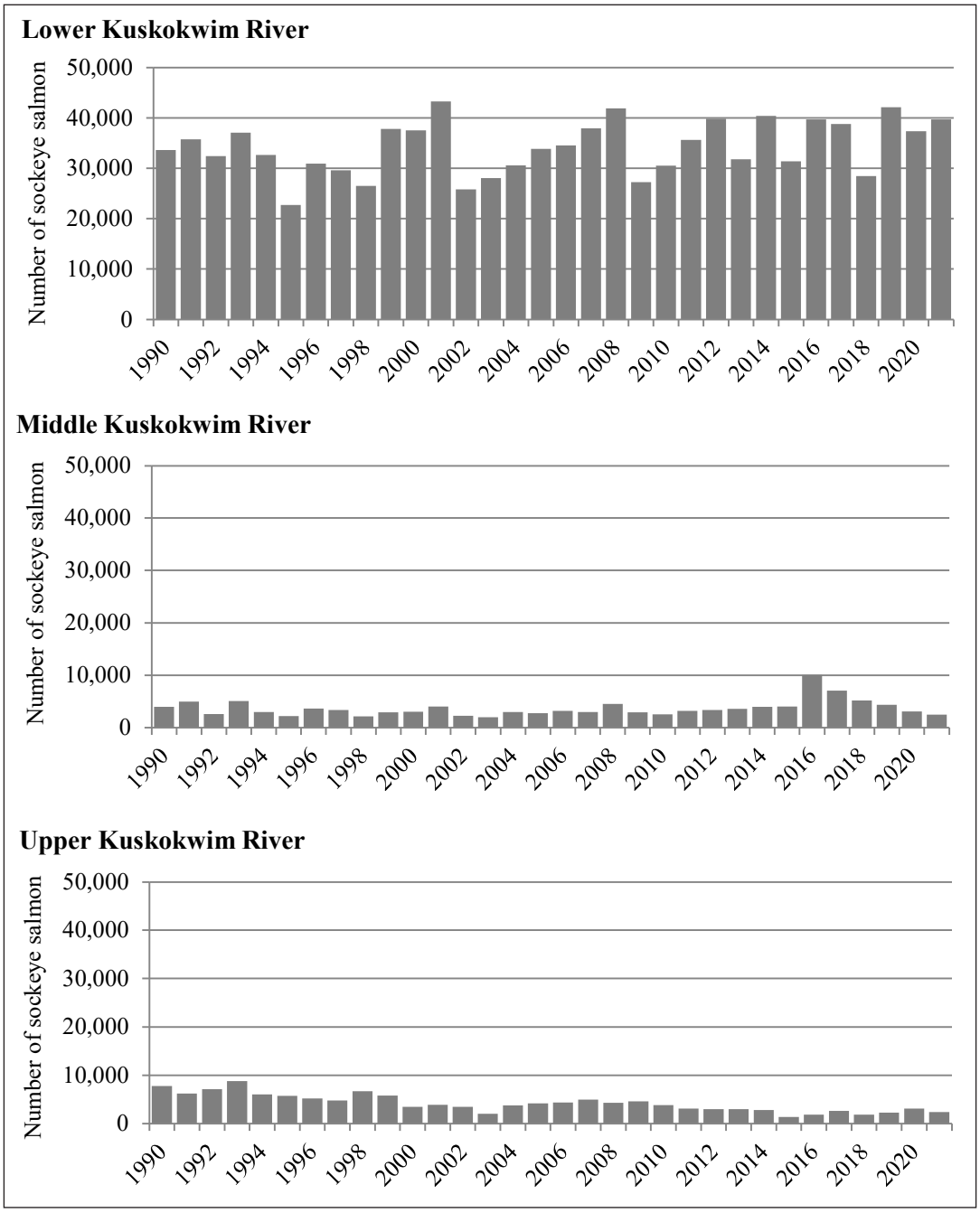
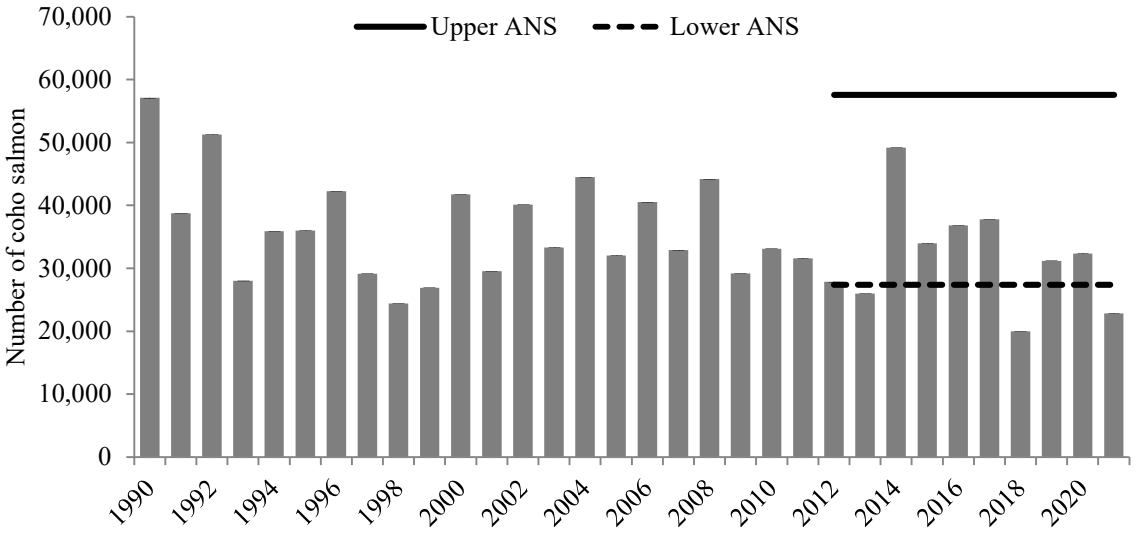


Figure 4-7.–Estimated sockeye salmon subsistence harvests by subarea, Kuskokwim Rier, 1990–2021.



Amounts reasonably necessary for subsistence (ANS) established by the Alaska Board of Fisheries, 2013 (05 AAC 01.286(b)).

Figure 4-8.–Estimated coho salmon subsistence harvests, 1990–2021, and ANS range, 2012–2021, Kuskokwim River.

The 2021 sockeye salmon harvest was within its ANS range for the ninth consecutive season since ANS levels were revised in 2013, but the coho salmon harvest fell below its ANS range for the second time since 2018.

Comparison of Needs Met

A smaller proportion of Kuskokwim River drainage area households achieved their harvest goals for Chinook salmon in 2021 (36%) compared to 2020 (40%; Table 3-8; McDevitt et al. 2021b). Inseason fishing restrictions associated with Chinook salmon were similar between the two seasons, and the overall Chinook salmon harvest was less in 2021 than 2020. The reasons provided for not meeting Chinook salmon harvest goals during 2021 and 2020 were similar in both nature and frequency of responses. Similar to 2020, the primary factors for households that did not meet their harvest goals in 2021 included personal reasons, equipment issues, and fishery management actions.

A smaller percentage of Kuskokwim River drainage area households reported meeting their chum salmon harvest goals in 2021 compared to 2020 (Table 3-9; McDevitt et al. 2021b). The most frequently cited reasons provided for not meeting those goals in 2021 were the same as those provided in 2020: personal reasons, equipment issues, management decisions, and run dynamics. However, a larger percentage of households (35% in 2021 vs. 17% in 2020) cited run dynamics as the reason for not meeting their chum salmon harvest goals in 2021 compared to 2020.

The percentage of households that met their sockeye salmon harvest goals during the 2021 season was similar to the 2020 season (Table 3-10; McDevitt et al. 2021b). Respondents who did not meet their sockeye salmon harvest goals gave the same reasons in 2021 as in 2020: personal reasons, equipment issues, management decisions, run dynamics, and did not fish. However, a greater proportion of household respondents cited personal reasons and management decisions in 2021 than in 2020 as the reasons why they were unable to meet their harvest goals.

A smaller percentage of households met their coho salmon harvest goals in 2021 compared to 2020. (Table 3-11; McDevitt et al. 2021b). Reasons for not meeting coho salmon harvest goals provided by respondents

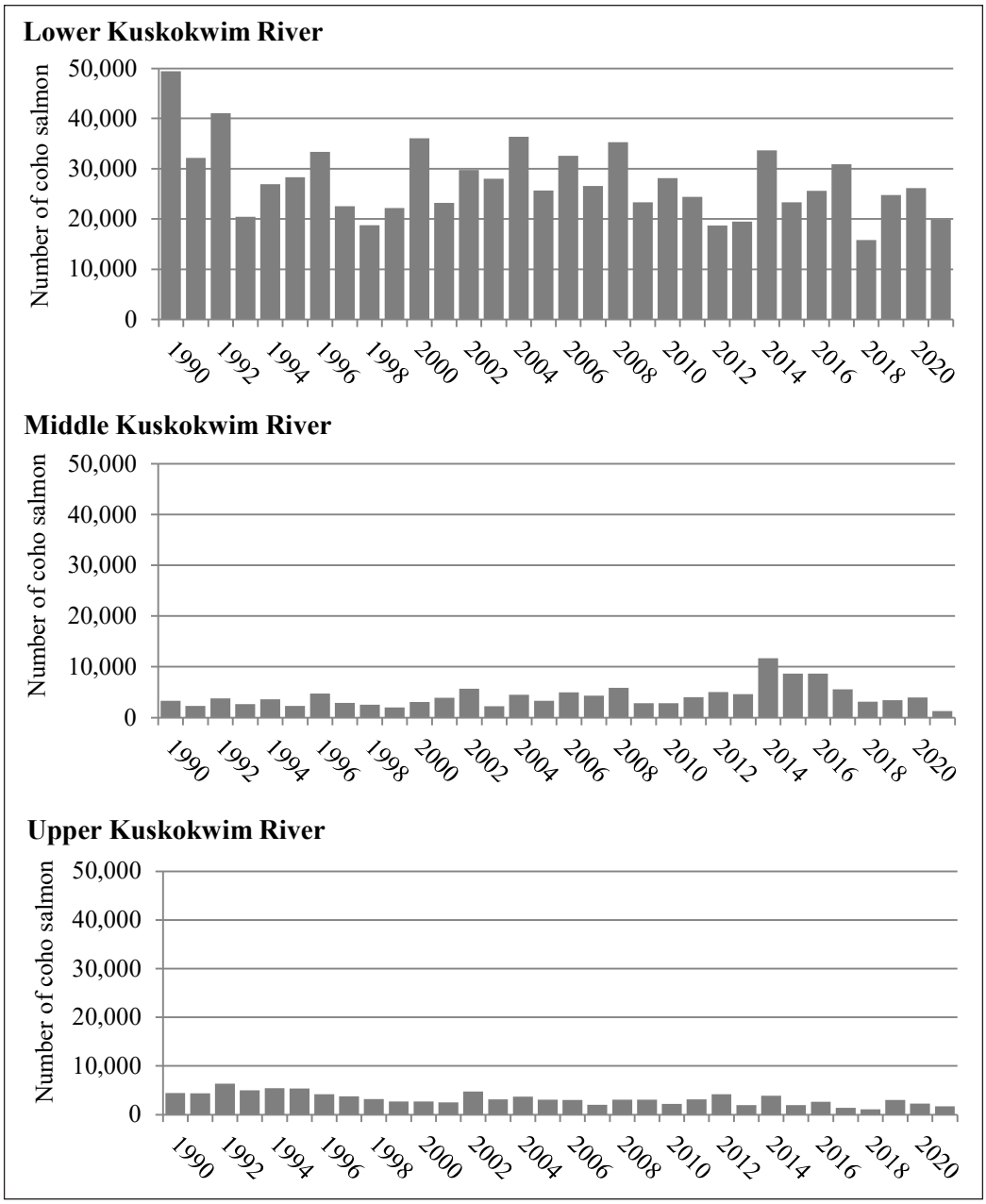


Figure 4-9.–Estimated coho salmon subsistence harvests by subarea, Kuskokwim River, 1990–2021.

Table 4-1.–Amounts necessary for subsistence (ANS) and estimated subsistence salmon harvests, Kuskokwim River drainage, 1990–2021.

	Estimated salmon harvest					
Year[a]	Chinook	Sockeye	Coho	Chum	Pink	All salmon
1990	108,219	45,345	57,086	152,816	--	363,466
1991	74,091	46,872	38,762	86,259	--	245,984
1992	81,552	42,070	51,231	114,164	--	289,017
ANS Range[b]	Chinook	Sockeye	Coho	Chum	Pink	All salmon 192,000–242,000
1993	87,150	50,872	28,010	59,342	--	225,374
1994	101,536	41,639	35,896	75,174	--	254,245
1995	100,826	30,632	35,986	69,877	--	237,321
1996	95,369	39,777	42,275	99,023	--	276,444
1997	77,958	37,714	29,135	37,017	--	**181,824**
1998	79,841	35,312	24,407	60,261	--	199,821
1999	72,385	46,510	26,899	44,202	--	189,996
2000	66,311	44,032	41,757	54,641	--	206,741
ANS Range[c]	Chinook 64,500–83,000	Sockeye 27,500–39,500	Coho 24,500–35,000	Chum 39,500–75,500	Pink	All salmon
2001	76,562	51,179	29,546	53,792	--	211,079
2002	79,820	31,533	40,139	82,916	--	234,408
2003	65,734	32,044	33,295	41,185	--	172,258
2004	94,125	37,318	44,513	61,182	--	237,138
2005	84,327	40,782	32,015	56,595	1,298	215,017
2006	89,083	42,113	40,518	87,254	2,174	261,142
2007	93,033	45,856	32,883	71,207	1,222	244,201
2008	86,679	50,711	44,167	62,034	1,022	244,613
2009	78,653	34,729	29,206	42,904	535	186,027
2010	65,830	36,866	33,097	42,567	558	178,918
2011	**61,158**	41,979	31,559	51,507	706	186,909
2012	**22,257**	46,089	27,844	77,994	2,002	176,186
ANS Range[d]	Chinook 67,200–109,800	Sockeye 32,200–58,700	Coho 27,400–57,600	Chum 41,200–116,400	Pink 500–2,000	All salmon
2013	**46,472**	38,351	**25,997**	52,230	650	163,700
2014	**10,270**	47,142	49,175	66,484	2,551	175,622
2015	**16,124**	36,781	33,939	**40,872**	1,168	128,884
2016	**30,693**	51,580	36,816	44,881	4,351	168,321
2017	**16,380**	48,462	37,786	52,589	2,098	157,315
2018	**22,264**	35,448	**19,981**	45,918	1,695	125,306
2019	**37,940**	48,745	31,167	**34,568**	864	153,284
2020	**35,868**	43,531	32,324	**26,992**	866	139,581
2021	**28,643**	44,534	**22,808**	**9,759**	742	106,486

-continued-

Table 4-1.–Page 2 of 2.

Source ADF&G Division of Subsistence, ASFDB 2021 (ADF&G 2021).

a. ANS ranges did not exist for the Kuskokwim River subsistence salmon fishery prior to 1993.

b. In 1993, ANS options were first specified for all salmon in the Kuskokwim River drainage.

c. In 2001, species-specific ANS determinations were made for all species of salmon, except for pink salmon, due to lack of available data.

d. In 2013, ANS determinations for the drainage were revised, and an ANS determination was made for pink salmon.

Note '-- indicates data not available.

Note Bold text indicates subsistence harvest below the lower bound of the ANS range.

in 2021 were similar in nature and frequency of response to those of 2020, although more households cited management decisions in 2021 compared to 2020.

In all communities throughout the Kuskokwim River drainage, some households may fish for and harvest salmon for multiple households within that community or outside of the community. Although a respondent may indicate that they met their own household's harvest goals for a specific species of salmon, it may also be true that the household was not able to meet harvest goals for the other households they fish for. Additionally, household harvest goals for specific species of salmon may have changed throughout the years for some households. For example, prior to intensive management initiatives, households may have intended to harvest a set number of Chinook and sockeye salmon. After not reaching those goals over the course of several seasons, a household may reevalaute its goals and adjust accordingly. Thus, although a household may have indicated that they met their harvest goals for a specific species of salmon in 2021, their answer does not necessarily reflect changes over time in a household's harvest goals.

The ability of Kuskokwim River drainage area families to achieve their subsistence salmon harvest goals each season is shaped by a variety of factors. Fishery management actions, equipment issues, and personal circumstances all affect annual salmon harvests. In addition, natural occurrences such as low run abundance, river conditions, or weather events affect harvests. Moreover, many fishers have attributed poor returns and subsequent poor harvests of Chinook and chum salmon to bycatch among high seas commercial fishing operations. Challenges associated with subsistence salmon harvests are not exclusive to families within any one particular portion of the drainage. Rather, these factors are common issues to families throughout much of the Kuskokwim River drainage.

ACKNOWLEDGEMENTS

Special thanks to all Kuskokwim drainage area households for their continued participation in this project. This work could not be done without your valuable input. Thanks to the Fisheries Resources Monitoring Program of the U.S. Fish and Wildlife Service Office of Subsistence Management, which provided funding for this cooperative research under the *Kuskokwim Area postseason subsistence harvest survey project*. The authors thank all tribal council administrators whose assistance in their communities was essential for staff to complete this project successfully in 2021. We also extend our gratitude to all local research assistants who supported department staff in data collection efforts in their home communities. A special thanks to Orutsararmiut Native Council (ONC) Fisheries Partner Biologist Danielle Lowrey and the ONC Bethel Fisheries Technicians survey team: Jeremy Lee, WG Anaruk, Trina Wassilie, Mary Hikkila, and Darren Evans. Lastly, thank you to ADF&G Fish and Wildlife Technicians Katherine "Kitty" Roush, Morgan Maconnell and Cassidy Somerville for all of their work contacting hundreds of households in over two dozen Kuskokwim Area communities.

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APPENDIX A–SALMON HARVEST ESTIMATES, 1990–2021

Table A1.–Chinook salmon harvest estimates, surveyed communities, Kuskokwim Management Area,1990–2021.

	Year																
Community	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Kongiganak[a]	1,559	729	929	680	1,281	1,095	1,108	1,376	1,128	1,153	1,285	1,612	1,349	2,003	2,663	1,536	1,729
North Kuskokwim Bay	1,559	729	929	680	1,281	1,095	1,108	1,376	1,128	1,153	1,285	1,612	1,349	2,003	2,663	1,536	1,729
Tuntutuliak	4,174	4,156	3,750	3,905	5,019	3,928	4,256	3,159	3,797	3,412	2,826	2,958	3,907	2,657	3,912	4,545	4,469
Eek	4,923	2,617	2,057	2,496	2,976	3,679	2,786	2,009	2,215	1,730	2,140	2,035	2,514	2,075	2,954	3,133	***2,501***
Kasigluk	3,300	2,875	***3,150***	***3,609***	***3,351***	***3,208***	***3,294***	***3,480***	***2,617***	***5,473***	***3,857***	***5,054***	***4,685***	***4,711***	7,859	***5,242***	***4,905***
Nunapitchuk	4,192	4,004	4,123	3,852	4,580	4,543	3,479	3,605	4,502	4,215	3,425	3,328	4,503	3,179	4,921	4,103	4,121
Atmautluak	2,895	1,661	1,239	1,715	1,856	2,016	1,752	1,648	1,397	1,372	1,191	754	1,479	547	2,153	1,927	***1,758***
Napakiak	4,427	2,573	4,147	3,822	3,355	3,515	3,842	2,908	3,436	2,265	2,073	2,408	2,702	2,438	2,839	3,060	5,125
Napaskiak	6,586	4,008	5,299	5,566	6,521	4,862	5,261	4,756	4,901	3,633	4,175	4,596	3,922	3,390	4,058	4,485	5,877
Oscarville	1,263	1,476	***1,501***	1,496	1,390	1,046	995	***1,056***	754	1,543	***1,259***	1,779	1,115	1,153	1,325	1,069	1,052
Bethel	34,925	18,041	22,220	19,800	31,251	32,463	32,116	20,100	24,877	22,751	20,629	24,684	22,892	24,584	29,443	28,293	27,805
Kwethluk	10,657	7,298	6,949	9,280	9,546	9,907	9,786	6,319	7,502	6,366	5,174	6,460	6,880	4,206	7,157	6,089	7,258
Akiachak	8,395	5,607	8,130	7,678	7,622	6,410	5,689	6,699	6,026	5,210	6,311	6,978	6,946	2,493	7,131	5,411	5,561
Akiak	5,966	3,168	3,452	4,478	4,653	4,401	4,851	3,196	2,943	2,377	2,335	3,528	3,390	3,905	3,775	3,860	4,423
Tuluksak	2,022	3,114	2,330	3,662	4,414	4,175	3,309	5,456	3,554	2,239	2,464	2,520	2,860	3,286	3,766	2,655	2,372
Lower Kuskokwim River	**93,725**	**60,598**	**68,347**	**71,359**	**86,534**	**84,153**	**81,416**	**64,391**	**68,521**	**62,586**	**57,859**	**67,082**	**67,795**	**58,624**	**81,293**	**73,872**	**77,228**
Lower Kalskag	2,946	4,022	2,338	3,603	4,087	4,541	3,513	3,103	1,954	1,726	1,691	2,432	1,535	1,556	1,991	1,417	3,494
Upper Kalskag	1,618	1,031	1,321	1,682	1,297	1,447	1,304	941	1,394	1,670	1,234	1,149	1,545	1,328	2,498	2,533	1,569
Aniak	3,589	3,562	3,976	4,651	3,714	3,506	3,343	3,640	3,466	2,603	3,100	2,684	4,576	1,837	3,022	1,977	2,412
Chuathbaluk	1,718	998	986	1,443	1,013	2,461	914	1,204	730	1,035	281	700	505	405	1,460	913	887
Middle Kuskokwim River	**9,871**	**9,613**	**8,621**	**11,379**	**10,111**	**11,955**	**9,074**	**8,888**	**7,544**	**7,034**	**6,306**	**6,965**	**8,161**	**5,126**	**8,971**	**6,840**	**8,362**

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Table A1.–Page 2 of 4.

Community	Year																
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Crooked Creek	971	916	583	707	1,126	874	890	963	768	702	592	689	859	582	946	948	736
Red Devil	297	154	400	449	409	412	359	404	243	141	95	174	293	31	156	181	232
Sleetmute	777	887	782	1,795	1,295	964	1,265	1,171	978	414	412	505	604	600	906	522	750
Stony River	574	614	247	445	391	534	596	874	***293***	46	***178***	167	415	118	688	***311***	***288***
Lime Village	399	70	***162***	40	195	180	***141***	57	241	145	69	251	***178***	34	69	***171***	***103***
McGrath	896	902	1,586	550	1,026	804	1,223	995	872	1,033	656	444	970	395	587	***910***	689
Takotna	74	0	***6***	0	0	***11***	***7***	***3***	2	0	0	5	10	***0***	16	***8***	0
Nikolai	635	337	818	426	449	938	398	212	380	284	144	280	535	***224***	493	***564***	696
Upper Kuskokwim River	**4,623**	**3,880**	**4,584**	**4,412**	**4,891**	**4,717**	**4,879**	**4,679**	**3,777**	**2,765**	**2,146**	**2,515**	**3,864**	**1,984**	**3,861**	**3,615**	**3,494**
Kuskokwim River Total[b]	**108,219**	**74,091**	**81,552**	**87,150**	**101,536**	**100,826**	**95,369**	**77,958**	**79,841**	**72,385**	**66,311**	**76,562**	**79,820**	**65,734**	**94,125**	**84,327**	**89,083**
Quinhagak	3,881	3,753	4,394	3,634	3,977	2,864	3,506	3,186	3,774	2,815	3,053	3,177	2,649	2,563	4,563	3,505	5,163
Goodnews Bay	358	852	548	590	672	789	392	441	735	759	564	863	723	807	863	869	713
Platinum	202	20	67	75	74	24	***41***	14	***57***	69	99	57	154	45	122	74	45
South Kuskokwim Bay	**4,441**	**4,625**	**5,009**	**4,299**	**4,723**	**3,677**	**3,939**	**3,641**	**4,566**	**3,643**	**3,716**	**4,097**	**3,526**	**3,415**	**5,548**	**4,448**	**5,921**
Kuskokwim Area Total	**114,219**	**79,445**	**87,490**	**92,129**	**107,540**	**105,598**	**100,417**	**82,975**	**85,535**	**77,181**	**71,312**	**82,271**	**84,695**	**71,152**	**102,336**	**90,311**	**96,733**

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Table A1.–Page 3 of 4.

Community	Year															Average	
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	5-yr	10-yr
Kongiganak[a]	***1,865***	2,233	1,243	1,456	1,208	***287***	***641***	***964***	–	–	–	–	–	–	–	–	–
North Kuskokwim Bay	**1,865**	**2,233**	**1,243**	**1,456**	**1,208**	**287**	**641**	**964**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
Tuntutuliak	4,614	***4,266***	3,067	3,261	3,032	1,123	2,448	***574***	1,668	1,963	1,459	2,178	2,102	2,322	2,173	2,047	1,801
Eek	***2,512***	***2,966***	1,982	1,761	1,378	1,004	1,188	665	850	1,460	825	706	1,323	1,999	1,091	1,189	1,111
Kasigluk	***5,167***	2,471	2,464	3,014	2,823	552	2,919	205	438	951	791	843	1,628	1,908	917	1,217	1,115
Nunapitchuk	4,661	***4,234***	3,468	2,548	3,559	845	2,563	287	1,051	1,695	761	1,389	1,975	1,750	1,277	1,430	1,359
Atmautluak	1,890	***1,298***	1,567	1,088	1,236	234	1,592	108	514	763	195	661	1,135	692	643	665	654
Napakiak	3,245	1,903	2,387	1,674	1,963	457	1,588	311	917	1,151	505	842	948	869	755	784	834
Napaskiak	6,392	4,555	5,372	4,333	3,360	1,108	2,939	422	816	1,535	858	1,079	2,551	1,036	2,110	1,527	1,445
Oscarville	1,360	1,351	754	618	694	51	585	68	120	208	122	123	238	360	105	190	198
Bethel	30,422	27,800	26,170	26,157	25,093	7,321	17,246	3,089	4,918	9,462	5,336	5,469	12,694	13,578	8,511	9,118	8,762
Kwethluk	6,466	8,451	7,130	4,440	2,467	1,709	3,192	959	900	1,731	1,019	1,518	2,679	1,869	1,799	1,777	1,738
Akiachak	7,621	9,719	7,361	4,470	3,852	2,862	3,585	1,033	1,103	3,438	1,415	2,520	3,443	2,516	2,827	2,544	2,474
Akiak	4,297	4,090	3,247	3,625	2,455	***1,218***	1,449	530	610	1,274	694	1,249	1,454	1,245	2,264	1,381	1,199
Tuluksak	***3,266***	2,937	3,212	2,057	1,230	651	732	404	231	709	511	705	1,026	919	882	809	677
Lower Kuskokwim River	**81,914**	**76,040**	**68,181**	**59,046**	**53,142**	**19,135**	**42,026**	**8,655**	**14,136**	**26,340**	**14,491**	**19,282**	**33,196**	**31,063**	**25,354**	**24,677**	**23,368**
Lower Kalskag	1,937	1,748	2,525	1,030	1,260	459	744	283	351	578	260	474	1,000	685	513	586	535
Upper Kalskag	1,383	2,435	1,696	1,496	1,772	562	1,317	258	334	838	190	638	746	860	454	578	620
Aniak	3,417	3,100	2,130	2,262	2,214	993	1,440	344	542	1,293	718	803	1,315	1,544	1,325	1,141	1,032
Chuathbaluk	***973***	772	877	551	409	103	155	90	90	203	100	216	340	317	180	231	179
Middle Kuskokwim River	**7,710**	**8,055**	**7,228**	**5,339**	**5,655**	**2,117**	**3,656**	**975**	**1,317**	**2,912**	**1,268**	**2,131**	**3,401**	**3,406**	**2,472**	**2,536**	**2,366**

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Table A1.–Page 4 of 4.

Community	Year															Average	
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	5-yr	10-yr
Crooked Creek	***647***	488	608	240	402	124	***145***	35	78	384	110	144	289	238	153	187	170
Red Devil	301	148	258	33	186	225	77	83	52	69	38	10	69	45	55	43	72
Sleetmute	861	933	693	272	242	132	96	58	137	169	36	76	133	176	140	112	115
Stony River	***530***	514	704	189	134	***151***	51	24	25	33	109	53	***90***	***95***	137	97	77
Lime Village[a]	***95***	***29***	***75***	***47***	***118***	29	***43***	***32***	_	35	33	10	37	***32***	***12***	25	29
McGrath	495	288	600	262	829	68	95	173	75	384	118	239	375	439	83	251	205
Takotna	***10***	***0***	***8***	***0***	0	***0***	***0***	***0***	3	0	0	2	***4***	7	0	3	2
Nikolai	***471***	184	298	402	450	276	283	235	301	367	177	317	346	367	237	289	291
Upper Kuskokwim River	**3,409**	**2,584**	**3,244**	**1,445**	**2,361**	**1,005**	**790**	**640**	**671**	**1,441**	**621**	**851**	**1,343**	**1,399**	**817**	**1,006**	**958**
Kuskokwim River Total[b]	**93,033**	**86,679**	**78,653**	**65,830**	**61,158**	**22,257**	**46,472**	**10,270**	**16,124**	**30,693**	**16,380**	**22,264**	**37,940**	**35,868**	**28,643**	**28,219**	**26,691**
Quinhagak	4,686	3,125	3,312	2,793	2,588	2,396	3,143	3,723	3,082	4,822	5,217	3,592	5,690	4,757	2,728	4,397	3,915
Goodnews Bay	647	898	569	480	834	389	413	431	220	654	457	555	864	766	388	606	514
Platinum	***66***	42	61	17	62	24	39	46	11	99	96	67	142	84	78	93	69
South Kuskokwim Bay	**5,399**	**4,065**	**3,942**	**3,290**	**3,484**	**2,809**	**3,595**	**4,200**	**3,313**	**5,575**	**5,770**	**4,214**	**6,696**	**5,607**	**3,194**	**5,096**	**4,497**
Kuskokwim Area Total	**100,297**	**92,977**	**83,838**	**70,576**	**65,850**	**25,353**	**50,708**	**15,434**	**19,437**	**36,268**	**22,150**	**26,478**	**44,636**	**41,475**	**31,837**	**33,315**	**31,378**

Source ADF&G Division of Subsistence household surveys, 2021.

Note Bold, italic text indicates Bayesian estimates.

a. Dashes indicate that harvest was not estimated and could not be generated using Bayesian imputation due to lack of data.

b. Kuskokwim River Total includes the lower Kuskokwim River, middle Kuskokwim River, and upper Kuskokwim River.

Table A2.–Chum salmon harvest estimates, surveyed communities, Kuskokwim Management Area,1990–2021.

Community	Year																
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Kongiganak[a]	1,009	978	1,584	708	1,414	1,269	1,763	753	1,579	1,049	1,839	2,399	3,247	897	2,958	1,960	2,420
North Kuskokwim Bay	1,009	978	1,584	708	1,414	1,269	1,763	753	1,579	1,049	1,839	2,399	3,247	897	2,958	1,960	2,420
Tuntutuliak	6,592	4,697	6,245	3,325	5,346	3,509	6,119	2,435	3,640	1,709	2,622	2,585	4,150	1,288	2,546	3,568	4,024
Eek	3,014	790	1,324	250	591	899	999	556	795	484	636	402	1,228	578	688	877	***1,075***
Kasigluk	3,877	3,013	***4,076***	***2,522***	***2,663***	***2,774***	***4,047***	***1,951***	***2,543***	***4,777***	4,689	***5,158***	***5,513***	***3,581***	5,064	***4,194***	***5,461***
Nunapitchuk	6,448	5,840	9,195	4,895	4,560	4,264	6,255	2,465	4,885	4,428	4,865	4,724	8,002	2,865	5,053	4,167	5,150
Atmautluak	4,676	2,241	2,614	1,300	1,420	3,768	2,660	1,395	1,875	1,552	1,848	1,397	2,514	849	2,271	1,940	*2,337*
Napakiak	9,714	2,351	5,474	2,269	3,819	2,820	4,352	1,430	3,605	1,495	2,859	1,793	3,421	1,560	2,328	3,238	8,143
Napaskiak	11,334	6,703	7,817	3,653	5,797	4,137	6,200	2,318	3,771	2,529	2,757	2,364	4,010	2,061	2,705	2,205	4,323
Oscarville	1,400	1,147	*1,598*	561	676	740	1,548	*348*	378	1,530	*1,237*	1,831	1,319	804	828	686	1,151
Bethel	34,257	16,781	17,231	8,608	15,722	17,416	21,706	8,078	12,522	9,918	10,149	10,757	17,731	11,452	13,448	14,273	20,953
Kwethluk	11,451	5,714	8,001	3,499	6,340	6,114	12,043	3,266	4,508	3,582	5,232	4,601	8,019	2,294	4,288	4,328	6,328
Akiachak	10,565	5,921	9,532	3,308	5,998	3,992	5,019	1,615	2,218	2,696	4,719	3,170	5,173	2,650	3,880	2,428	4,333
Akiak	9,226	6,575	6,679	7,577	4,483	2,007	4,967	1,639	1,894	1,210	2,617	2,240	2,571	2,928	3,499	3,528	3,095
Tuluksak	5,863	5,454	4,632	3,774	2,395	2,698	3,208	2,790	3,044	1,480	2,492	2,068	3,719	894	2,433	2,183	3,094
Lower Kuskokwim River	**118,417**	**67,227**	**84,418**	**45,541**	**59,810**	**55,138**	**79,123**	**30,286**	**45,678**	**37,390**	**46,722**	**43,090**	**67,370**	**33,804**	**49,031**	**47,615**	**69,466**
Lower Kalskag	4,980	2,958	2,807	2,938	2,856	1,438	4,070	1,298	968	733	1,534	1,498	1,445	1,087	1,316	997	4,703
Upper Kalskag	1,406	3,139	3,040	591	836	1,326	1,565	349	464	649	1,550	1,502	2,460	516	1,656	1,201	2,469
Aniak	10,160	3,511	7,687	2,926	2,538	3,454	8,569	1,678	4,964	1,753	1,933	1,934	4,367	820	2,535	2,952	3,722
Chuathbaluk	4,408	2,138	2,644	2,879	1,495	1,701	2,175	1,135	925	698	654	2,711	1,458	2,502	2,352	530	1,451
Middle Kuskokwim River	20,954	11,746	16,178	9,334	7,725	7,919	16,379	4,460	7,321	3,833	5,671	7,645	9,730	4,925	7,859	5,680	12,345

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Table A2.–Page 2 of 4.

Community	Year																
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Crooked Creek	2,977	1,326	1,242	664	757	332	355	313	2,527	830	809	1,211	1,417	750	1,583	1,064	1,513
Red Devil	1,613	1,133	1,500	927	1,318	882	727	499	462	169	54	334	384	63	135	214	41
Sleetmute	2,006	1,880	2,961	692	1,520	1,683	1,250	417	870	340	371	379	1,293	468	1,054	422	1,475
Stony River	1,234	638	1,165	775	881	1,311	443	600	*395*	296	***320***	172	696	361	754	***324***	***790***
Lime Village	2,350	830	***1,299***	497	1,600	789	***306***	244	964	1,015	451	651	***869***	110	199	***573***	***316***
McGrath	2,326	1,083	4,472	578	1,264	1,525	211	138	1,510	242	188	247	969	513	290	***470***	999
Takotna	64	0	***15***	0	6	***1***	***0***	***0***	15	0	0	10	1	***0***	0	***4***	0
Nikolai	875	396	914	334	293	297	229	60	519	87	56	53	187	***191***	277	***230***	308
Upper Kuskokwim River	**13,445**	**7,286**	**13,568**	**4,467**	**7,639**	**6,820**	**3,521**	**2,271**	**7,262**	**2,979**	**2,249**	**3,057**	**5,816**	**2,456**	**4,292**	**3,301**	**5,442**
Kuskokwim River Total[b]	**152,816**	**86,259**	**114,164**	**59,342**	**75,174**	**69,877**	**99,023**	**37,017**	**60,261**	**44,202**	**54,641**	**53,792**	**82,916**	**41,185**	**61,182**	**56,595**	**87,254**
Quinhagak	3,161	1,631	2,287	1,053	1,401	669	943	572	1,375	1,587	895	808	2,011	559	1,383	994	2,754
Goodnews Bay	200	136	1,311	177	406	140	221	135	295	232	251	187	349	200	240	192	555
Platinum	149	4	137	0	51	3	*26*	0	*51*	33	82	60	95	19	42	21	108
South Kuskokwim Bay	**3,510**	**1,771**	**3,735**	**1,230**	**1,858**	**812**	**1,190**	**707**	**1,721**	**1,852**	**1,228**	**1,055**	**2,455**	**778**	**1,665**	**1,207**	**3,417**
Kuskokwim Area Total	**157,335**	**89,008**	**119,483**	**61,280**	**78,446**	**71,958**	**101,975**	**38,477**	**63,561**	**47,103**	**57,708**	**57,246**	**88,618**	**42,860**	**65,805**	**59,762**	**93,091**

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Table A2.–Page 3 of 4.

Community	Year															Average	
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	5-yr	10-yr
Kongiganak[a]	***2,353***	1,755	1,420	2,522	2,809	***1,638***	***1,397***	***1,915***	–	–	–	–	–	–	–	–	–
North Kuskokwim Bay	**2,353**	**1,755**	**1,420**	**2,522**	**2,809**	**1,638**	**1,397**	**1,915**	–	–	–	–	–	–	–	–	–
Tuntutuliak	3,350	***3,375***	3,330	2,439	1,865	2,614	2,180	***2,967***	2,143	1,673	2,158	2,739	2,290	1,261	739	1,837	2,076
Eek	***783***	***788***	782	721	486	1,552	1,232	1,182	1,023	681	762	809	315	475	316	535	835
Kasigluk	***4,309***	1,502	1,857	2,338	2,029	3,261	2,197	3,612	2,080	1,485	2,360	2,312	2,007	2,697	744	2,024	2,276
Nunapitchuk	6,619	***4,705***	3,468	3,223	4,257	5,312	2,977	5,213	3,631	2,422	5,035	4,058	2,721	2,384	496	2,939	3,425
Atmautluak	2,193	***2,177***	1,665	1,386	1,864	2,701	2,409	3,327	2,165	1,609	2,090	2,509	1,502	957	219	1,455	1,949
Napakiak	3,628	1,313	1,638	1,759	1,546	1,711	1,185	2,392	1,508	2,091	1,726	1,959	1,386	879	208	1,232	1,505
Napaskiak	3,032	2,400	1,451	3,110	1,783	3,216	2,589	3,171	2,173	1,901	2,355	2,402	2,045	1,246	766	1,763	2,186
Oscarville	932	847	534	352	402	599	490	599	350	240	261	553	386	502	27	346	401
Bethel	16,540	15,853	10,055	9,575	15,324	26,872	12,506	18,017	10,958	13,494	17,780	9,385	10,493	7,983	3,153	9,759	13,064
Kwethluk	6,291	5,729	4,111	3,112	3,484	3,849	3,825	4,318	2,230	2,326	4,501	2,994	1,805	1,703	706	2,342	2,826
Akiachak	4,782	6,856	2,872	2,856	3,205	4,150	3,417	4,744	2,085	2,176	3,311	3,897	1,652	1,318	707	2,177	2,746
Akiak	4,141	3,522	1,350	1,163	2,421	*2,925*	2,212	2,982	2,348	5,803	3,026	3,299	2,033	1,452	743	2,111	2,682
Tuluksak	***3,202***	2,920	1,570	3,180	2,697	***2,585***	3,062	2,274	1,747	2,698	2,408	2,623	1,738	987	349	1,621	2,047
Lower Kuskokwim River	**59,803**	**51,988**	**34,683**	**35,214**	**41,363**	**61,347**	**40,281**	**54,798**	**34,441**	**38,599**	**47,773**	**39,539**	**30,373**	**23,844**	**9,173**	**30,140**	**38,017**
Lower Kalskag	1,997	1,004	930	691	1,643	3,284	1,214	1,458	1,233	624	1,019	1,081	369	624	86	636	1,099
Upper Kalskag	294	2,432	329	391	1,599	1,930	1,534	1,038	642	1,055	204	883	147	295	89	324	782
Aniak	4,108	2,830	2,602	2,515	2,391	5,667	2,880	4,695	1,395	2,422	1,604	1,822	2,038	658	235	1,271	2,342
Chuathbaluk	***1,541***	593	937	535	686	796	935	805	342	347	606	872	190	291	51	402	524
Middle Kuskokwim River	**7,940**	**6,859**	**4,798**	**4,132**	**6,319**	**11,677**	**6,563**	**7,996**	**3,612**	**4,448**	**3,433**	**4,658**	**2,744**	**1,868**	**461**	**2,633**	**4,746**

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Table A2.–Page 4 of 4.

Community	Year															Average	
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	5-yr	10-yr
Crooked Creek	***813***	352	519	539	862	610	***1,803***	391	383	831	374	295	553	179	28	286	545
Red Devil	186	188	244	122	434	516	981	284	48	129	121	72	23	25	5	49	220
Sleetmute	818	373	367	524	689	1,004	542	633	337	268	147	142	115	25	23	90	324
Stony River	***540***	1,247	771	338	516	***491***	27	89	44	14	109	0	***128***	***44***	42	65	99
Lime Village[a]	***419***	***297***	***405***	***314***	***499***	***419***	***909***	***295***	_	232	135	175	90	***112***	***21***	107	265
McGrath	464	676	825	944	476	885	598	642	7	150	145	706	518	864	0	447	452
Takotna	***0***	***0***	***0***	***0***	0	***0***	***12***	***0***	0	5	0	0	***0***	0	0	0	2
Nikolai	***223***	54	292	440	349	1,044	513	1,356	2,000	205	352	331	24	31	6	149	586
Upper Kuskokwim River	**3,464**	**3,187**	**3,423**	**3,221**	**3,825**	**4,970**	**5,386**	**3,690**	**2,819**	**1,834**	**1,383**	**1,721**	**1,451**	**1,280**	**125**	**1,192**	**2,466**
Kuskokwim River Total[b]	**71,207**	**62,034**	**42,904**	**42,567**	**51,507**	**77,994**	**52,230**	**66,484**	**40,872**	**44,881**	**52,589**	**45,918**	**34,568**	**26,992**	**9,759**	**33,965**	**45,229**
Quinhagak	2,249	1,794	1,557	1,347	1,255	2,001	1,958	1,959	691	848	1,592	1,575	721	829	842	1,112	1,302
Goodnews Bay	395	586	138	324	349	322	153	268	197	219	90	147	114	146	26	105	168
Platinum	***77***	106	28	37	70	76	90	62	16	78	188	203	246	69	63	154	109
South Kuskokwim Bay	**2,720**	**2,486**	**1,723**	**1,708**	**1,674**	**2,399**	**2,201**	**2,289**	**904**	**1,145**	**1,870**	**1,925**	**1,081**	**1,044**	**931**	**1,370**	**1,579**
Kuskokwim Area Total	**76,281**	**66,275**	**46,047**	**46,797**	**55,990**	**82,030**	**55,828**	**70,687**	**41,776**	**46,026**	**54,459**	**47,843**	**35,649**	**28,036**	**10,690**	**35,335**	**47,302**

Source ADF&G Division of Subsistence household surveys, 2021.

Note Bold, italic text indicates Bayesian estimates.

a. Dashes indicate that harvest was not estimated and could not be generated using Bayesian imputation due to lack of data.

b. Kuskokwim River Total includes the lower Kuskokwim River, middle Kuskokwim River, and upper Kuskokwim River.

Table A3.–Sockeye salmon harvest estimates, surveyed communities, Kuskokwim Management Area,1990–2021.

	Year																
Community	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Kongiganak[a]	552	498	923	583	743	658	951	976	878	908	1,770	1,546	1,347	929	1,809	1,103	1,464
North Kuskokwim Bay	552	498	923	583	743	658	951	976	878	908	1,770	1,546	1,347	929	1,809	1,103	1,464
Tuntutuliak	2,132	1,768	1,846	1,063	3,289	1,082	1,561	1,724	1,227	2,070	1,180	1,702	1,045	1,148	1,620	2,145	1,834
Eek	1,293	479	669	363	452	308	526	503	375	595	883	1,085	759	586	567	1,033	***684***
Kasigluk	843	1,376	***1,690***	***1,608***	***976***	***1,179***	***1,127***	***1,315***	***1,012***	***3,287***	3,805	***3,213***	***2,111***	***2,429***	1,668	***1,634***	***2,248***
Nunapitchuk	1,520	2,193	2,329	2,743	1,633	870	1,877	2,082	2,029	3,258	2,194	2,529	1,500	1,714	1,659	1,821	1,871
Atmautluak	1,696	830	1,193	1,313	837	1,173	1,408	681	982	1,743	1,540	988	1,150	679	1,103	1,444	***1,012***
Napakiak	1,548	1,187	1,663	1,217	1,533	887	1,106	1,526	1,487	2,018	1,916	1,917	1,688	1,453	1,351	2,122	1,845
Napaskiak	1,660	2,850	3,116	3,508	1,933	1,573	3,180	2,209	1,457	1,929	2,525	3,377	1,296	1,643	1,148	1,344	1,784
Oscarville	287	726	***938***	957	398	301	208	***442***	249	1,724	***1,115***	1,451	400	806	436	278	778
Bethel	11,787	11,428	9,225	9,501	11,370	8,802	10,556	10,233	8,464	12,094	11,613	14,264	8,850	12,198	11,679	14,297	12,816
Kwethluk	4,271	3,746	1,958	3,802	3,864	2,536	3,963	3,288	3,785	3,485	3,859	4,191	2,100	1,903	3,302	2,457	2,770
Akiachak	3,461	4,029	3,970	4,990	3,241	1,942	2,767	2,737	2,395	3,066	3,687	4,680	2,507	1,607	3,109	2,372	2,661
Akiak	1,873	1,696	1,769	3,537	1,740	809	1,544	1,327	1,640	1,151	1,036	2,005	1,214	995	1,258	1,920	2,000
Tuluksak	1,225	3,427	2,063	2,452	1,390	1,270	1,108	1,514	1,413	1,412	2,201	1,862	1,205	875	1,670	987	2,247
Lower Kuskokwim River	**33,596**	**35,735**	**32,428**	**37,054**	**32,656**	**22,732**	**30,931**	**29,581**	**26,515**	**37,832**	**37,554**	**43,264**	**25,825**	**28,036**	**30,570**	**33,854**	**34,550**
Lower Kalskag	1,007	1,080	503	2,286	989	679	1,387	1,277	546	583	824	918	347	515	775	439	1,434
Upper Kalskag	284	314	354	346	288	82	284	216	238	586	588	319	508	431	686	945	563
Aniak	1,539	2,073	1,213	1,609	751	955	1,295	1,078	1,132	1,302	1,136	2,167	1,059	756	996	1,015	692
Chuathbaluk	1,157	1,471	497	822	924	465	687	796	223	441	476	614	313	274	526	369	508
Middle Kuskokwim River	**3,987**	**4,938**	**2,567**	**5,063**	**2,952**	**2,181**	**3,653**	**3,367**	**2,139**	**2,912**	**3,024**	**4,018**	**2,227**	**1,976**	**2,983**	**2,768**	**3,197**

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Table A3.–Page 2 of 4.

Community	Year																
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Crooked Creek	1,607	968	738	752	558	177	311	350	717	710	514	640	449	571	732	693	544
Red Devil	455	391	355	662	336	576	914	637	692	497	109	360	109	309	88	272	510
Sleetmute	1,153	1,347	794	1,643	1,120	1,109	1,341	1,458	1,282	879	725	1,008	706	504	980	673	1,181
Stony River	933	1,966	1,389	1,485	758	1,281	1,267	1,626	***1,023***	1,018	***654***	163	602	158	896	***688***	***746***
Lime Village	2,125	1,110	***1,304***	2,743	1,733	857	***1,225***	642	2,782	2,619	1,409	1,453	***1,186***	374	874	***1,368***	***1,216***
McGrath	1,489	416	2,494	1,465	1,501	1,652	111	52	146	0	43	273	407	112	194	***454***	149
Takotna	0	0	***1***	0	0	***2***	***1***	***1***	0	0	0	0	0	***1***	0	***1***	0
Nikolai	0	1	0	5	25	65	23	0	16	43	0	0	22	***2***	1	***10***	20
Upper Kuskokwim River	**7,762**	**6,199**	**7,075**	**8,755**	**6,031**	**5,719**	**5,193**	**4,766**	**6,658**	**5,766**	**3,454**	**3,897**	**3,481**	**2,031**	**3,765**	**4,160**	**4,365**
Kuskokwim River Total[b]	**45,345**	**46,872**	**42,070**	**50,872**	**41,639**	**30,632**	**39,777**	**37,714**	**35,312**	**46,510**	**44,032**	**51,179**	**31,533**	**32,044**	**37,318**	**40,782**	**42,113**
Quinhagak	1,710	1,818	1,448	1,228	962	597	499	460	1,368	1,433	1,368	1,054	909	805	1,375	1,745	3,128
Goodnews Bay	982	1,061	1,293	733	646	202	387	480	499	715	951	908	855	705	873	1,213	995
Platinum	163	134	238	48	90	32	***56***	143	***80***	106	188	83	257	64	183	90	63
South Kuskokwim Bay	**2,855**	**3,013**	**2,979**	**2,009**	**1,698**	**831**	**942**	**1,083**	**1,947**	**2,254**	**2,507**	**2,045**	**2,021**	**1,574**	**2,431**	**3,048**	**4,186**
Kuskokwim Area Total	**48,752**	**50,383**	**45,972**	**53,464**	**44,080**	**32,121**	**41,669**	**39,773**	**38,137**	**49,672**	**48,309**	**54,770**	**34,901**	**34,547**	**41,558**	**44,933**	**47,763**

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Table A3.–Page 3 of 4.

Community	Year															Average	
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	5-yr	10-yr
Kongiganak[a]	***960***	1,502	1,018	1,869	1,266	***1,307***	***1,031***	***1,230***	–	–	–	–	–	–	–	–	–
North Kuskokwim Bay	**960**	**1,502**	**1,018**	**1,869**	**1,266**	**1,307**	**1,031**	**1,230**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
Tuntutuliak	1,763	***2,120***	932	2,068	1,274	1,516	1,183	***1,774***	1,999	1,707	1,438	1,978	1,969	1,839	2,571	1,959	1,797
Eek	***558***	***834***	1,019	1,241	664	1,490	1,319	1,450	1,111	888	1,266	1,138	1,048	1,422	1,505	1,276	1,264
Kasigluk	***1,786***	1,041	1,215	1,441	1,269	1,451	1,470	1,990	1,442	1,543	1,703	1,448	2,416	2,701	2,020	2,058	1,818
Nunapitchuk	2,147	***2,549***	1,538	1,902	2,223	2,396	1,806	2,059	2,851	2,508	1,570	1,532	3,273	2,609	3,166	2,430	2,377
Atmautluak	1,041	***1,250***	624	731	827	1,623	1,316	1,531	1,173	1,562	1,535	1,621	2,093	1,055	2,394	1,740	1,590
Napakiak	1,962	1,244	917	1,183	1,351	1,141	1,105	1,573	1,179	2,132	916	1,336	1,688	1,503	1,241	1,337	1,381
Napaskiak	1,738	2,620	1,579	1,979	1,587	2,065	2,069	2,514	2,022	2,086	1,404	1,980	3,029	1,708	3,968	2,418	2,285
Oscarville	712	677	332	250	228	323	347	679	282	329	260	234	541	497	212	349	370
Bethel	13,902	15,247	11,272	11,103	16,946	18,282	12,616	14,828	11,951	16,730	17,477	8,127	17,608	16,912	13,454	14,716	14,799
Kwethluk	3,536	4,920	2,432	2,534	2,357	2,884	2,705	5,921	1,955	2,464	3,257	2,233	2,381	2,518	2,309	2,540	2,863
Akiachak	3,269	4,354	2,407	2,433	2,647	3,443	2,594	3,047	2,551	2,726	3,316	2,848	2,770	2,126	3,836	2,979	2,926
Akiak	3,695	2,881	1,290	1,161	2,576	***1,818***	1,731	2,418	1,855	3,772	3,398	2,757	2,248	1,595	1,922	2,384	2,351
Tuluksak	***1,845***	2,133	1,691	2,483	1,699	1,380	1,541	622	1,037	1,249	1,256	1,231	1,074	870	1,110	1,108	1,137
Lower Kuskokwim River	**37,955**	**41,869**	**27,248**	**30,509**	**35,648**	**39,812**	**31,802**	**40,406**	**31,408**	**39,696**	**38,796**	**28,463**	**42,138**	**37,355**	**39,708**	**37,292**	**36,958**
Lower Kalskag	780	1,583	1,044	507	802	891	977	1,040	487	284	630	695	348	427	521	524	630
Upper Kalskag	417	1,000	369	460	938	770	662	839	718	1,176	509	516	426	661	217	466	649
Aniak	1,261	1,585	923	1,165	1,168	1,375	1,466	1,578	2,407	8,380	5,277	3,500	3,235	1,723	1,463	3,040	3,040
Chuathbaluk	***484***	363	564	403	300	297	480	481	382	210	631	466	328	280	274	396	383
Middle Kuskokwim River	**2,942**	**4,531**	**2,900**	**2,535**	**3,208**	**3,333**	**3,585**	**3,938**	**3,994**	**10,050**	**7,047**	**5,177**	**4,337**	**3,091**	**2,475**	**4,425**	**4,703**

-continued-

Table A3.–Page 4 of 4.

Community	Year															Average	
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	5-yr	10-yr
Crooked Creek	***523***	220	329	302	243	234	***514***	391	303	264	508	297	687	678	328	500	420
Red Devil	318	359	477	475	502	511	270	151	88	238	206	137	67	118	98	125	188
Sleetmute	1,303	1,164	684	1,024	693	715	362	541	497	458	514	511	638	816	687	633	574
Stony River	***1,019***	1,476	977	372	303	***469***	447	137	91	95	138	92	***357***	***627***	726	388	318
Lime Village[a]	***1,406***	***659***	***1,080***	***932***	***739***	***780***	***831***	***888***	–	541	325	224	420	***545***	***255***	354	534
McGrath	375	417	965	650	630	233	538	451	0	199	892	507	71	291	229	398	341
Takotna	***1***	***3***	***3***	***2***	***0***	***2***	***2***	***3***	0	5	1	0	***0***	0	0	0	1
Nikolai	***14***	13	66	65	13	0	0	236	400	34	35	40	30	10	28	29	81
Upper Kuskokwim River	**4,960**	**4,310**	**4,581**	**3,822**	**3,123**	**2,945**	**2,964**	**2,798**	**1,379**	**1,834**	**2,619**	**1,808**	**2,270**	**3,085**	**2,351**	**2,427**	**2,405**
Kuskokwim River Total[b]	**45,856**	**50,711**	**34,729**	**36,866**	**41,979**	**46,089**	**38,351**	**47,142**	**36,781**	**51,580**	**48,462**	**35,448**	**48,745**	**43,531**	**44,534**	**44,144**	**44,066**
Quinhagak	1,755	2,097	1,960	1,719	1,582	2,015	2,158	2939	1065	1,691	3,850	2,622	2,537	2,000	3,170	2,836	2,405
Goodnews Bay	920	1,739	902	1,093	1,328	1,197	1,113	1370	797	975	677	777	1,201	941	1,684	1,056	1,073
Platinum	***121***	156	186	175	135	173	181	349	148	381	533	210	409	358	660	434	340
South Kuskokwim Bay	2,796	3,992	3,048	2,987	3,045	3,385	3,452	4,658	2,010	3,047	5,060	3,609	4,147	3,299	5,514	4,326	3,818
Kuskokwim Area Total	**49,613**	**56,205**	**38,795**	**41,722**	**46,290**	**50,781**	**42,834**	**53,030**	**38,791**	**54,627**	**53,522**	**39,057**	**52,892**	**46,830**	**50,048**	**48,470**	**48,241**

Source ADF&G Division of Subsistence household surveys, 2021.

Note Bold, italic text indicates Bayesian estimates.

a. Dashes indicate that harvest was not estimated and could not be generated using Bayesian imputation due to lack of data.

b. Kuskokwim River Total includes the lower Kuskokwim River, middle Kuskokwim River, and upper Kuskokwim River.

Table A4.–Coho salmon harvest estimates, surveyed communities, Kuskokwim Management Area,1990–2021.

	Year																
Community	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Kongiganak[a]	474	490	605	448	569	662	579	514	204	203	339	919	1,138	236	937	740	657
North Kuskokwim Bay	**474**	**490**	**605**	**448**	**569**	**662**	**579**	**514**	**204**	**203**	**339**	**919**	**1,138**	**236**	**937**	**740**	**657**
Tuntutuliak	1,287	733	693	820	364	339	1,335	558	858	277	3,264	335	1,239	2,092	1,189	1,074	948
Eek	1,800	387	502	160	399	387	437	63	314	242	493	241	821	747	1,018	378	***773***
Kasigluk	922	1,723	***1,388***	***372***	***532***	***90***	***519***	***170***	***330***	***3,906***	9,726	***1,058***	***2,195***	***1,762***	5,034	***1,304***	***3,070***
Nunapitchuk	746	1,131	2,242	318	749	629	1,444	732	345	368	355	425	821	627	555	807	692
Atmautluak	398	237	333	380	402	634	534	485	283	190	227	375	612	283	744	530	***254***
Napakiak	1,470	599	1,570	586	871	344	602	161	739	459	453	667	793	992	1,648	742	2,363
Napaskiak	1,139	798	1,108	780	2,016	584	506	592	488	316	836	455	717	983	655	602	1,640
Oscarville	57	147	***151***	0	48	0	15	***0***	0	779	***216***	90	161	19	304	60	175
Bethel	32,988	17,677	24,908	12,310	17,082	22,007	21,982	17,077	12,058	11,565	13,478	14,108	15,489	15,062	17,040	12,994	18,810
Kwethluk	3,928	2,311	2,419	1,809	1,880	1,690	2,995	1,104	1,583	2,883	3,435	1,773	2,706	1,787	3,430	3,048	1,245
Akiachak	1,910	2,337	3,058	1,102	1,281	628	903	383	409	662	2,555	1,912	1,690	1,627	2,397	1,817	1,714
Akiak	1,789	2,193	1,072	1,373	1,099	481	920	798	521	259	479	594	1,136	1,094	1,342	1,847	379
Tuluksak	978	1,854	1,629	408	223	522	1,175	418	812	298	520	1,136	1,349	921	1,007	484	498
Lower Kuskokwim River	**49,412**	**32,127**	**41,074**	**20,418**	**26,946**	**28,335**	**33,367**	**22,541**	**18,740**	**22,204**	**36,037**	**23,169**	**29,729**	**27,996**	**36,363**	**25,687**	**32,561**
Lower Kalskag	445	500	526	823	881	715	1,246	572	345	285	403	597	281	314	368	319	1,415
Upper Kalskag	346	527	972	353	178	257	348	661	834	155	286	536	1,069	462	1,500	594	1,799
Aniak	1,669	1,171	1,933	1,104	1,768	1,244	2,723	1,428	1,284	1,419	1,911	2,006	3,737	1,164	2,355	2,032	1,018
Chuathbaluk	826	87	368	366	741	79	409	196	50	138	462	733	610	259	284	346	727
Middle Kuskokwim River	**3,286**	**2,285**	**3,799**	**2,646**	**3,568**	**2,295**	**4,726**	**2,857**	**2,513**	**1,997**	**3,062**	**3,872**	**5,697**	**2,199**	**4,507**	**3,291**	**4,959**

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Table A4.–Page 2 of 4.

Community	Year																
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Crooked Creek	922	279	712	396	646	358	175	261	394	529	137	97	440	375	713	312	401
Red Devil	914	1,038	1,284	1,673	1,074	1,539	1,135	1,455	504	424	161	426	499	351	65	331	171
Sleetmute	1,036	1,588	937	912	626	1,104	870	419	267	210	525	428	806	731	505	581	671
Stony River	474	513	727	511	477	1,023	529	455	***378***	423	***348***	397	662	214	679	***468***	***322***
Lime Village	486	390	***345***	606	1,467	223	***607***	270	776	701	556	559	***680***	46	231	***372***	***132***
McGrath	466	477	2,146	563	998	604	824	745	734	338	881	436	1,508	997	1,228	***799***	894
Takotna	0	0	***4***	0	0	***6***	***6***	***2***	3	0	20	31	25	***6***	51	***8***	0
Nikolai	90	65	204	285	94	499	36	130	97	73	30	131	93	***379***	171	***166***	407
Upper Kuskokwim River	**4,388**	**4,350**	**6,358**	**4,946**	**5,382**	**5,356**	**4,182**	**3,737**	**3,153**	**2,698**	**2,658**	**2,505**	**4,713**	**3,099**	**3,643**	**3,037**	**2,998**
Kuskokwim River Total[b]	**57,086**	**38,762**	**51,231**	**28,010**	**35,896**	**35,986**	**42,275**	**29,135**	**24,407**	**26,899**	**41,757**	**29,546**	**40,139**	**33,295**	**44,513**	**32,015**	**40,518**
Quinhagak	3,799	3,230	3,291	2,029	2,544	2,480	1,734	1,105	1,537	1,781	1,042	1,719	1,133	1,868	1,435	1,558	1,315
Goodnews Bay	1,630	1,704	1,671	1,118	428	268	330	348	323	421	380	548	198	1,228	1,542	634	605
Platinum	95	36	290	27	87	11	***46***	55	***75***	147	100	118	96	144	266	223	116
South Kuskokwim Bay	5,524	4,970	5,252	3,174	3,059	2,759	2,110	1,508	1,935	2,349	1,522	2,385	1,427	3,240	3,243	2,415	2,036
Kuskokwim Area Total	**63,084**	**44,222**	**57,088**	**31,632**	**39,524**	**39,407**	**44,964**	**31,157**	**26,546**	**29,451**	**43,618**	**32,850**	**42,704**	**36,771**	**48,693**	**35,170**	**43,211**

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Table A4.–Page 3 of 4.

Community	Year															Average	
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	5-yr	10-yr
Kongiganak[a]	***883***	557	561	483	613	***356***	***412***	***561***	–	–	–	–	–	–	–	–	–
North Kuskokwim Bay	**883**	**557**	**561**	**483**	**613**	**356**	**412**	**561**	–	–	–	–	–	–	–	–	–
Tuntutuliak	703	***1,620***	359	698	250	565	450	***794***	362	456	472	329	163	423	378	353	439
Eek	***459***	***661***	176	315	280	612	483	555	629	410	797	298	367	553	652	533	536
Kasigluk	***1,753***	867	629	1,043	430	303	418	851	446	394	390	422	436	687	285	444	463
Nunapitchuk	1,752	***508***	286	195	407	319	226	1,305	1,154	492	1,103	412	783	614	394	661	680
Atmautluak	424	***262***	67	36	263	383	203	176	311	81	415	81	482	425	300	341	286
Napakiak	1,244	1,006	420	877	927	402	634	740	1,117	506	379	597	1,073	929	371	670	675
Napaskiak	639	903	786	1,029	471	269	772	1,153	1,353	726	1,011	614	566	865	1,776	966	911
Oscarville	180	62	67	12	43	38	37	128	25	134	82	58	59	63	81	69	71
Bethel	12,972	15,839	12,895	20,426	18,141	13,280	12,662	19,364	12,277	16,801	17,852	8,978	15,596	16,861	11,161	14,090	14,483
Kwethluk	1,624	7,262	4,333	1,495	1,097	1,013	1,555	4,422	1,677	682	2,361	1,475	1,526	1,968	1,141	1,694	1,782
Akiachak	2,355	4,311	1,790	1,181	1,440	714	1,106	1,845	1,924	2,007	1,771	1,343	1,510	1,230	1,613	1,493	1,506
Akiak	1,325	1,358	661	475	505	***455***	454	1,501	1,423	2,403	3,566	683	1,768	843	1,218	1,616	1,431
Tuluksak	***1,131***	635	857	330	163	341	473	808	623	482	668	529	453	673	490	563	554
Lower Kuskokwim River	**26,561**	**35,293**	**23,326**	**28,112**	**24,417**	**18,694**	**19,473**	**33,642**	**23,321**	**25,574**	**30,867**	**15,819**	**24,782**	**26,134**	**19,860**	**23,492**	**23,817**
Lower Kalskag	515	76	318	96	684	1,107	529	907	419	228	347	430	339	319	80	303	471
Upper Kalskag	381	2,350	181	92	998	360	636	938	384	722	188	419	231	390	164	278	443
Aniak	3,003	2,883	2,223	2,533	2,215	3,365	3,102	9,566	7,705	7,530	4,883	2,107	2,698	3,139	950	2,755	4,505
Chuathbaluk	***419***	525	96	76	109	179	319	291	166	149	149	138	119	126	95	125	173
Middle Kuskokwim River	4,318	5,834	2,818	2,797	4,006	5,011	4,586	11,702	8,674	8,629	5,567	3,094	3,387	3,974	1,289	3,462	5,591

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Table A4.–Page 4 of 4.

Community	Year															Average	
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	5-yr	10-yr
Crooked Creek	***289***	952	283	87	297	149	***255***	198	275	298	256	138	238	243	170	209	222
Red Devil	193	307	126	88	130	238	318	792	214	166	106	50	117	30	35	68	207
Sleetmute	360	228	403	458	426	784	219	993	752	524	61	400	205	307	288	252	453
Stony River	***336***	552	634	201	333	***358***	120	177	77	29	86	23	***135***	***208***	135	117	135
Lime Village[a]	***443***	***695***	***210***	***146***	***596***	117	***384***	***226***	–	123	81	0	34	***55***	***15***	37	115
McGrath	279	247	1,175	1,053	1,331	2,257	523	1,189	173	769	663	411	2,260	1,342	901	1,115	1,049
Takotna	***8***	***6***	***28***	***20***	3	***22***	***0***	***0***	53	90	0	0	***2***	0	0	0	17
Nikolai	***95***	53	203	135	20	214	119	256	400	614	99	46	7	31	115	60	190
Upper Kuskokwim River	**2,005**	**3,040**	**3,062**	**2,188**	**3,136**	**4,139**	**1,938**	**3,831**	**1,944**	**2,613**	**1,352**	**1,068**	**2,998**	**2,216**	**1,659**	**1,859**	**2,376**
Kuskokwim River Total[b]	**32,883**	**44,167**	**29,206**	**33,097**	**31,559**	**27,844**	**25,997**	**49,175**	**33,939**	**36,816**	**37,786**	**19,981**	**31,167**	**32,324**	**22,808**	**28,813**	**31,784**
Quinhagak	1,550	1,869	1,824	1,599	1,369	1,380	1,087	2,240	2,238	2,014	1,734	1,486	1,791	1,395	1,105	1,502	1,647
Goodnews Bay	468	769	261	319	259	382	295	371	552	378	289	201	328	155	222	239	317
Platinum	***106***	114	81	197	143	124	50	240	87	180	273	254	142	380	189	248	192
South Kuskokwim Bay	**2,124**	**2,752**	**2,166**	**2,115**	**1,771**	**1,886**	**1,432**	**2,851**	**2,877**	**2,572**	**2,296**	**1,941**	**2,261**	**1,930**	**1,516**	**1,989**	**2,156**
Kuskokwim Area Total	**35,890**	**47,476**	**31,933**	**35,695**	**33,943**	**30,086**	**27,841**	**52,587**	**36,816**	**39,388**	**40,082**	**21,922**	**33,428**	**34,254**	**24,324**	**30,802**	**34,073**

Source ADF&G Division of Subsistence household surveys, 2021.

Note Bold, italic text indicates Bayesian estimates.

a. Dashes indicate that harvest was not estimated and could not be generated using Bayesian imputation due to lack of data.

b. Kuskokwim River Total includes the lower Kuskokwim River, middle Kuskokwim River, and upper Kuskokwim River.

APPENDIX B–SURVEY INSTRUMENTS, 2021

Figure B1.–Full-length survey, 2021.

Date of Survey:_____ Time: _____ Person Interviewed:_____

Relation to HH: _____ Interviewer: _____

HHID #	COMMUNITY:

CONFIDENTIAL INFORMATION **2021 Kuskokwim Area Postseason Subsistence Salmon Survey**

1. Head of Household:_____ **Telephone** _____ **Address:** _____

2. How many people live in your household? _____ **Permanent Notes:** _____

3. Did anyone in your household subsistence or commercial fish for salmon? YES ☐ NO ☐
(Subsistence "harvest" includes catching or cutting salmon.) **YES →Part I. NO → Part II.**

☐ Adult household member declined to be interviewed.
Reason:_____

PART I: FISHING HOUSEHOLDS

4. Do you have a CATCH CALENDAR to turn in: YES ☐ NO ☐ Already Sent In ☐ (Is calendar group or household harvest? Are all salmon recorded on calendar?)

5. Did you sign up for an UPRIVER SUBSISTENCE PERMIT this year: YES ☐ NO ☐ Permit Holder: _____

6. Did you fish in a group or did you fish by yourself? Total households (including respondent): _____Names:_____

7. How many salmon did your fishing group harvest this year? Chinook _____ Sockeye _____ Chum _____ Coho _____ Pink _____

8. How many salmon did your household harvest/keep from the group harvest? Where did you go fishing? (See Map; ~~Including Permit caught fish~~)

Area_____ Chinook _____ Sockeye _____ Chum _____ Coho _____ Pink _____

Area_____ Chinook _____ Sockeye _____ Chum _____ Coho _____ Pink _____

Total Household Harvest:	Chinook:		Sockeye:		Chum:		Coho:		Pink:		Office use Only

9. What is your household's main gear type? (1=primary, 2=secondary, etc.) Set Net _____ Drift Net _____ Hook & Line ____ Fish Wheel _____ Dipnet _____ Other ___

a. Hook & Line? YES ☐ NO ☐ Chinook _____Sockeye _____Chum _____Coho _____Pink _____ a1. Included above (#8)? YES ☐ NO ☐

b. Fishwheel? YES ☐ NO ☐ Chinook _____Sockeye _____Chum _____Coho _____Pink _____ b1. Included above (#8)? YES ☐ NO ☐

c. Dipnet YES ☐ NO ☐ Chinook _____Sockeye _____Chum _____Coho _____Pink _____ c1. Included above (#8)? YES ☐ NO ☐

d. Other gear _____Chinook _____Sockeye _____Chum _____Coho _____Pink _____ d1. Included above (#8)? YES ☐ NO ☐

~~e. **Permit Salmon?** YES ☐ NO ☐ Chinook _____Sockeye _____Chum _____Coho _____Pink _____ e1. Included above (#8)? YES ☐ NO ☐~~

f. **Whitefish Net?** YES ☐ NO ☐ Chinook _____Sockeye _____Chum _____Coho _____Pink _____ f1. Included above (#8)? YES ☐ NO ☐

10. Did anyone in your household commercial fish? YES ☐ NO ☐

a. If yes, did your household keep any of the commercial salmon for subsistence? Area_____ Chinook _____Sockeye _____Chum _____ Coho _____Pink ____

b. Are these fish already reported in the household harvest (#8)? YES ☐ NO ☐

11. Did anyone in your household lose any salmon (i.e. bears, weather, flies, etc.)? YES ☐ NO ☐

Chinook _____ Sockeye _____ Chum _____ Coho _____ Pink _____ Reason (s) for loss: _____

a. Are the "lost" fish already reported in the household harvest (#8)? YES ☐ NO ☐

b. Were any of the "lost" salmon fed to **your** dogs (whole fish only)? YES ☐ NO ☐; How many? Chinook ____ Sockeye ____ Chum _____ Coho _____ Pink ____

c. Were extra fish harvested to replace those that were lost? YES ☐ NO ☐; How many? Area_____ Chinook ____Sockeye ____Chum _____Coho ____Pink ____

d. Are the "replacement" fish already reported in the household harvest (#8)? YES ☐ NO ☐

12. Did your household give away any salmon that you harvested (not including spoiled)? YES ☐ NO ☐ (shared outside of their fishing group)

Chinook _____ Sockeye _____ Chum _____ Coho _____ Pink _____; Names: _____

a. Are these fish already reported in the household harvest (#8)? YES ☐ NO ☐

PART II: ALL HOUSEHOLDS

13. How many dogs does your household have? _____ (if zero go to question #16)

14. Did you harvest whole salmon for your dogs? YES ☐ NO ☐ Fed Only Scraps to Dogs ☐

15. Not including spoiled fish or fish you received, how many whole salmon did your household put up for dogs this year? (whole fish, not incl. scraps)

Chinook _____ Sockeye _____ Chum _____ Coho _____ Pink _____

a. Are fish harvested for dogs already reported in the household harvest (from question #8)? YES ☐ NO ☐

16. Did anyone give you salmon? YES ☐ NO ☐ **Code:** S = Subsistence; P=Permit; C = Commercial; T = Test Fish;

Code:___**S**___Chinook _____ Sockeye _____ Chum _____ Coho _____ Pink _____ Names: _____

Code:___**P**___Chinook _____ Sockeye _____ Chum _____ Coho _____ Pink _____ Names: _____

Code:___**C**___Chinook _____ Sockeye _____ Chum _____ Coho _____ Pink _____ Names: _____

Code:___**T**___Chinook _____ Sockeye _____ Chum _____ Coho _____ Pink _____ Names: _____

a. Were any of the fish you received fed to your dogs? YES ☐ NO ☐ Chinook _____ Sockeye _____ Chum _____ Coho _____ Pink _____

17. Did your household catch any other fish besides salmon? (From last Sept/October to now.) YES ☐ NO ☐

Humpback Whitefish_____ Broad Whitefish_____ Cisco _____ Sheefish_____ Lush_____ Pike_____ Blackfish_____

Grayling_____ Char_____ Rainbow Trout_____ Smelt_____ Herring_____

a. **FOR NON-SALMON FISHING HOUSEHOLDS: Did you catch any salmon in your summer whitefish net?** YES ☐ NO ☐

Area_____ Chinook _____ Sockeye _____ Chum _____ Coho _____ Pink _____

18. Did your household meet their subsistence needs for salmon this year?

Chinook ☐YES ☐ NO ☐ No Need WHY? _____Chum ☐YES ☐ NO ☐ No Need WHY? _____ Pink ☐YES ☐ NO ☐ No Need

Sockeye ☐YES ☐ NO ☐ No Need WHY? _____ Coho ☐YES ☐ NO ☐ No Need WHY? _____ WHY? _____

19. Additional Comments: _____

_____

_____

Surveyor Comments:

Completed Survey ☐ Partial Survey ☐ No Survey ☐ Survey Reviewed for completeness by Surveyor ☐

Figure B2.–Abbreviated survey, 2021.

INSTRUCTIONS FOR **2021** KUSKOKWIM AREA SALMON HARVEST SURVEY

The Kuskokwim postseason survey is an annual harvest monitoring program that provides important summary information to fishery managers, tribal organizations, and members of the public. Household harvest information you provide on this form is protected confidential information under AS 16.05.815. Any information shared will be kept confidential and will NOT be used for enforcement or marketing.

Every year we ask households throughout the Kuskokwim Area about their subsistence salmon harvest. This year, we are doing our part to help keep your community safe by collecting salmon harvest information without visiting in person.

TO AVOID FUTURE NOTIFICATIONS, PLEASE RESPOND BY PHONE, COMPLETE THE ONLINE SURVEY AT https://arcg.is/1bqyDL OR RETURN THIS TO THE ALASKA DEPARMENT OF FISH AND GAME

Complete and return form to be entered into a drawing for a cash $$ prize!

For assistance with this survey please call: 907-545-6001 or 907-545-5478

Household Information.

- Please fill this in completely. We will use this information to contact you if you win the drawing.

Question 1.

- Answer YES if anyone in your household fished for SALMON in the Kuskokwim Area, which includes the Kuskokwim River and Kuskokwim Bay, during 2021,
- Answer YES if you fished for salmon, even if you didn't harvest any,
- Answer NO if no one in your household fished for SALMON, and then return this form. It is important for us to hear from non-fishing households, and you are still eligible for the cash drawing!

NOTE: for questions 2 and 3**,** please be sure to include:

- Salmon you harvested but gave to others,
- Salmon lost to flies, bears, bad weather, theft, etc…
- Whole salmon harvested for dogs (not including heads or backbones),
- Salmon harvested with **rod and reel,**
- Salmon harvested with **gillnet**, **setnet**, **dip net**, or **fish wheel** (including community fish wheels)**.**

Question 2.

- Answer these questions ONLY if you went fishing with other households for SALMON during 2021,
- If you did fish with other households, please fill in the number of each species you harvested together, then fill in the number of salmon that your household kept from that total.

  Example: If your group harvested 100 reds total and your household kept 25 of the reds, you would write 100 in the first box for reds (group harvest) and 25 in the second box (household harvest).
- If you did not fish with any other households, check NO and skip to question 3,

Question 3.

- For each species listed, please write in the number of salmon harvested by your household only.
- These are salmon you harvested while not fishing in a group. If you did not catch any fish outside of your fishing group or on your own, record '0' for each species.
- Do not include salmon that other people gave to you.
- If you fished in a group, do not include those salmon you kept from your group harvest (see question 2).

2021 KUSKOKWIM AREA SALMON HARVEST SURVEY

Alaska Department of Fish and Game AND Orutsararmiut Native Council

Household Information:

First and last NAME of the head of your household? ..... *First name* _____ *Last name* _____

What is your PO BOX?.. _____ ..What COMMUNITY do you live in?.. _____

Bethel Only: What is your STREET ADDRESS? ..... _____

What is your PHONE NUMBER? ..... _____

How many people live in your household? ..... _____

Please answer each question to the best of your knowledge.

1. Did anyone in your household go SALMON fishing in the Kuskokwim Area during 2021? ..... ☐ **YES** ☐ **NO** **YOU ARE DONE!**
   (Kuskokwim Area includes the Kuskokwim River and Kuskokwim Bay)
   Return this form to be entered into the drawing for a cash prize!

If you went salmon fishing in 2021, answer questions 2 & 3 below.

2. Did you fish in a group with other households? ..... ☐ **YES** ☐ **NO** **Skip to question 3**

If YES, tell us about your TOTAL group harvest

Total **KINGS** harvested by the group?		How many of these did you KEEP?	
Total **REDS** harvested by the group?		How many of these did you KEEP?	
Total **CHUMS** harvested by the group?		How many of these did you KEEP?	
Total **SILVERS** harvested by the group? ..		How many of these did you KEEP?	
Total **PINKS** harvested by the group?		How many of these did you KEEP?	

Please continue to question 3

3. Did you go fishing on your own? ..... ☐ **YES** ☐ **NO** **YOU ARE DONE!**

If YES, tell us about your harvest

Return this form to be entered into the drawing for a cash prize!

Number of **KINGS**	
Number of **REDS**	
Number of **CHUMS**	
Number of **SILVERS**	
Number of **PINKS**	

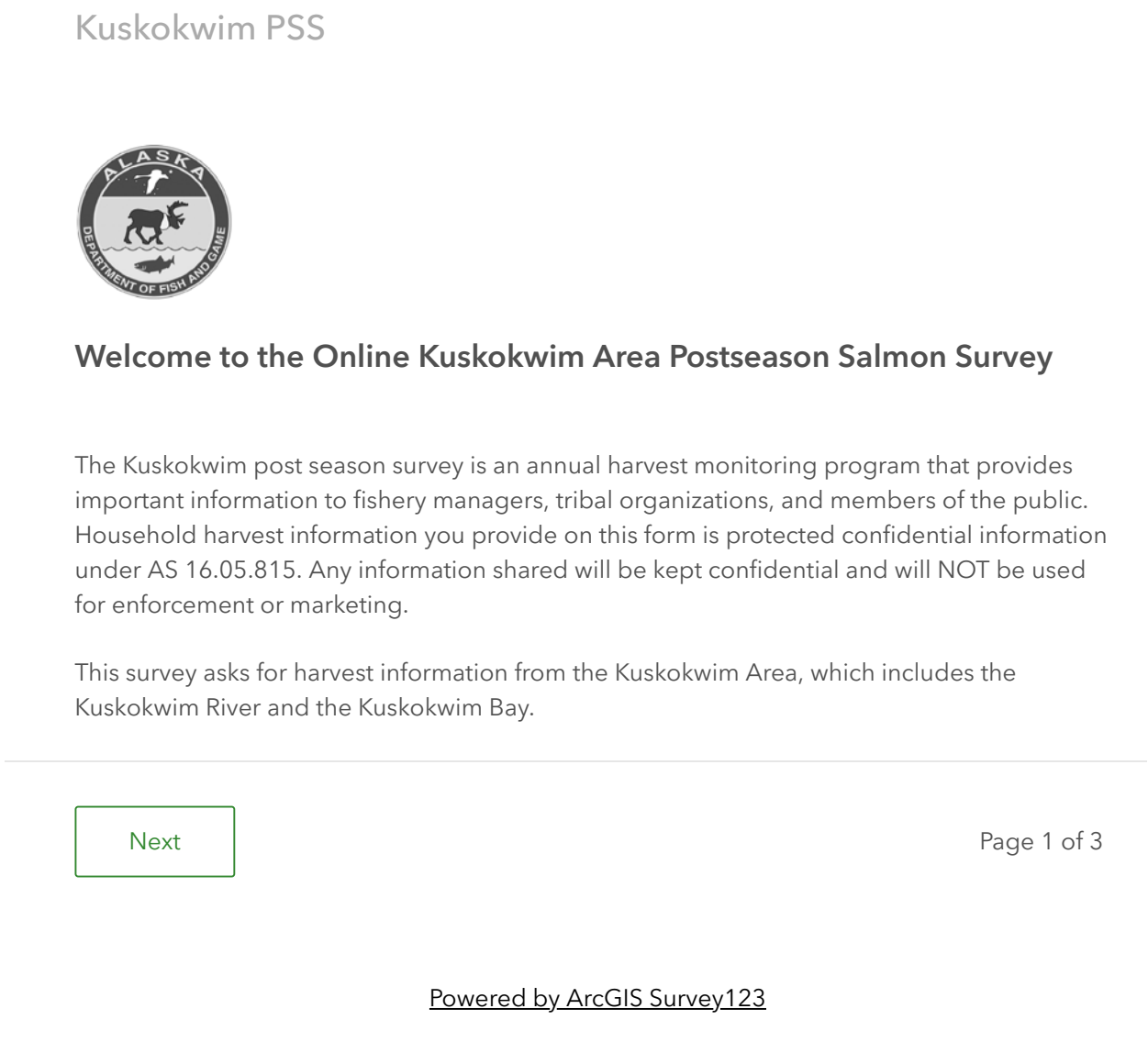
WAIT!
Did you remember to include?

- *Gill net, Dip net, Fish wheel, Whitefish net*
- *Rod and reel* ***AND*** all of the:
- *Salmon lost to spoilage or other reasons*
- *Whole salmon fed to dogs*
- *Salmon you harvested and gave away*

QUYANA! ~ THANK YOU!

Do you still have questions? Please call 545-6001 OR 545-5478

Figure B3.–Online survey, 2021.



Kuskokwim Postseason Salmon Survey

Community

If Other, please specify

If Bethel, then HH ID

Household information

First Name of primary head of household

Last Name of primary head of household

First and last name of additional head of household

Address

Street Address

Phone Number

How many people live in your household?

Did you or anyone in your household fish for SALMON in the Kuskokwim Area in 2021?

Fishing Groups

Did your household fish in a group with other households in the Kuskokwim Area?

How many households were in your fishing group?

Chinook Salmon (fishing group)

How many Chinook of those harvested in the group did you KEEP for your household's own use?

Chum Salmon (fishing group)

How many Chum of those harvested in the group did you KEEP for your household's own use?

Sockeye Salmon (fishing group)

How many Sockeye of those harvested in the group did you KEEP for your household's own use?

Coho Salmon (fishing group)

How many Coho of those harvested in the group did you KEEP for your household's own use?

Pink Salmon (fishing group)

How many Pink Salmon of those harvested in the group did you KEEP for your household's own use?

Household Salmon Harvests

Did you or anyone in your household fish on your own?

Household Salmon Harvests

Chinook Salmon (household)

Chum Salmon (household)

Sockeye Salmon (household)

Coho Salmon (household)

Pink Salmon (household)

Would you be interested in answering a few questions about whether or not your household met its needs for SALMON this year?

Did your household meet its needs for SALMON this year (all species combined)?

If no, what were the reasons your household did not meet its need for SALMON this year?

Thank you!

Do you have any comments or remarks you would like to share with The Alaska Department of Fish and Game?

APPENDIX C–SUBSISTENCE SALMON HARVEST CALENDAR, 2021

Congratulations

2020 Photo Contest Winners

Audrey Leary, Aniak

John Andrew, Kwethluk

Debbie Hartman, McGrath

Daniel Nelson, Napakiak

Jade Patterson, Nikolai

Elena Simon, Tuntutuliak

Congratulations

2020 Salmon Survey & Calendar Drawing Winners

Frank Evan, Akiak
Bill Wilson, Aniak
Alyssa Brown, Bethel
Larry Little, Bethel
Alexandria Phillips, Crooked Creek
Bessie Green, Eek
Grace Lopez, Eek

Anna Neck, Kasigluk
Natalia Brink, Kasigluk
Jacob Charles, Kwethluk
Olga McGill, Kwethluk
Anonymous, Lower Kalskag
Anonymous, Lower Kalskag
Matt Anderson, McGrath
Anonymous, Napaskiak

John Sipary, Napaskiak
Bobby Esai Jr, Nikolai
Oscar Benn, Nunapitchuk
Christian Stewart, Nunapitchuk
Christian Mark, Quinhagak
John Smith, Quinhagak
Zachary Smith, Sleetmute

2021 Subsistence Salmon Photo Contest

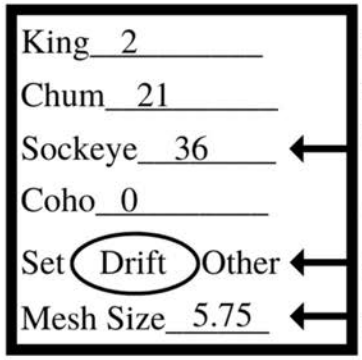
Submit your Kuskokwim Area subsistence fishing photos for a chance to win 25-gallons of gas or heating oil. Up to six winning photos will be selected and featured in the 2022 salmon harvest calendar.
Photos must be submitted by Feb 28, 2022

Email photos to: dfg.sub.photos@alaska.gov

Questions? Call ADF&G: 907-328-6103

How to Record Your Catch

Record the fish retained by your household only, not your fishing group. Do not record fish that you receive from other subsistence fishers or from organizations.



Record number of fish retained, by species.

Circle or write gear type.

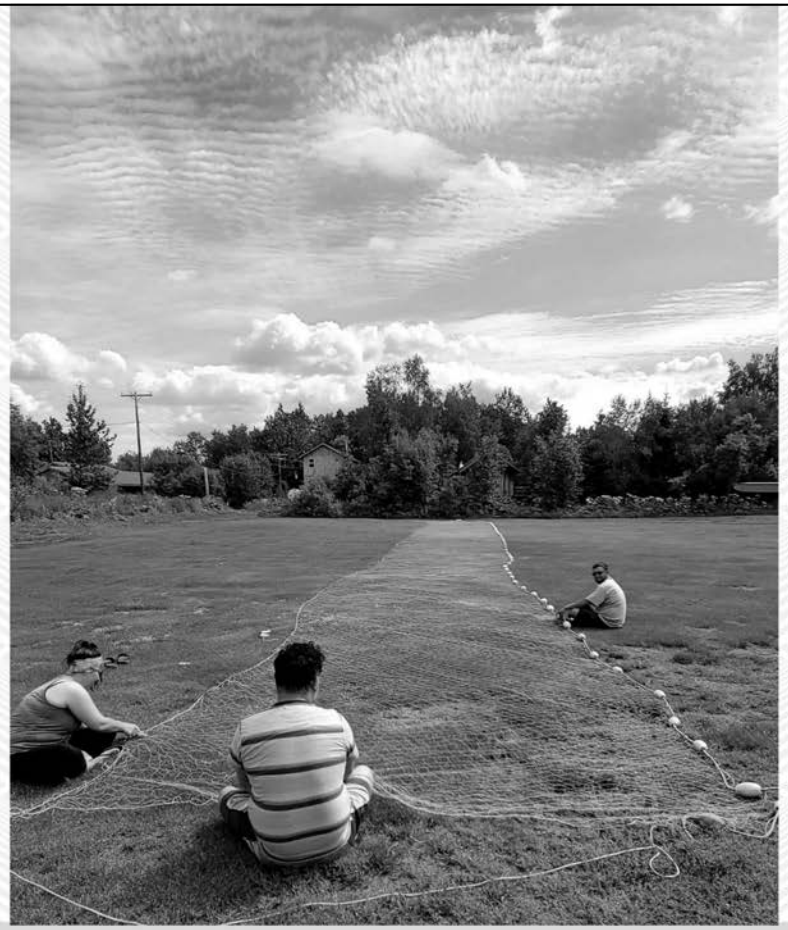
Record mesh size.

Survey Cash Prizes

$500 (2 prizes)
$250 (2 prizes)
$100 (18 prizes)

Turn in your salmon harvest calendar and/or complete the postseason salmon survey to be entered into a drawing to win a cash prize. Double your chances of winning by completing both the survey and calendar.

To be entered into the drawing, the survey and/or calendar must be completed and submitted by December 31, 2021. The drawing and notifications will take place by May 2022.



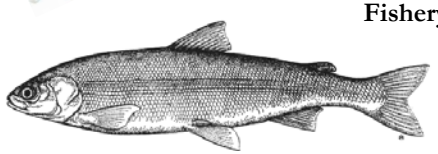
MAY 2021

PREPARING GILLNETS FOR THE FISHING SEASON IN RED DEVIL.
PHOTO: DEBBIE HARTMAN

Did you catch any whitefish this month? If so, please record them here. 卌
Ciiq/Sheefish
Cingikeggliq/ Humpback Whitefish
Qaurtuq/Akakiik/ Broad Whitefish
Cev'eq/ Round Whitefish
Imarpinraq/ Bering Cisco
Iituliq/Least Cisco

Sun	Mon	Tue	Wed	Thu	Fri	Sat

SIGN UP FOR KUSKOKWIM AREA FISHERY ANNOUNCEMENTS



Fishery announcements will be emailed to you as soon as they are published

Sign up at: www.adfg.alaska.gov

Or type this link in your browser:

https://www.adfg.alaska.gov/index.cfm?adfg=cfnews.search

1 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	2 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	3 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	4 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	5 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	6 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	7 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____
8 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	9 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	10 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	11 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	12 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	13 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	14 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____
15 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	16 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	17 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	18 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	19 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	20 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	21 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____
22 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	23 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	24 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	25 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	26 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	27 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	28 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____
29 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____ (MAY 30 & 31 NEXT PAGE)						

JUNE 2021

A YOUNG SUBSISTENCE FISHER BRINGS IN THE HARVEST NEAR NAPAKIAK.
PHOTO: DANIEL NELSON

Did you catch any whitefish this month? If so, please record them here. 𝍸
Ciiq/Sheefish
Cingikeggliq/ Humpback Whitefish
Qaurtuq/Akakiik/ Broad Whitefish
Cev'eq/ Round Whitefish
Imarpinraq/ Bering Cisco
Iituliq/Least Cisco

Sun	Mon	Tue	Wed	Thu	Fri	Sat

30 (May) King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	**31 (May)** King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	**1 (June)** King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	**2** King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	**3** King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	**4** King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	**5** King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____
6 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	**7** King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	**8** King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	**9** King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	**10** King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	**11** King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	**12** King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____
13 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	**14** King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	**15** King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	**16** King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	**17** King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	**18** King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	**19** King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____
20 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	**21** King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	**22** King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	**23** King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	**24** King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	**25** King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	**26** King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____
27 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	**28** King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	**29** King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	**30** King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	**SUBSISTENCE SALMON PHOTO CONTEST** Send in your best subsistence salmon fishing/fish camp photos for a chance to win **25 GALLONS OF GAS OR HEATING OIL!** Up to six winners will be selected and photos will be published in the 2022 salmon harvest calendar. Submit photos: **dfg.sub.photos@alaska.gov**		

JULY 2021

SUBSISTENCE FISHERMEN OFFLOAD THEIR HARVEST NEAR KWETHLUK.
PHOTO: JOHN ANDREW

Did you catch any whitefish this month? If so, please record them here. 𝍸
Ciiq/Sheefish
Cingikeggliq/ Humpback Whitefish
Qaurtuq/Akakiik/ Broad Whitefish
Cev'eq/ Round Whitefish
Imarpinraq/ Bering Cisco
Iituliq/Least Cisco

Sun	Mon	Tue	Wed	Thu	Fri	Sat

Follow us on Facebook! **Kuskokwim River Fishing-ADF&G** **@KuskoRiverFishingADFG** 				1 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	2 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	3 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____
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11 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	12 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	13 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	14 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	15 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	16 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	17 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____
18 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	19 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	20 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	21 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	22 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	23 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	24 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____
25 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	26 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	27 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	28 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	29 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	30 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	31 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____

AUGUST 2021

CUTTING SALMON NEAR ANIAK.
PHOTO: AUDREY LEARY

Did you catch any whitefish this month? If so, please record them here. 𝍸
Ciiq/Sheefish
Cingikeggliq/ Humpback Whitefish
Qaurtuq/Akakiik/ Broad Whitefish
Cev'eq/ Round Whitefish
Imarpinraq/ Bering Cisco
Iituliq/Least Cisco

Sun	Mon	Tue	Wed	Thu	Fri	Sat

1 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	**2** King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	**3** King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	**4** King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	**5** King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh	**6** King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	**7** King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____
8 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	**9** King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	**10** King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	**11** King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	**12** King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	**13** King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	**14** King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____
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SEPTEMBER 2021

Did you catch any whitefish this month? If so, please record them here.
Ciiq/Sheefish
Cingikeggliq/ Humpback Whitefish
Qaurtuq/Akakiik/ Broad Whitefish
Cev'eq/ Round Whitefish
Imarpinraq/ Bering Cisco
Iituliq/Least Cisco

Sun	Mon	Tue	Wed	Thu	Fri	Sat

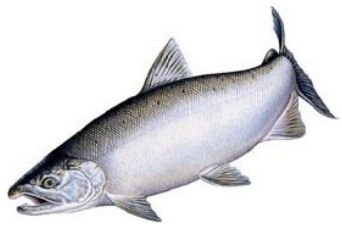
SUBSISTENCE SALMON PHOTO CONTEST

Send in your best subsistence salmon fishing/fish camp photos for a chance to win

25 GALLONS OF GAS OR HEATING OIL!

Up to six winners will be selected and photos will be published in the 2022 salmon harvest calendar. Submit photos:

dfg.sub.photos@alaska.gov

			1 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	2 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	3 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	4 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____
5 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	6 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	7 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	8 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	9 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	10 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	11 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____
12 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	13 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	14 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	15 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	16 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	17 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	18 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____
19 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	20 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	21 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	22 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	23 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	24 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	25 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____
26 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	27 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	28 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	29 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	30 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____		

OCTOBER 2021

SALMON DRYING NEAR TUNTUTULIAK.
PHOTO: ELENA SIMON

Did you catch any whitefish this month? If so, please record them here.
Ciiq/Sheefish
Cingikeggliq/ Humpback Whitefish
Qaurtuq/Akakiik/ Broad Whitefish
Cev'eq/ Round Whitefish
Imarpinraq/ Bering Cisco
Iituliq/Least Cisco

Sun	Mon	Tue	Wed	Thu	Fri	Sat

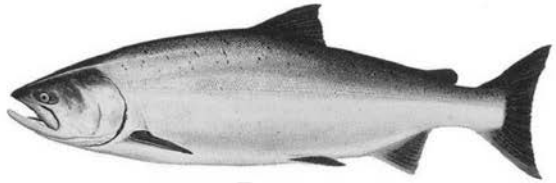
Moose Hunters

Please take a moment to report your hunt,
even if you did not harvest a moose:
Unit 18 hunters call Bethel ADF&G: 543-1678
Unit 19 hunters call McGrath ADF&G: 524-3240
You may also report online: hunt.alaska.gov

					1 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	2 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____
3 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	4 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	5 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	6 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	7 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	8 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	9 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____
10 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	11 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	12 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	13 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	14 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	15 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	16 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____
17 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	18 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	19 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	20 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	21 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	22 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	23 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____
24 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	25 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	26 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	27 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	28 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	29 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____	30 King_____ Chum_____ Sockeye_____ Coho_____ SET DRIFT OTHER Mesh Size:_____ (OCT 31ST NOT AVAILABLE)

Cak'uciggua Neqa?

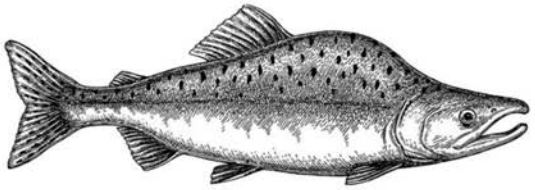
(What kind of salmon is it?)



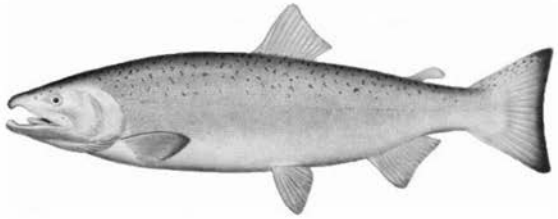
Taryaqvak/Chinook/King

Iqalluut/Chum/Dog

Caiyiit/Sockeye/Red



Amaqaayak/Pink/Humpy

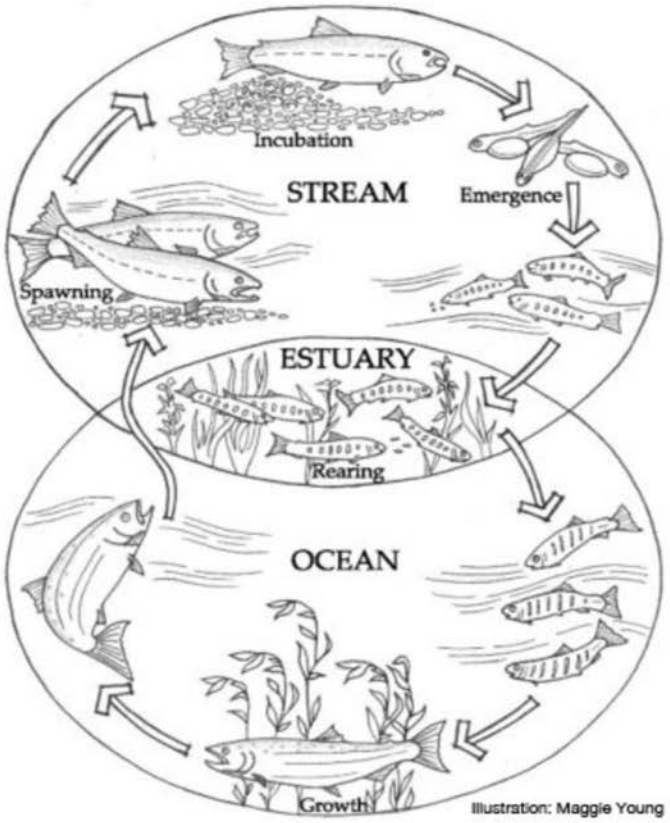


Qakiyaat/Coho/Silver

Tape Here To Close

Neqim Unguwallra

(Salmon Life Cycle)



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APPENDIX D–EXPANDED SALMON HARVEST ESTIMATES, 2021

Table D1.–Estimated harvest of Chinook salmon by household harvest group, surveyed communities, Kuskokwim Management Area, 2021.

Community	Household harvest groups: Light harvester				Medium harvester				High harvester				Does not usually harvest				Unknown				Combined harvest groups			
	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Estimated total	95% CI
Kongiganak[a]	62	0	–	–	12	0	–	–	2	0	–	–	14	0	–	–	0	0	–	–	90	0	–	–
North Kuskokwim Bay	**62**	**0**	**–**	**–**	**12**	**0**	**–**	**–**	**2**	**0**	**–**	**–**	**14**	**0**	**–**	**–**	**0**	**0**	**–**	**–**	**90**	**0**	**–**	**–**
Tuntutuliak	40	25	11	2	21	13	30	5	17	12	46	6	33	20	10	3	1	1	9	0	112	71	2,173	375
Eek	43	28	15	3	11	7	10	3	3	1	11	0	41	17	7	4	1	1	0	0	99	54	1,091	385
Kasigluk	47	25	9	2	24	17	8	1	4	2	28	20	43	13	4	3	1	0	0	0	119	57	917	333
Nunapitchuk	44	26	11	2	17	11	18	2	17	8	26	7	45	19	1	1	0	0	0	0	123	64	1,277	317
Atmautluak	14	7	4	1	19	18	9	1	7	4	5	3	28	10	11	8	8	0	0	0	76	39	643	509
Napakiak	29	15	11	2	15	10	17	3	10	5	11	4	45	21	2	1	0	0	0	0	99	51	755	182
Napaskiak	37	10	12	4	22	12	22	4	6	4	65	18	41	10	14	9	15	1	17	0	121	37	2,110	840
Oscarville	3	3	3	0	7	6	10	2	1	0	0	0	5	5	1	0	1	1	17	0	17	15	105	24
Bethel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,750	535	5	1	1,750	535	8,511	1,564
Kwethluk	56	33	11	2	23	16	19	3	18	11	38	5	68	36	1	0	0	0	0	0	165	96	1,799	283
Akiachak	60	25	14	3	30	16	22	3	11	7	27	4	70	11	11	6	5	1	55	0	176	60	2,827	988
Akiak	27	11	11	3	16	13	15	2	13	10	40	4	33	5	34	14	5	4	17	7	94	43	2,264	947
Tuluksak	36	20	7	1	14	8	22	3	9	5	35	6	33	17	0	0	0	0	0	0	92	50	882	171
Lower Kuskokwim River	**436**	**228**	**11**	**1**	**219**	**147**	**18**	**1**	**116**	**69**	**33**	**2**	**485**	**184**	**8**	**2**	**1,787**	**544**	**5**	**0**	**3,043**	**1,172**	**25,353**	**2,398**
Lower Kalskag	36	12	5	3	9	5	35	7	1	0	0	0	39	15	0	0	0	0	0	0	85	32	513	229
Upper Kalskag	20	4	6	3	4	3	63	22	5	5	13	0	28	5	0	0	2	1	5	0	59	18	454	228
Aniak	68	27	9	2	13	9	9	2	6	4	44	13	58	10	4	2	18	14	3	1	163	64	1,325	449
Chuathbaluk	21	17	3	1	6	6	13	0	1	1	35	0	1	1	0	0	3	3	1	0	32	28	180	27
Middle Kuskokwim River	**145**	**60**	**7**	**1**	**32**	**23**	**24**	**4**	**13**	**10**	**30**	**7**	**126**	**31**	**2**	**1**	**23**	**18**	**3**	**1**	**339**	**142**	**2,473**	**542**

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Table D1.–Page 2 of 2.

Community	Household harvest groups: Light harvester				Medium harvester				High harvester				Does not usually harvest				Unknown				Combined harvest groups			
	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Estimated total	95% CI
Crooked Creek	14	10	8	2	3	3	5	0	2	2	15	0	13	9	0	0	7	5	0	0	39	29	153	63
Red Devil	4	4	11	0	1	1	0	0	0	0	0	0	1	1	5	0	1	0	0	0	7	6	55	0
Sleetmute	17	13	3	1	2	1	10	0	3	2	3	0	8	7	0	0	6	2	10	8	36	25	140	106
Stony River	6	4	15	5	1	1	2	0	0	0	0	0	6	1	2	0	5	3	7	4	18	9	137	83
Lime Village[a]	2	0	–	–	0	0	–	–	2	0	–	–	1	0	–	–	0	0	–	–	5	0	–	–
McGrath	37	18	2	1	7	4	0	0	1	1	18	0	72	30	0	0	2	1	0	0	119	54	83	44
Takotna	5	5	0	0	0	0	0	0	0	0	0	0	20	12	0	0	1	1	0	0	26	18	0	0
Nikolai	22	16	8	2	2	2	17	0	1	1	8	0	6	5	2	1	0	0	0	0	31	24	237	85
Upper Kuskokwim River	**107**	**70**	**5**	**1**	**16**	**12**	**4**	**0**	**9**	**6**	**9**	**0**	**127**	**65**	**0**	**0**	**22**	**12**	**5**	**3**	**281**	**165**	**805**	**166**
Kuskokwim River Total[b]	**688**	**358**	**9**	**1**	**267**	**182**	**18**	**1**	**138**	**85**	**31**	**2**	**738**	**280**	**5**	**1**	**1,832**	**574**	**5**	**0**	**3,663**	**1,479**	**28,630**	**2,463**
Quinhagak	82	46	12	2	33	24	26	3	16	12	50	7	45	20	1	1	3	0	0	0	179	102	2,728	445
Goodnews Bay	42	26	6	1	8	4	14	4	0	0	0	0	30	15	1	1	7	4	0	0	87	49	388	128
Platinum	9	5	0	0	3	1	4	0	2	2	26	0	1	0	0	0	3	1	2	0	18	9	78	6
South Kuskokwim Bay	**133**	**77**	**9**	**1**	**44**	**29**	**22**	**2**	**18**	**14**	**47**	**6**	**76**	**35**	**1**	**1**	**13**	**5**	**1**	**0**	**284**	**160**	**3,193**	**460**
Kuskokwim Area Total	**883**	**435**	**9**	**1**	**323**	**211**	**18**	**1**	**158**	**99**	**33**	**2**	**828**	**315**	**5**	**1**	**1,845**	**579**	**5**	**0**	**4,037**	**1,639**	**31,824**	**2,505**

Source ADF&G Division of Subsistence household surveys, 2021.

Note This table depicts only expanded harvest estimates by community. It does not include Bayesian estimates for unsurveyed communities. For full annual harvest estimate see Table 3-2 and Appendix A1.

Note Dashes indicate that data are unavailable or not applicable for this year.

a. No surveys were conducted in these communities.

b. Kuskokwim River Total includes the lower Kuskokwim River, middle Kuskokwim River, and upper Kuskokwim River.

Table D2.–Estimated harvest of chum salmon by household harvest group, surveyed communities, Kuskokwim Management Area, 2021.

Community	Household harvest groups: Light harvester				Medium harvester				High harvester				Does not usually harvest				Unknown				Combined harvest groups			
	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Estimated total	95% CI
Kongiganak[a]	62	0	–	–	12	0	–	–	2	0	–	–	14	0	–	–	0	0	–	–	90	0	–	–
North Kuskokwim Bay	**62**	**0**	**–**	**–**	**12**	**0**	**–**	**–**	**2**	**0**	**–**	**–**	**14**	**0**	**–**	**–**	**0**	**0**	**–**	**–**	**90**	**0**	**–**	**–**
Tuntutuliak	40	25	4	1	21	13	8	1	17	12	21	4	33	20	2	1	1	1	12	0	112	71	739	164
Eek	43	28	5	1	11	7	1	1	3	1	0	0	41	17	3	1	1	1	0	0	99	54	316	103
Kasigluk	47	25	8	3	24	17	4	1	4	2	15	11	43	13	5	3	1	0	0	0	119	57	744	407
Nunapitchuk	44	26	7	1	17	11	1	0	17	8	10	3	45	19	0	0	0	0	0	0	123	64	496	164
Atmautluak	14	7	3	1	19	18	7	0	7	4	0	0	28	10	1	1	8	0	0	0	76	39	219	54
Napakiak	29	15	1	1	15	10	2	1	10	5	15	7	45	21	0	0	0	0	0	0	99	51	208	140
Napaskiak	37	10	8	5	22	12	5	2	6	4	8	3	41	10	1	1	15	1	18	0	121	37	766	405
Oscarville	3	3	0	0	7	6	3	1	1	0	0	0	5	5	1	0	1	1	0	0	17	15	27	10
Bethel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,750	535	2	0	1,750	535	3,153	1,017
Kwethluk	56	33	6	1	23	16	9	2	18	11	10	3	68	36	0	0	0	0	0	0	165	96	706	200
Akiachak	60	25	3	1	30	16	7	2	11	7	14	3	70	11	2	1	5	1	7	0	176	60	707	242
Akiak	27	11	3	1	16	13	2	1	13	10	7	1	33	5	16	10	5	4	1	0	94	43	743	693
Tuluksak	36	20	1	0	14	8	14	4	9	5	15	5	33	17	0	0	0	0	0	0	92	50	349	137
Lower Kuskokwim River	**436**	**228**	**5**	**1**	**219**	**147**	**6**	**1**	**116**	**69**	**12**	**1**	**485**	**184**	**2**	**1**	**1,787**	**544**	**2**	**0**	**3,043**	**1,172**	**9,175**	**1,413**
Lower Kalskag	36	12	0	0	9	5	9	2	1	0	0	0	39	15	0	0	0	0	0	0	85	32	86	42
Upper Kalskag	20	4	0	0	4	3	17	8	5	5	3	0	28	5	0	0	2	1	0	0	59	18	89	69
Aniak	68	27	1	0	13	9	1	0	6	4	27	14	58	10	0	0	18	14	0	0	163	64	235	178
Chuathbaluk	21	17	1	0	6	6	5	0	1	1	0	0	1	1	0	0	3	3	0	0	32	28	51	12
Middle Kuskokwim River	**145**	**60**	**1**	**0**	**32**	**23**	**6**	**1**	**13**	**10**	**15**	**7**	**126**	**31**	**0**	**0**	**23**	**18**	**0**	**0**	**339**	**142**	**462**	**192**

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Table D2.–Page 2 of 2.

Community	Household harvest groups: Light harvester				Medium harvester				High harvester				Does not usually harvest				Unknown				Combined harvest groups			
	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Estimated total	95% CI
Crooked Creek	14	10	2	1	3	3	0	0	2	2	4	0	13	9	0	0	7	5	0	0	39	29	28	23
Red Devil	4	4	1	0	1	1	0	0	0	0	0	0	1	1	0	0	1	0	0	0	7	6	5	0
Sleetmute	17	13	0	0	2	1	10	0	3	2	0	0	8	7	0	0	6	2	0	0	36	25	23	3
Stony River	6	4	4	1	1	1	0	0	0	0	0	0	6	1	0	0	5	3	3	1	18	9	42	21
Lime Village[a]	2	0	–	–	0	0	–	–	2	0	–	–	1	0	–	–	0	0	–	–	5	0	–	–
McGrath	37	18	0	0	7	4	0	0	1	1	0	0	72	30	0	0	2	1	0	0	119	54	0	0
Takotna	5	5	0	0	0	0	0	0	0	0	0	0	20	12	0	0	1	1	0	0	26	18	0	0
Nikolai	22	16	0	0	2	2	1	0	1	1	4	0	6	5	0	0	0	0	0	0	31	24	6	0
Upper Kuskokwim River	**107**	**70**	**1**	**0**	**16**	**12**	**1**	**0**	**9**	**6**	**2**	**0**	**127**	**65**	**0**	**0**	**22**	**12**	**1**	**0**	**281**	**165**	**103**	***29***
Kuskokwim River Total[b]	**688**	**358**	**3**	**0**	**267**	**182**	**6**	**0**	**138**	**85**	**11**	**1**	**738**	**280**	**2**	**1**	**1,832**	**574**	**2**	**0**	**3,663**	**1,479**	**9,740**	**1,425**
Quinhagak	82	46	5	2	33	24	8	1	16	12	9	2	45	20	0	0	3	0	0	0	179	102	842	286
Goodnews Bay	42	26	1	0	8	4	0	0	0	0	0	0	30	15	0	0	7	4	0	0	87	49	26	22
Platinum	9	5	1	0	3	1	0	0	2	2	21	0	1	0	0	0	3	1	4	0	18	9	63	9
South Kuskokwim Bay	**133**	**77**	**3**	**1**	**44**	**29**	**6**	**1**	**18**	**14**	**11**	**1**	**76**	**35**	**0**	**0**	**13**	**5**	**1**	**0**	284	160	931	**285**
Kuskokwim Area Total	**883**	**435**	**3**	**0**	**323**	**211**	**6**	**0**	**158**	**99**	**11**	**1**	**828**	**315**	**1**	**1**	**1,845**	**579**	**2**	**0**	**4,037**	**1,639**	**10,671**	**1,453**

Source ADF&G Division of Subsistence household surveys, 2021.

Note This table depicts only expanded harvest estimates by community. It does not include Bayesian estimates for unsurveyed communities. For full annual harvest estimate see Table 3-2 and Appendix A2.

Note Dashes indicate that data are unavailable or not applicable for this year.

a. No surveys were conducted in these communities.

b. Kuskokwim River Total includes the lower Kuskokwim River, middle Kuskokwim River, and upper Kuskokwim River.

Table D3.–Estimated harvest of sockeye salmon by household harvest group, surveyed communities, Kuskokwim Management Area, 2021.

Community	Household harvest groups: Light harvester				Medium harvester				High harvester				Does not usually harvest				Unknown				Combined harvest groups			
	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Estimated total	95% CI
Kongiganak[a]	62	0	–	–	12	0	–	–	2	0	–	–	14	0	–	–	0	0	–	–	90	0	–	–
North Kuskokwim Bay	**62**	**0**	**–**	**–**	**12**	**0**	**–**	**–**	**2**	**0**	**–**	**–**	**14**	**0**	**–**	**–**	**0**	**0**	**–**	**–**	**90**	**0**	**–**	**–**
Tuntutuliak	40	25	19	4	21	13	36	5	17	12	49	4	33	20	5	2	1	1	22	0	112	71	2,571	415
Eek	43	28	20	4	11	7	25	5	3	1	13	0	41	17	8	5	1	1	0	0	99	54	1,505	517
Kasigluk	47	25	22	4	24	17	21	3	4	2	28	20	43	13	8	6	1	0	0	0	119	57	2,020	664
Nunapitchuk	44	26	28	4	17	11	47	10	17	8	57	26	45	19	3	2	0	0	0	0	123	64	3,166	1,026
Atmautluak	14	7	29	8	19	18	24	1	7	4	25	16	28	10	40	28	8	0	0	0	76	39	2,394	1,804
Napakiak	29	15	16	2	15	10	20	3	10	5	37	14	45	21	3	1	0	0	0	0	99	51	1,241	343
Napaskiak	37	10	27	7	22	12	56	11	6	4	100	27	41	10	15	9	15	1	36	0	121	37	3,968	1,099
Oscarville	3	3	3	0	7	6	26	4	1	0	0	0	5	5	1	0	1	1	0	0	17	15	212	68
Bethel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,750	535	8	1	1,750	535	13,454	2,622
Kwethluk	56	33	16	2	23	16	29	4	18	11	40	8	68	36	0	0	0	0	0	0	165	96	2,309	413
Akiachak	60	25	13	4	30	16	29	6	11	7	30	4	70	11	20	17	5	1	90	0	176	60	3,836	2,385
Akiak	27	11	10	3	16	13	17	2	13	10	40	6	33	5	24	7	5	4	17	6	94	43	1,922	505
Tuluksak	36	20	7	2	14	8	38	8	9	5	36	8	33	17	0	0	0	0	0	0	92	50	1,110	295
Lower Kuskokwim River	**436**	**228**	**18**	**1**	**219**	**147**	**31**	**2**	**116**	**69**	**43**	**5**	**485**	**184**	**11**	**3**	**1,787**	**544**	**8**	**1**	**3,043**	**1,172**	**39,708**	**4,358**
Lower Kalskag	36	12	5	3	9	5	32	7	1	0	0	0	39	15	1	1	0	0	0	0	85	32	521	243
Upper Kalskag	20	4	1	1	4	3	36	16	5	5	10	0	28	5	0	0	2	1	0	0	59	18	217	143
Aniak	68	27	7	2	13	9	10	2	6	4	95	21	58	10	4	3	18	14	2	1	163	64	1,463	492
Chuathbaluk	21	17	5	1	6	6	22	0	1	1	22	0	1	1	0	0	3	3	1	0	32	28	274	38
Middle Kuskokwim River	**145**	**60**	**6**	**1**	**32**	**23**	**22**	**3**	**13**	**10**	**53**	**11**	**126**	**31**	**2**	**1**	**23**	**18**	**2**	**1**	**339**	**142**	**2,475**	**559**

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Table D3.–Page 2 of 2.

Community	Household harvest groups: Light harvester				Medium harvester				High harvester				Does not usually harvest				Unknown				Combined harvest groups			
	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Estimated total	95% CI
Crooked Creek	14	10	9	3	3	3	7	0	2	2	88	0	13	9	0	0	7	5	1	0	39	29	328	75
Red Devil	4	4	21	0	1	1	0	0	0	0	0	0	1	1	2	0	1	0	0	0	7	6	98	0
Sleetmute	17	13	9	3	2	1	25	0	3	2	120	46	8	7	0	0	6	2	20	16	36	25	687	361
Stony River	6	4	24	6	1	1	20	0	0	0	0	0	6	1	30	0	5	3	77	39	18	9	726	454
Lime Village[a]	2	0	–	–	0	0	–	–	2	0	–	–	1	0	–	–	0	0	–	–	5	0	–	–
McGrath	37	18	0	0	7	4	9	6	1	1	120	0	72	30	1	1	2	1	0	0	119	54	229	109
Takotna	5	5	0	0	0	0	0	0	0	0	0	0	20	12	0	0	1	1	0	0	26	18	0	0
Nikolai	22	16	1	1	2	2	0	0	1	1	0	0	6	5	0	0	0	0	0	0	31	24	28	30
Upper Kuskokwim River	**107**	**70**	**5**	**1**	**16**	**12**	**10**	**3**	**9**	**6**	**94**	**20**	**127**	**65**	**2**	**0**	**22**	**12**	**24**	**11**	**281**	**165**	**2,096**	**542**
Kuskokwim River Total[b]	**688**	**358**	**14**	**1**	**267**	**182**	**29**	**2**	**138**	**85**	**47**	**4**	**738**	**280**	**8**	**2**	**1,832**	**574**	**8**	**1**	**3,663**	**1,479**	**44,278**	**4,425**
Quinhagak	82	46	17	5	33	24	25	3	16	12	48	7	45	20	2	2	3	0	0	0	179	102	3,170	856
Goodnews Bay	42	26	17	3	8	4	101	40	0	0	0	0	30	15	6	3	7	4	1	1	87	49	1,684	709
Platinum	9	5	17	11	3	1	100	0	2	2	85	0	1	0	0	0	3	1	0	0	18	9	660	244
South Kuskokwim Bay	**133**	**77**	**17**	**3**	**44**	**29**	**44**	**8**	**18**	**14**	**52**	**6**	**76**	**35**	**4**	**2**	**13**	**5**	**1**	**0**	**284**	**160**	**5,513**	**1,121**
Kuskokwim Area Total	**883**	**435**	**14**	**1**	**323**	**211**	**31**	**2**	**158**	**99**	**47**	**4**	**828**	**315**	**7**	**2**	**1,845**	**579**	**8**	**1**	**4,037**	**1,639**	**49,791**	**4,563**

Source ADF&G Division of Subsistence household surveys, 2021.

Note This table depicts only expanded harvest estimates by community. It does not include Bayesian estimates for unsurveyed communities. For full annual harvest estimate see Table 3-2 and Appendix A3.

Note Dashes indicate that data are unavailable or not applicable for this year.

a. No surveys were conducted in these communities.

b. Kuskokwim River Total includes the lower Kuskokwim River, middle Kuskokwim River, and upper Kuskokwim River.

Table D4.–Estimated harvest of coho salmon by household harvest group, surveyed communities, Kuskokwim Management Area, 2021.

Community	Household harvest groups																				Combined harvest groups			
	Light harvester				Medium harvester				High harvester				Does not usually harvest				Unknown							
	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Estimated total	95% CI
Kongiganak[a]	62	0	–	–	12	0	–	–	2	0	–	–	14	0	–	–	0	0	–	–	90	0	–	–
North Kuskokwim Bay	**62**	**0**	**–**	**–**	**12**	**0**	**–**	**–**	**2**	**0**	**–**	**–**	**14**	**0**	**–**	**–**	**0**	**0**	**–**	**–**	**90**	**0**	**–**	**–**
Tuntutuliak	40	25	2	1	21	13	2	1	17	12	12	3	33	20	2	1	1	1	7	0	112	71	378	129
Eek	43	28	7	1	11	7	15	4	3	1	44	0	41	17	1	1	1	1	0	0	99	54	652	147
Kasigluk	47	25	5	2	24	17	3	1	4	2	0	0	43	13	0	0	1	0	0	0	119	57	285	191
Nunapitchuk	44	26	3	1	17	11	7	2	17	8	8	3	45	19	1	1	0	0	0	0	123	64	394	137
Atmautluak	14	7	8	4	19	18	1	0	7	4	5	3	28	10	4	2	8	0	0	0	76	39	300	199
Napakiak	29	15	0	0	15	10	10	3	10	5	16	8	45	21	2	1	0	0	0	0	99	51	371	197
Napaskiak	37	10	22	9	22	12	6	1	6	4	30	5	41	10	3	2	15	1	35	0	121	37	1,776	688
Oscarville	3	3	0	0	7	6	8	1	1	0	0	0	5	5	0	0	1	1	24	0	17	15	81	20
Bethel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,750	535	6	1	1,750	535	11,161	2,025
Kwethluk	56	33	5	2	23	16	8	1	18	11	31	6	68	36	2	1	0	0	0	0	165	96	1,141	313
Akiachak	60	25	12	5	30	16	7	2	11	7	9	4	70	11	8	3	5	1	7	0	176	60	1,613	686
Akiak	27	11	8	3	16	13	5	1	13	10	20	7	33	5	19	10	5	4	6	2	94	43	1,218	697
Tuluksak	36	20	2	1	14	8	14	3	9	5	25	9	33	17	0	0	0	0	0	0	92	50	490	199
Lower Kuskokwim River	**436**	**228**	**7**	**1**	**219**	**147**	**6**	**1**	**116**	**69**	**17**	**2**	**485**	**184**	**4**	**1**	**1,787**	**544**	**7**	**1**	**3,043**	**1,172**	**19,859**	**2,397**
Lower Kalskag	36	12	0	0	9	5	9	3	1	0	0	0	39	15	0	0	0	0	0	0	85	32	80	49
Upper Kalskag	20	4	5	3	4	3	3	2	5	5	2	0	28	5	0	0	2	1	20	0	59	18	164	109
Aniak	68	27	6	2	13	9	8	2	6	4	57	24	58	10	0	0	18	14	4	1	163	64	950	373
Chuathbaluk	21	17	1	0	6	6	11	0	1	1	2	0	1	1	0	0	3	3	5	0	32	28	95	7
Middle Kuskokwim River	**145**	**60**	**4**	**1**	**32**	**23**	**8**	**1**	**13**	**10**	**30**	**12**	**126**	**31**	**0**	**0**	**23**	**18**	**6**	**1**	**339**	**142**	**1,289**	**386**

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Table D4.–Page 2 of 2.

Community	Household harvest groups: Light harvester				Medium harvester				High harvester				Does not usually harvest				Unknown				Combined harvest groups			
	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Estimated total	95% CI
Crooked Creek	14	10	7	3	3	3	5	0	2	2	30	0	13	9	0	0	7	5	0	0	39	29	170	78
Red Devil	4	4	8	0	1	1	0	0	0	0	0	0	1	1	0	0	1	0	0	0	7	6	35	0
Sleetmute	17	13	6	2	2	1	10	0	3	2	45	26	8	7	1	0	6	2	5	4	36	25	288	178
Stony River	6	4	5	3	1	1	15	0	0	0	0	0	6	1	15	0	5	3	0	0	18	9	135	39
Lime Village[a]	2	0	–	–	0	0	–	–	2	0	–	–	1	0	–	–	0	0	–	–	5	0	–	–
McGrath	37	18	0	0	7	4	0	0	1	1	890	0	72	30	0	0	2	1	0	0	119	54	901	10
Takotna	5	5	0	0	0	0	0	0	0	0	0	0	20	12	0	0	1	1	0	0	26	18	0	0
Nikolai	22	16	5	2	2	2	3	0	1	1	0	0	6	5	0	0	0	0	0	0	31	24	115	104
Upper Kuskokwim River	**107**	**70**	**4**	**1**	**16**	**12**	**3**	**0**	**9**	**6**	**155**	**11**	**127**	**65**	**1**	**0**	**22**	**12**	**1**	**1**	**281**	**165**	**1,644**	**214**
Kuskokwim River Total[b]	**688**	**358**	**6**	**1**	**267**	**182**	**6**	**0**	**138**	**85**	**26**	**2**	**738**	**280**	**3**	**1**	**1,832**	**574**	**7**	**1**	**3,663**	**1,479**	**22,793**	**2,436**
Quinhagak	82	46	5	2	33	24	7	2	16	12	20	4	45	20	2	2	3	0	0	0	179	102	1,105	336
Goodnews Bay	42	26	4	1	8	4	2	1	0	0	0	0	30	15	1	0	7	4	1	1	87	49	222	103
Platinum	9	5	7	4	3	1	30	0	2	2	11	0	1	0	0	0	3	1	2	0	18	9	189	91
South Kuskokwim Bay	**133**	**77**	**5**	**1**	**44**	**29**	**8**	**1**	**18**	**14**	**19**	**4**	**76**	**35**	**2**	**1**	**13**	**5**	**1**	**0**	**284**	**160**	**1,516**	**358**
Kuskokwim Area Total	**883**	**435**	**5**	**1**	**323**	**211**	**7**	**0**	**158**	**99**	**25**	**2**	**828**	**315**	**3**	**1**	**1,845**	**579**	**7**	**1**	**4,037**	**1,639**	**24,308**	**2,462**

Source ADF&G Division of Subsistence household surveys, 2021.

Note This table depicts only expanded harvest estimates by community. It does not include Bayesian estimates for unsurveyed communities. For full annual harvest estimate see Table 3-2 and Appendix A4.

Note Dashes indicate that data are unavailable or not applicable for this year.

a. No surveys were conducted in these communities.

b. Kuskokwim River Total includes the lower Kuskokwim River, middle Kuskokwim River, and upper Kuskokwim River.

Table D5.–Estimated harvest of chum salmon by household harvest group, surveyed communities, Kuskokwim Management Area, 2021.

Community	Household harvest groups																				Combined harvest groups			
	Light harvester				Medium harvester				High harvester				Does not usually harvest				Unknown							
	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Estimated total	95% CI
Kongiganak[a]	62	0	–	–	12	0	–	–	2	0	–	–	14	0	–	–	0	0	–	–	90	0	–	–
North Kuskokwim Bay	**62**	**0**	**–**	**–**	**12**	**0**	**–**	**–**	**2**	**0**	**–**	**–**	**14**	**0**	**–**	**–**	**0**	**0**	**–**	**–**	**90**	**0**	**–**	**–**
Tuntutuliak	40	25	0	0	21	13	0	0	17	12	0	0	33	20	0	0	1	1	1	0	112	71	1	0
Eek	43	28	0	0	11	7	0	0	3	1	0	0	41	17	0	0	1	1	0	0	99	54	16	11
Kasigluk	47	25	0	0	24	17	0	0	4	2	1	0	43	13	0	0	1	0	0	0	119	57	2	3
Nunapitchuk	44	26	0	0	17	11	0	0	17	8	0	0	45	19	0	0	0	0	0	0	123	64	13	9
Atmautluak	14	7	0	0	19	18	0	0	7	4	0	0	28	10	0	0	8	0	0	0	76	39	1	1
Napakiak	29	15	0	0	15	10	0	0	10	5	0	0	45	21	0	0	0	0	0	0	99	51	0	0
Napaskiak	37	10	0	0	22	12	0	0	6	4	0	0	41	10	0	0	15	1	0	0	121	37	4	6
Oscarville	3	3	0	0	7	6	0	0	1	0	0	0	5	5	0	0	1	1	0	0	17	15	0	0
Bethel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,750	535	0	0	1,750	535	586	368
Kwethluk	56	33	0	0	23	16	0	0	18	11	1	1	68	36	0	0	0	0	0	0	165	96	13	16
Akiachak	60	25	0	0	30	16	0	0	11	7	0	0	70	11	1	0	5	1	0	0	176	60	56	69
Akiak	27	11	0	0	16	13	0	0	13	10	0	0	33	5	0	0	5	4	0	0	94	43	4	3
Tuluksak	36	20	0	0	14	8	0	0	9	5	0	0	33	17	0	0	0	0	0	0	92	50	0	0
Lower Kuskokwim River	**436**	**228**	**0**	**0**	**219**	**147**	**0**	**0**	**116**	**69**	**0**	**0**	**485**	**184**	**0**	**0**	**1,787**	**544**	**0**	**0**	**3,043**	**1,172**	**695**	**375**
Lower Kalskag	36	12	0	0	9	5	0	0	1	0	0	0	39	15	0	0	0	0	0	0	85	32	0	0
Upper Kalskag	20	4	0	0	4	3	0	0	5	5	4	0	28	5	0	0	2	1	0	0	59	18	20	0
Aniak	68	27	0	0	13	9	0	0	6	4	1	1	58	10	0	0	18	14	0	0	163	64	10	9
Chuathbaluk	21	17	0	0	6	6	0	0	1	1	0	0	1	1	0	0	3	3	0	0	32	28	0	0
Middle Kuskokwim River	**145**	**60**	**0**	**0**	**32**	**23**	**0**	**0**	**13**	**10**	**2**	**0**	**126**	**31**	**0**	**0**	**23**	**18**	**0**	**0**	**339**	**142**	**30**	**9**

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Table D4.–Page 2 of 2.

Community	Household harvest groups: Light harvester				Medium harvester				High harvester				Does not usually harvest				Unknown				Combined harvest groups			
	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Mean	Standard error	Total households	Surveyed households	Estimated total	95% CI
Crooked Creek	14	10	0	0	3	3	0	0	2	2	3	0	13	9	0	0	7	5	0	0	39	29	5	0
Red Devil	4	4	0	0	1	1	0	0	0	0	0	0	1	1	0	0	1	0	0	0	7	6	0	0
Sleetmute	17	13	0	0	2	1	0	0	3	2	0	0	8	7	0	0	6	2	0	0	36	25	0	0
Stony River	6	4	1	0	1	1	0	0	0	0	0	0	6	1	0	0	5	3	2	1	18	9	11	13
Lime Village[a]	2	0	–	–	0	0	–	–	2	0	–	–	1	0	–	–	0	0	–	–	5	0	–	–
McGrath	37	18	0	0	7	4	0	0	1	1	0	0	72	30	0	0	2	1	0	0	119	54	0	0
Takotna	5	5	0	0	0	0	0	0	0	0	0	0	20	12	0	0	1	1	0	0	26	18	0	0
Nikolai	22	16	0	0	2	2	0	0	1	1	0	0	6	5	0	0	0	0	0	0	31	24	0	0
Upper Kuskokwim River	**107**	**70**	**0**	**0**	**16**	**12**	**0**	**0**	**9**	**6**	**1**	**0**	**127**	**65**	**0**	**0**	**22**	**12**	**0**	**0**	**281**	**165**	**16**	**11**
Kuskokwim River Total[b]	**688**	**358**	**0**	**0**	**267**	**182**	**0**	**0**	**138**	**85**	**0**	**0**	**738**	**280**	**0**	**0**	**1,832**	**574**	**0**	**0**	**3,663**	**1,479**	**741**	**375**
Quinhagak	82	46	0	0	33	24	1	0	16	12	0	0	45	20	0	0	3	0	0	0	179	102	28	29
Goodnews Bay	42	26	0	0	8	4	0	0	0	0	0	0	30	15	0	0	7	4	0	0	87	49	6	6
Platinum	9	5	0	0	3	1	0	0	2	2	8	0	1	0	0	0	3	1	0	0	18	9	18	3
South Kuskokwim Bay	**133**	**77**	**0**	**0**	**44**	**29**	**1**	**0**	**18**	**14**	**1**	**0**	**76**	**35**	**0**	**0**	**13**	**5**	**0**	**0**	**284**	**160**	**52**	**30**
Kuskokwim Area Total	**883**	**435**	**0**	**0**	**323**	**211**	**0**	**0**	**158**	**99**	**1**	**0**	**828**	**315**	**0**	**0**	**1,845**	**579**	**0**	**0**	**4,037**	**1,639**	**794**	**376**

Source ADF&G Division of Subsistence household surveys, 2021.

Note This table depicts only expanded harvest estimates by community. It does not include Bayesian estimates for missed communities. For full annual harvest estimate see Table 3-2.

Note Dashes indicate that data are unavailable or not applicable for this year.

a. No surveys were conducted in these communities.

b. Kuskokwim River Total includes the lower Kuskokwim River, middle Kuskokwim River, and upper Kuskokwim River.

APPENDIX E–SUBSISTENCE SALMON NEEDS, 2021

Table E1.–Comments provided by survey participants regarding whether or not their subsistence needs for Chinook salmon were met, surveyed communities, Kuskokwim Management Area, 2021.

			Percentage of households		
Community	Total households	Valid responses	Needs met	No need	Needs not met
Kongiganak[a]	90	0	–	–	–
North Kuskokwim Bay	**90**	**0**	**–**	**–**	**–**
Tuntutuliak	112	60	30%	3%	66%
Eek	99	48	36%	16%	48%
Kasigluk	119	48	13%	29%	58%
Nunapitchuk	123	57	29%	16%	55%
Atmautluak	76	30	26%	8%	66%
Napakiak	99	44	41%	5%	55%
Napaskiak	121	35	29%	3%	68%
Oscarville	17	15	21%	0%	79%
Bethel[b]	1,750	–	–	–	–
Kwethluk	165	93	43%	6%	52%
Akiachak	176	58	36%	7%	56%
Akiak	94	43	50%	0%	50%
Tuluksak	92	50	28%	6%	66%
Lower Kuskokwim River[c]	**3,043**	**581**	**33%**	**9%**	**58%**
Lower Kalskag	85	31	39%	7%	55%
Upper Kalskag	59	17	34%	28%	38%
Aniak	163	64	36%	27%	37%
Chuathbaluk	32	28	46%	15%	40%
Middle Kuskokwim River	**339**	**140**	**37%**	**21%**	**42%**
Crooked Creek	39	28	43%	12%	45%
Red Devil	7	6	33%	33%	33%
Sleetmute	36	22	36%	41%	23%
Stony River	18	9	59%	27%	14%
Lime Village[a]	5	–	–	–	–
McGrath	119	48	40%	29%	31%
Takotna	26	18	0%	31%	69%
Nikolai	31	20	43%	12%	45%
Upper Kuskokwim River[c]	**281**	**151**	**38%**	**26%**	**36%**
Kuskokwim River Total[c,d]	**3,663**	**872**	**34%**	**14%**	**52%**
Quinhagak	179	95	56%	5%	38%
Goodnews Bay	87	46	39%	28%	33%
Platinum	18	8	37%	13%	50%
South Kuskokwim Bay	**284**	**149**	**50%**	**13%**	**37%**
Kuskokwim Area Total[c]	**4,037**	**1,021**	**36%**	**14%**	**50%**

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Table E1.–Page 2 of 4.

Community	Percentage of household reasons for not meeting needs						
	Did not fish	Personal	Equipment	Expenses	Management (negative)	Run dynamics (negative)	River conditions (negative)
Kongiganak[a]	–	–	–	–	–	–	–
North Kuskokwim Bay	**–**	**–**	**–**	**–**	**–**	**–**	**–**
Tuntutuliak	3%	30%	10%	0%	52%	3%	0%
Eek	0%	32%	0%	0%	11%	30%	0%
Kasigluk	10%	11%	3%	0%	46%	6%	0%
Nunapitchuk	4%	0%	25%	0%	40%	3%	0%
Atmautluak	0%	12%	4%	4%	8%	13%	0%
Napakiak	9%	26%	11%	0%	25%	10%	0%
Napaskiak	0%	4%	9%	0%	36%	7%	0%
Oscarville	8%	16%	0%	0%	17%	17%	0%
Bethel[b]	–	–	–	–	–	–	–
Kwethluk	6%	21%	34%	0%	35%	2%	0%
Akiachak	9%	10%	7%	0%	51%	2%	0%
Akiak	17%	3%	5%	0%	59%	3%	0%
Tuluksak	3%	21%	46%	3%	18%	0%	0%
Lower Kuskokwim River[c]	**5%**	**15%**	**15%**	**1%**	**36%**	**6%**	**0%**
Lower Kalskag	0%	62%	26%	0%	7%	0%	0%
Upper Kalskag	0%	14%	5%	0%	27%	50%	0%
Aniak	4%	43%	16%	0%	14%	0%	0%
Chuathbaluk	20%	35%	0%	0%	18%	0%	0%
Middle Kuskokwim River	**4%**	**44%**	**16%**	**0%**	**14%**	**8%**	**0%**
Crooked Creek	40%	32%	14%	0%	0%	0%	0%
Red Devil	0%	50%	0%	0%	0%	0%	0%
Sleetmute	34%	0%	17%	0%	0%	17%	17%
Stony River	0%	0%	0%	0%	0%	0%	0%
Lime Village[a]	–	–	–	–	–	–	–
McGrath	45%	27%	7%	0%	0%	6%	0%
Takotna	54%	28%	0%	0%	0%	0%	0%
Nikolai	33%	43%	12%	0%	0%	0%	0%
Upper Kuskokwim River[c]	**41%**	**28%**	**8%**	**0%**	**0%**	**4%**	**1%**
Kuskokwim River Total[c,d]	**9%**	**20%**	**14%**	**0%**	**29%**	**6%**	**0%**
Quinhagak	9%	48%	31%	0%	0%	4%	2%
Goodnews Bay	8%	30%	0%	0%	0%	24%	0%
Platinum	0%	0%	88%	0%	0%	0%	0%
South Kuskokwim Bay	**8%**	**39%**	**28%**	**0%**	**0%**	**9%**	**1%**
Kuskokwim Area Total[c]	**9%**	**22%**	**15%**	**0%**	**26%**	**7%**	**0%**

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Table E1.–Page 3 of 4.

Community	Percentage of household reasons for not meeting needs							
	Weather	Voluntary conservation	Human theft	Animal	COVID	Not enough sharing	Other	Unknown[e]
Kongiganak[a]	–	–	–	–	–	–	–	–
North Kuskokwim Bay	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
Tuntutuliak	0%	0%	0%	0%	0%	3%	0%	0%
Eek	5%	0%	0%	0%	5%	16%	0%	0%
Kasigluk	13%	0%	0%	0%	10%	0%	0%	2%
Nunapitchuk	9%	0%	3%	0%	0%	7%	9%	0%
Atmautluak	19%	4%	8%	0%	20%	0%	4%	4%
Napakiak	0%	0%	0%	0%	0%	20%	0%	0%
Napaskiak	6%	0%	6%	0%	0%	18%	2%	12%
Oscarville	9%	0%	8%	0%	0%	8%	0%	17%
Bethel[b]	–	–	–	–	–	–	–	–
Kwethluk	0%	0%	0%	0%	0%	0%	0%	2%
Akiachak	4%	0%	0%	0%	2%	6%	9%	0%
Akiak	6%	0%	8%	0%	0%	0%	0%	0%
Tuluksak	3%	0%	0%	0%	0%	6%	0%	0%
Lower Kuskokwim River[c]	**6%**	**0%**	**2%**	**0%**	**3%**	**7%**	**3%**	**2%**
Lower Kalskag	0%	0%	0%	0%	0%	0%	0%	6%
Upper Kalskag	5%	0%	0%	0%	0%	0%	0%	0%
Aniak	0%	5%	0%	0%	0%	10%	0%	8%
Chuathbaluk	0%	0%	10%	8%	0%	10%	0%	0%
Middle Kuskokwim River	**1%**	**2%**	**1%**	**1%**	**0%**	**5%**	**0%**	**6%**
Crooked Creek	0%	0%	8%	0%	0%	0%	0%	6%
Red Devil	0%	0%	0%	0%	0%	0%	0%	50%
Sleetmute	0%	0%	0%	0%	0%	0%	0%	17%
Stony River	0%	0%	0%	0%	0%	0%	0%	100%
Lime Village[a]	–	–	–	–	–	–	–	–
McGrath	0%	0%	0%	0%	0%	6%	0%	7%
Takotna	0%	0%	0%	0%	0%	0%	9%	9%
Nikolai	0%	0%	0%	0%	0%	12%	0%	0%
Upper Kuskokwim River[c]	**0%**	**0%**	**1%**	**0%**	**0%**	**4%**	**2%**	**11%**
Kuskokwim River Total[c,d]	**4%**	**0%**	**2%**	**0%**	**2%**	**6%**	**2%**	**4%**
Quinhagak	0%	0%	0%	0%	0%	0%	0%	5%
Goodnews Bay	6%	0%	0%	0%	0%	8%	0%	23%
Platinum	12%	0%	0%	0%	0%	0%	0%	0%
South Kuskokwim Bay	**3%**	**0%**	**0%**	**0%**	**0%**	**2%**	**0%**	**10%**
Kuskokwim Area Total[c]	**4%**	**0%**	**2%**	**0%**	**2%**	**6%**	**2%**	**4%**

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Source ADF&G Division of Subsistence household surveys, 2021.

Note Dashes indicate that data are unavailable.

a. No surveys were conducted in these communities.

b. Questions about needs being met were not asked in Bethel for the 2021 fishing season.

c. Percentages in subtotals only include communities where data is available.

d. Kuskokwim River Total includes the lower Kuskokwim River, middle Kuskokwim River, and upper Kuskokwim River.

e. Unknown includes irrelevant responses, such as ‘Didn’t get enough.’

Table E2.–Comments provided by survey participants regarding whether or not their subsistence needs for chum salmon were met, surveyed communities, Kuskokwim Management Area, 2021.

Community	Total households	Valid responses	Percentage of households: Needs met	No need	Needs not met
Kongiganak[a]	90	0	–	–	–
North Kuskokwim Bay	**90**	**0**	**–**	**–**	**–**
Tuntutuliak	112	60	7%	14%	80%
Eek	99	49	31%	22%	47%
Kasigluk	119	48	20%	26%	54%
Nunapitchuk	123	57	16%	19%	65%
Atmautluak	76	31	10%	21%	69%
Napakiak	99	43	8%	21%	71%
Napaskiak	121	35	18%	14%	68%
Oscarville	17	15	6%	6%	88%
Bethel[b]	1,750	–	–	–	–
Kwethluk	165	93	8%	25%	67%
Akiachak	176	57	21%	18%	61%
Akiak	94	43	29%	12%	59%
Tuluksak	92	50	12%	16%	72%
Lower Kuskokwim River[c]	**3,043**	**581**	**16%**	**19%**	**65%**
Lower Kalskag	85	31	10%	28%	62%
Upper Kalskag	59	17	26%	30%	44%
Aniak	163	64	9%	58%	33%
Chuathbaluk	32	28	6%	29%	64%
Middle Kuskokwim River	**339**	**140**	**12%**	**43%**	**45%**
Crooked Creek	39	27	11%	36%	52%
Red Devil	7	6	17%	67%	17%
Sleetmute	36	22	12%	61%	27%
Stony River	18	9	26%	23%	51%
Lime Village[a]	5	–	–	–	–
McGrath	119	48	27%	41%	32%
Takotna	26	18	0%	51%	49%
Nikolai	31	21	5%	46%	49%
Upper Kuskokwim River[c]	**281**	**151**	**17%**	**44%**	**38%**
Kuskokwim River Total[c,d]	**3,663**	**872**	**16%**	**27%**	**58%**
Quinhagak	179	94	20%	26%	54%
Goodnews Bay	87	47	13%	68%	19%
Platinum	18	8	38%	49%	13%
South Kuskokwim Bay	**284**	**149**	**19%**	**40%**	**41%**
Kuskokwim Area Total[c]	**4,037**	**1,021**	**16%**	**29%**	**56%**

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Table E2.–Page 2 of 4.

Community	Percentage of household reasons for not meeting needs: Did not fish	Personal	Equipment	Expenses	Management (negative)	Run dynamics (negative)	River conditions (negative)
Kongiganak[a]	–	–	–	–	–	–	–
North Kuskokwim Bay	**–**	**–**	**–**	**–**	**–**	**–**	**–**
Tuntutuliak	0%	27%	8%	0%	12%	41%	0%
Eek	0%	23%	0%	0%	7%	44%	0%
Kasigluk	18%	15%	6%	0%	9%	34%	0%
Nunapitchuk	4%	0%	19%	0%	15%	46%	0%
Atmautluak	0%	11%	7%	4%	0%	49%	0%
Napakiak	4%	24%	9%	0%	12%	29%	0%
Napaskiak	0%	9%	9%	0%	6%	33%	0%
Oscarville	7%	7%	0%	0%	0%	56%	0%
Bethel[b]	–	–	–	–	–	–	–
Kwethluk	3%	16%	25%	0%	12%	28%	0%
Akiachak	6%	7%	4%	0%	26%	33%	0%
Akiak	12%	2%	2%	0%	24%	43%	0%
Tuluksak	3%	16%	45%	3%	8%	19%	0%
Lower Kuskokwim River[c]	**4%**	**13%**	**13%**	**0%**	**13%**	**36%**	**0%**
Lower Kalskag	0%	54%	22%	0%	0%	24%	0%
Upper Kalskag	0%	8%	0%	0%	0%	85%	0%
Aniak	0%	27%	16%	0%	5%	46%	0%
Chuathbaluk	12%	22%	0%	0%	0%	49%	0%
Middle Kuskokwim River	**2%**	**32%**	**13%**	**0%**	**2%**	**45%**	**0%**
Crooked Creek	35%	26%	13%	0%	0%	19%	0%
Red Devil	0%	0%	0%	0%	0%	100%	0%
Sleetmute	29%	14%	14%	0%	0%	14%	14%
Stony River	0%	0%	0%	0%	0%	100%	0%
Lime Village[a]	–	–	–	–	–	–	–
McGrath	44%	33%	7%	0%	0%	9%	0%
Takotna	47%	39%	0%	0%	0%	0%	0%
Nikolai	19%	29%	11%	0%	0%	40%	0%
Upper Kuskokwim River[c]	**34%**	**27%**	**8%**	**0%**	**0%**	**23%**	**1%**
Kuskokwim River Total[c,d]	**7%**	**17%**	**12%**	**0%**	**10%**	**36%**	**0%**
Quinhagak	5%	30%	23%	0%	0%	34%	0%
Goodnews Bay	14%	30%	0%	0%	0%	23%	0%
Platinum	0%	0%	100%	0%	0%	0%	0%
South Kuskokwim Bay	**6%**	**29%**	**22%**	**0%**	**0%**	**32%**	**0%**
Kuskokwim Area Total[c]	**7%**	**19%**	**13%**	**0%**	**9%**	**35%**	**0%**

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Table E2.–Page 3 of 4.

Community	Percentage of household reasons for not meeting needs: Weather	Voluntary conservation	Human theft	Animal	COVID	Not enough sharing	Other	Unknown[e]
Kongiganak[a]	–	–	–	–	–	–	–	–
North Kuskokwim Bay	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
Tuntutuliak	0%	0%	0%	0%	0%	4%	2%	4%
Eek	0%	0%	0%	0%	6%	21%	0%	0%
Kasigluk	5%	0%	0%	0%	11%	0%	0%	2%
Nunapitchuk	6%	0%	0%	0%	0%	4%	7%	0%
Atmautluak	0%	3%	3%	0%	19%	0%	0%	3%
Napakiak	0%	0%	0%	0%	0%	13%	0%	9%
Napaskiak	5%	6%	6%	0%	0%	18%	7%	2%
Oscarville	8%	0%	7%	0%	0%	7%	0%	7%
Bethel[b]	–	–	–	–	–	–	–	–
Kwethluk	2%	0%	0%	0%	0%	7%	0%	6%
Akiachak	8%	0%	0%	0%	2%	6%	8%	0%
Akiak	0%	0%	2%	0%	0%	2%	12%	0%
Tuluksak	0%	0%	0%	0%	0%	6%	0%	0%
Lower Kuskokwim River[c]	**3%**	**1%**	**1%**	**0%**	**3%**	**7%**	**3%**	**3%**
Lower Kalskag	0%	0%	0%	0%	0%	0%	0%	0%
Upper Kalskag	0%	0%	0%	0%	0%	0%	8%	0%
Aniak	0%	3%	0%	0%	0%	0%	0%	5%
Chuathbaluk	0%	0%	6%	5%	0%	6%	0%	0%
Middle Kuskokwim River	**0%**	**1%**	**1%**	**1%**	**0%**	**1%**	**1%**	**2%**
Crooked Creek	0%	0%	7%	0%	0%	0%	0%	0%
Red Devil	0%	0%	0%	0%	0%	0%	0%	0%
Sleetmute	0%	0%	0%	0%	0%	0%	0%	14%
Stony River	0%	0%	0%	0%	0%	0%	0%	0%
Lime Village[a]	–	–	–	–	–	–	–	–
McGrath	0%	0%	0%	0%	0%	0%	0%	7%
Takotna	0%	0%	0%	0%	0%	0%	13%	0%
Nikolai	0%	0%	0%	0%	0%	0%	0%	0%
Upper Kuskokwim River[c]	**0%**	**0%**	**1%**	**0%**	**0%**	**0%**	**2%**	**4%**
Kuskokwim River Total[c,d]	**2%**	**1%**	**1%**	**0%**	**2%**	**6%**	**3%**	**3%**
Quinhagak	0%	0%	0%	0%	0%	8%	0%	0%
Goodnews Bay	10%	0%	0%	0%	0%	14%	0%	10%
Platinum	0%	0%	0%	0%	0%	0%	0%	0%
South Kuskokwim Bay	**1%**	**0%**	**0%**	**0%**	**0%**	**8%**	**0%**	**1%**
Kuskokwim Area Total[c]	**2%**	**1%**	**1%**	**0%**	**2%**	**6%**	**3%**	**3%**

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Source ADF&G Division of Subsistence household surveys, 2021.

Note Dashes indicate that data are unavailable.

a. No surveys were conducted in these communities.

b. Questions about needs being met were not asked in Bethel for the 2021 fishing season.

c. Percentages in subtotals only include communities where data is available.

d. Kuskokwim River Total includes the lower Kuskokwim River, middle Kuskokwim River, and upper Kuskokwim River.

e. Unknown includes irrelevant responses, such as ‘Didn’t get enough.’

Table E3.–Comments provided by survey participants regarding whether or not their subsistence needs for sockeye salmon were met, surveyed communities, Kuskokwim Management Area, 2021.

Community	Total households	Valid responses	Percentage of households: Needs met	No need	Needs not met
Kongiganak[a]	90	0	–	–	–
North Kuskokwim Bay	**90**	**0**	**–**	**–**	**–**
Tuntutuliak	112	60	37%	5%	58%
Eek	99	49	41%	14%	45%
Kasigluk	119	49	48%	22%	30%
Nunapitchuk	123	57	56%	11%	32%
Atmautluak	76	31	31%	13%	56%
Napakiak	99	44	51%	5%	45%
Napaskiak	121	35	58%	3%	39%
Oscarville	17	15	49%	0%	51%
Bethel[b]	1,750	–	–	–	–
Kwethluk	165	93	49%	10%	41%
Akiachak	176	58	43%	7%	50%
Akiak	94	43	63%	0%	37%
Tuluksak	92	50	25%	6%	68%
Lower Kuskokwim River[c]	**3,043**	**584**	**46%**	**9%**	**45%**
Lower Kalskag	85	31	35%	14%	51%
Upper Kalskag	59	17	21%	36%	43%
Aniak	163	64	41%	29%	31%
Chuathbaluk	32	28	42%	19%	40%
Middle Kuskokwim River	**339**	**140**	**36%**	**25%**	**39%**
Crooked Creek	39	28	38%	19%	42%
Red Devil	7	6	67%	17%	17%
Sleetmute	36	22	40%	29%	31%
Stony River	18	9	82%	9%	8%
Lime Village[a]	5	–	–	–	–
McGrath	119	48	40%	29%	31%
Takotna	26	18	6%	31%	63%
Nikolai	31	20	6%	46%	48%
Upper Kuskokwim River[c]	**281**	**151**	**36%**	**28%**	**36%**
Kuskokwim River Total[c,d]	**3,663**	**875**	**43%**	**14%**	**43%**
Quinhagak	179	94	55%	9%	36%
Goodnews Bay	87	48	61%	19%	20%
Platinum	18	9	61%	0%	39%
South Kuskokwim Bay	**284**	**151**	**57%**	**12%**	**31%**
Kuskokwim Area Total[c]	**4,037**	**1,026**	**45%**	**14%**	**41%**

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Table E3.–Page 2 of 4.

Community	Percentage of household reasons for not meeting needs						
	Did not fish	Personal	Equipment	Expenses	Management (negative)	Run dynamics (negative)	River conditions (negative)
Kongiganak[a]	–	–	–	–	–	–	–
North Kuskokwim Bay	**–**	**–**	**–**	**–**	**–**	**–**	**–**
Tuntutuliak	0%	40%	12%	0%	37%	3%	0%
Eek	0%	33%	0%	0%	12%	6%	0%
Kasigluk	19%	21%	6%	0%	17%	4%	0%
Nunapitchuk	7%	0%	38%	0%	20%	0%	0%
Atmautluak	0%	9%	4%	5%	9%	0%	0%
Napakiak	11%	37%	14%	0%	24%	0%	0%
Napaskiak	0%	17%	16%	0%	22%	13%	0%
Oscarville	12%	24%	0%	0%	12%	0%	0%
Bethel[b]	–	–	–	–	–	–	–
Kwethluk	5%	26%	41%	0%	20%	2%	0%
Akiachak	7%	11%	5%	0%	50%	5%	0%
Akiak	22%	7%	7%	0%	45%	11%	0%
Tuluksak	3%	20%	48%	3%	17%	3%	0%
Lower Kuskokwim River[c]	**6%**	**21%**	**18%**	**1%**	**26%**	**4%**	**0%**
Lower Kalskag	0%	66%	27%	0%	7%	0%	0%
Upper Kalskag	20%	12%	0%	0%	20%	48%	0%
Aniak	0%	42%	17%	0%	15%	5%	0%
Chuathbaluk	27%	27%	0%	0%	18%	0%	0%
Middle Kuskokwim River	**6%**	**43%**	**15%**	**0%**	**13%**	**11%**	**0%**
Crooked Creek	51%	25%	15%	0%	0%	0%	0%
Red Devil	0%	100%	0%	0%	0%	0%	0%
Sleetmute	25%	25%	12%	0%	0%	12%	12%
Stony River	0%	0%	0%	0%	0%	0%	0%
Lime Village[a]	–	–	–	–	–	–	–
McGrath	45%	34%	7%	0%	0%	6%	0%
Takotna	59%	31%	0%	0%	0%	0%	0%
Nikolai	32%	31%	12%	0%	0%	24%	0%
Upper Kuskokwim River[c]	**43%**	**31%**	**9%**	**0%**	**0%**	**7%**	**1%**
Kuskokwim River Total[c,d]	**11%**	**26%**	**16%**	**0%**	**21%**	**6%**	**0%**
Quinhagak	12%	48%	37%	0%	0%	2%	0%
Goodnews Bay	12%	38%	0%	0%	0%	0%	0%
Platinum	0%	0%	73%	0%	0%	0%	0%
South Kuskokwim Bay	**11%**	**42%**	**33%**	**0%**	**0%**	**2%**	**0%**
Kuskokwim Area Total[c]	**11%**	**27%**	**18%**	**0%**	**19%**	**5%**	**0%**

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Table E3.–Page 3 of 4.

Community	Percentage of household reasons for not meeting needs							
	Weather	Voluntary conservation	Human theft	Animal	COVID	Not enough sharing	Other	Unknown[e]
Kongiganak[a]	–	–	–	–	–	–	–	–
North Kuskokwim Bay	–	–	–	–	–	–	–	–
Tuntutuliak	0%	0%	0%	0%	0%	3%	0%	6%
Eek	15%	0%	7%	0%	6%	21%	0%	0%
Kasigluk	15%	0%	0%	0%	19%	0%	0%	0%
Nunapitchuk	7%	0%	0%	0%	0%	12%	10%	6%
Atmautluak	32%	4%	8%	0%	24%	0%	5%	0%
Napakiak	0%	0%	0%	0%	0%	14%	0%	0%
Napaskiak	0%	0%	10%	0%	0%	19%	4%	0%
Oscarville	14%	0%	12%	0%	0%	12%	0%	12%
Bethel[b]	–	–	–	–	–	–	–	–
Kwethluk	3%	0%	0%	0%	0%	0%	0%	2%
Akiachak	9%	0%	0%	0%	3%	7%	3%	0%
Akiak	4%	0%	3%	0%	0%	0%	0%	0%
Tuluksak	0%	0%	0%	0%	0%	6%	0%	0%
Lower Kuskokwim River[c]	**7%**	**0%**	**2%**	**0%**	**4%**	**7%**	**2%**	**1%**
Lower Kalskag	0%	0%	0%	0%	0%	0%	0%	0%
Upper Kalskag	0%	0%	0%	0%	0%	0%	0%	0%
Aniak	0%	0%	0%	0%	0%	12%	5%	5%
Chuathbaluk	0%	0%	10%	8%	0%	10%	0%	0%
Middle Kuskokwim River	**0%**	**0%**	**1%**	**1%**	**0%**	**5%**	**2%**	**2%**
Crooked Creek	0%	0%	8%	0%	0%	0%	0%	0%
Red Devil	0%	0%	0%	0%	0%	0%	0%	0%
Sleetmute	0%	0%	0%	0%	0%	0%	0%	13%
Stony River	0%	0%	0%	0%	0%	0%	0%	100%
Lime Village[a]	–	–	–	–	–	–	–	–
McGrath	0%	0%	0%	0%	0%	0%	0%	7%
Takotna	0%	0%	0%	0%	0%	0%	10%	0%
Nikolai	0%	0%	0%	0%	0%	0%	0%	0%
Upper Kuskokwim River[c]	**0%**	**0%**	**1%**	**0%**	**0%**	**0%**	**2%**	**6%**
Kuskokwim River Total[c,d]	**5%**	**0%**	**2%**	**0%**	**3%**	**6%**	**2%**	**2%**
Quinhagak	0%	0%	0%	0%	0%	0%	0%	0%
Goodnews Bay	9%	0%	0%	0%	0%	12%	0%	28%
Platinum	0%	0%	27%	0%	0%	0%	0%	0%
South Kuskokwim Bay	**2%**	**0%**	**2%**	**0%**	**0%**	**2%**	**0%**	**5%**
Kuskokwim Area Total[c]	**5%**	**0%**	**2%**	**0%**	**2%**	**6%**	**2%**	**2%**

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Table E3.–Page 4 of 4.

Source ADF&G Division of Subsistence household surveys, 2021.

Note Dashes indicate that data are unavailable.

a. No surveys were conducted in these communities.

b. Questions about needs being met were not asked in Bethel for the 2021 fishing season.

c. Percentages in subtotals only include communities where data is available.

d. Kuskokwim River Total includes the lower Kuskokwim River, middle Kuskokwim River, and upper Kuskokwim River.

e. Unknown includes irrelevant responses, such as 'Didn't get enough.'

Table E4.–Comments provided by survey participants regarding whether or not their subsistence needs for coho salmon were met, surveyed communities, Kuskokwim Management Area, 2021.

			Percentage of households		
Community	Total households	Valid responses	Needs met	No need	Needs not met
Kongiganak[a]	90	0	–	–	–
North Kuskokwim Bay	**90**	**0**	**–**	**–**	**–**
Tuntutuliak	112	55	16%	50%	35%
Eek	99	48	43%	20%	37%
Kasigluk	119	48	11%	52%	37%
Nunapitchuk	123	57	25%	47%	27%
Atmautluak	76	31	26%	20%	54%
Napakiak	99	42	22%	45%	34%
Napaskiak	121	35	43%	14%	43%
Oscarville	17	14	31%	28%	41%
Bethel[b]	1,750	–	–	–	–
Kwethluk	165	93	23%	38%	39%
Akiachak	176	57	32%	32%	37%
Akiak	94	43	49%	13%	38%
Tuluksak	92	50	18%	20%	62%
Lower Kuskokwim River[c]	**3,043**	**573**	**28%**	**33%**	**39%**
Lower Kalskag	85	30	10%	40%	49%
Upper Kalskag	59	17	26%	33%	41%
Aniak	163	64	37%	39%	24%
Chuathbaluk	32	28	28%	36%	36%
Middle Kuskokwim River	**339**	**139**	**28%**	**38%**	**34%**
Crooked Creek	39	27	21%	29%	51%
Red Devil	7	6	33%	50%	17%
Sleetmute	36	22	31%	41%	27%
Stony River	18	9	47%	36%	17%
Lime Village[a]	5	–	–	–	–
McGrath	119	48	32%	37%	31%
Takotna	26	18	0%	51%	49%
Nikolai	31	21	20%	30%	51%
Upper Kuskokwim River[c]	**281**	**151**	**27%**	**37%**	**36%**
Kuskokwim River Total[c,d]	**3,663**	**863**	**28%**	**34%**	**38%**
Quinhagak	179	92	28%	36%	35%
Goodnews Bay	87	48	32%	42%	27%
Platinum	18	8	37%	13%	50%
South Kuskokwim Bay	**284**	**148**	**30%**	**37%**	**34%**
Kuskokwim Area Total[c]	**4,037**	**1,011**	**28%**	**35%**	**37%**

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Table E4.–Page 2 of 4.

Community	Percentage of household reasons for not meeting needs						
	Did not fish	Personal	Equipment	Expenses	Management (negative)	Run dynamics (negative)	River conditions (negative)
Kongiganak[a]	–	–	–	–	–	–	–
North Kuskokwim Bay	**–**	**–**	**–**	**–**	**–**	**–**	**–**
Tuntutuliak	5%	68%	21%	0%	0%	0%	0%
Eek	0%	43%	7%	0%	10%	7%	0%
Kasigluk	16%	27%	8%	0%	12%	3%	0%
Nunapitchuk	14%	0%	40%	0%	5%	7%	0%
Atmautluak	4%	29%	9%	5%	0%	0%	0%
Napakiak	10%	46%	19%	0%	5%	0%	0%
Napaskiak	0%	4%	11%	0%	9%	29%	0%
Oscarville	16%	16%	0%	0%	0%	0%	0%
Bethel[b]	–	–	–	–	–	–	–
Kwethluk	6%	22%	46%	0%	17%	0%	0%
Akiachak	22%	16%	4%	0%	28%	4%	0%
Akiak	48%	0%	7%	0%	21%	7%	0%
Tuluksak	3%	19%	52%	3%	9%	6%	0%
Lower Kuskokwim River[c]	**11%**	**23%**	**21%**	**1%**	**11%**	**6%**	**0%**
Lower Kalskag	0%	70%	30%	0%	0%	0%	0%
Upper Kalskag	0%	12%	0%	0%	0%	67%	0%
Aniak	0%	62%	21%	0%	4%	0%	0%
Chuathbaluk	30%	30%	0%	0%	0%	0%	0%
Middle Kuskokwim River	**3%**	**51%**	**18%**	**0%**	**1%**	**14%**	**0%**
Crooked Creek	44%	22%	13%	0%	0%	0%	0%
Red Devil	100%	0%	0%	0%	0%	0%	0%
Sleetmute	29%	14%	14%	0%	0%	14%	14%
Stony River	0%	0%	0%	0%	0%	0%	100%
Lime Village[a]	–	–	–	–	–	–	–
McGrath	45%	34%	7%	0%	0%	6%	0%
Takotna	47%	39%	0%	0%	0%	0%	0%
Nikolai	29%	39%	11%	0%	0%	22%	0%
Upper Kuskokwim River[c]	**40%**	**30%**	**9%**	**0%**	**0%**	**7%**	**4%**
Kuskokwim River Total[c,d]	**14%**	**29%**	**19%**	**1%**	**8%**	**7%**	**1%**
Quinhagak	8%	47%	37%	0%	0%	0%	0%
Goodnews Bay	16%	46%	0%	0%	0%	0%	0%
Platinum	0%	26%	26%	0%	0%	0%	0%
South Kuskokwim Bay	**9%**	**45%**	**27%**	**0%**	**0%**	**0%**	**0%**
Kuskokwim Area Total[c]	**13%**	**31%**	**20%**	**0%**	**7%**	**6%**	**1%**

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Table E4.–Page 3 of 4.

Community	Percentage of household reasons for not meeting needs							
	Weather	Voluntary conservation	Human theft	Animal	COVID	Not enough sharing	Other	Unknown[e]
Kongiganak[a]	–	–	–	–	–	–	–	–
North Kuskokwim Bay	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
Tuntutuliak	0%	0%	0%	0%	0%	5%	0%	0%
Eek	7%	0%	0%	0%	0%	26%	0%	0%
Kasigluk	18%	0%	0%	0%	16%	0%	0%	0%
Nunapitchuk	13%	0%	0%	0%	0%	8%	12%	0%
Atmautluak	20%	4%	0%	0%	25%	0%	0%	4%
Napakiak	0%	0%	0%	0%	0%	19%	0%	0%
Napaskiak	18%	0%	9%	0%	0%	17%	4%	0%
Oscarville	19%	0%	16%	0%	0%	16%	0%	16%
Bethel[b]	–	–	–	–	–	–	–	–
Kwethluk	6%	0%	0%	0%	0%	0%	0%	4%
Akiachak	10%	0%	0%	0%	4%	10%	4%	0%
Akiak	4%	0%	3%	0%	0%	4%	0%	7%
Tuluksak	0%	0%	0%	0%	0%	7%	0%	0%
Lower Kuskokwim River[c]	**9%**	**0%**	**1%**	**0%**	**4%**	**8%**	**2%**	**2%**
Lower Kalskag	0%	0%	0%	0%	0%	0%	0%	0%
Upper Kalskag	0%	0%	0%	0%	0%	0%	0%	21%
Aniak	0%	0%	0%	0%	0%	0%	0%	13%
Chuathbaluk	9%	0%	11%	9%	0%	11%	0%	0%
Middle Kuskokwim River	**1%**	**0%**	**1%**	**1%**	**0%**	**1%**	**0%**	**9%**
Crooked Creek	14%	0%	7%	0%	0%	0%	0%	0%
Red Devil	0%	0%	0%	0%	0%	0%	0%	0%
Sleetmute	0%	0%	0%	0%	0%	0%	0%	14%
Stony River	0%	0%	0%	0%	0%	0%	0%	0%
Lime Village[a]	–	–	–	–	–	–	–	–
McGrath	0%	0%	0%	0%	0%	0%	0%	7%
Takotna	0%	0%	0%	0%	0%	0%	13%	0%
Nikolai	0%	0%	0%	0%	0%	0%	0%	0%
Upper Kuskokwim River[c]	**3%**	**0%**	**1%**	**0%**	**0%**	**0%**	**2%**	**4%**
Kuskokwim River Total[c,d]	**7%**	**0%**	**1%**	**0%**	**3%**	**6%**	**1%**	**3%**
Quinhagak	0%	0%	0%	0%	0%	8%	0%	0%
Goodnews Bay	7%	0%	0%	0%	0%	9%	0%	21%
Platinum	0%	0%	0%	0%	0%	0%	12%	35%
South Kuskokwim Bay	**2%**	**0%**	**0%**	**0%**	**0%**	**8%**	**1%**	**8%**
Kuskokwim Area Total[c]	**6%**	**0%**	**1%**	**0%**	**2%**	**6%**	**1%**	**4%**

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Table E4.–Page 4 of 4.

Source ADF&G Division of Subsistence household surveys, 2021.

Note Dashes indicate that data are unavailable.

a. No surveys were conducted in these communities.

b. Questions about needs being met were not asked in Bethel for the 2021 fishing season.

c. Percentages in subtotals only include communities where data is available.

d. Kuskokwim River Total includes the lower Kuskokwim River, middle Kuskokwim River, and upper Kuskokwim River.

e. Unknown includes irrelevant responses, such as 'Didn't get enough.'

Table E5.–Comments provided by survey participants regarding whether or not their subsistence needs for pink salmon were met, surveyed communities, Kuskokwim Management Area, 2021.

			Percentage of households		
Community	Total households	Valid responses	Needs met	No need	Needs not met
Kongiganak[a]	90	0	–	–	–
North Kuskokwim Bay	**90**	0	**–**	**–**	**–**
Tuntutuliak	112	54	0%	100%	0%
Eek	99	44	2%	88%	10%
Kasigluk	119	48	4%	83%	12%
Nunapitchuk	123	57	4%	85%	11%
Atmautluak	76	29	0%	100%	0%
Napakiak	99	42	0%	100%	0%
Napaskiak	121	33	16%	79%	5%
Oscarville	17	15	0%	80%	20%
Bethel[b]	1,750	–	–	–	–
Kwethluk	165	91	0%	99%	1%
Akiachak	176	54	10%	76%	14%
Akiak	94	43	14%	74%	12%
Tuluksak	92	50	0%	100%	0%
Lower Kuskokwim River[c]	**3,043**	**560**	**5%**	**89%**	**7%**
Lower Kalskag	85	29	0%	100%	0%
Upper Kalskag	59	17	0%	91%	9%
Aniak	163	64	2%	97%	2%
Chuathbaluk	32	28	0%	92%	8%
Middle Kuskokwim River	**339**	**138**	**1%**	**96%**	**3%**
Crooked Creek	39	27	7%	86%	8%
Red Devil	7	6	0%	100%	0%
Sleetmute	36	22	8%	69%	23%
Stony River	18	9	8%	92%	0%
Lime Village[a]	5	–	–	–	–
McGrath	119	48	27%	44%	29%
Takotna	26	17	0%	100%	0%
Nikolai	31	21	5%	89%	5%
Upper Kuskokwim River[c]	**281**	**150**	**15%**	**68%**	**17%**
Kuskokwim River Total[c,d]	**3,663**	**848**	**6%**	**87%**	**8%**
Quinhagak	179	90	2%	95%	3%
Goodnews Bay	87	48	2%	98%	0%
Platinum	18	8	19%	81%	0%
South Kuskokwim Bay	**284**	**146**	**3%**	**95%**	**2%**
Kuskokwim Area Total[c]	**4,037**	**994**	**5%**	**88%**	**7%**

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Table E5.–Page 2 of 4.

Community	Percentage of household reasons for not meeting needs						
	Did not fish	Personal	Equipment	Expenses	Management (negative)	Run dynamics (negative)	River conditions (negative)
Kongiganak[a]	–	–	–	–	–	–	–
North Kuskokwim Bay	**–**	**–**	**–**	**–**	**–**	**–**	**–**
Tuntutuliak	0%	0%	0%	0%	0%	0%	0%
Eek	0%	27%	0%	0%	0%	0%	0%
Kasigluk	15%	15%	10%	0%	0%	0%	0%
Nunapitchuk	0%	0%	50%	0%	12%	0%	0%
Atmautluak	0%	0%	0%	0%	0%	0%	0%
Napakiak	0%	0%	0%	0%	0%	0%	0%
Napaskiak	0%	33%	33%	0%	0%	33%	0%
Oscarville	0%	0%	0%	0%	0%	0%	0%
Bethel[b]	–	–	–	–	–	–	–
Kwethluk	0%	0%	100%	0%	0%	0%	0%
Akiachak	32%	21%	0%	0%	18%	11%	0%
Akiak	57%	0%	0%	0%	11%	0%	0%
Tuluksak	0%	0%	0%	0%	0%	0%	0%
Lower Kuskokwim River[c]	**20%**	**14%**	**15%**	**0%**	**9%**	**5%**	**0%**
Lower Kalskag	0%	0%	0%	0%	0%	0%	0%
Upper Kalskag	0%	0%	0%	0%	0%	100%	0%
Aniak	0%	0%	0%	0%	0%	0%	0%
Chuathbaluk	50%	0%	0%	0%	0%	0%	0%
Middle Kuskokwim River	**12%**	**0%**	**0%**	**0%**	**0%**	**53%**	**0%**
Crooked Creek	46%	0%	0%	0%	0%	0%	0%
Red Devil	0%	0%	0%	0%	0%	0%	0%
Sleetmute	34%	0%	17%	0%	0%	0%	0%
Stony River	0%	0%	0%	0%	0%	0%	0%
Lime Village[a]	–	–	–	–	–	–	–
McGrath	48%	29%	8%	0%	0%	7%	0%
Takotna	0%	0%	0%	0%	0%	0%	0%
Nikolai	0%	100%	0%	0%	0%	0%	0%
Upper Kuskokwim River[c]	**44%**	**25%**	**9%**	**0%**	**0%**	**5%**	**0%**
Kuskokwim River Total[c,d]	**27%**	**17%**	**12%**	**0%**	**5%**	**9%**	**0%**
Quinhagak	0%	50%	50%	0%	0%	0%	0%
Goodnews Bay	0%	0%	0%	0%	0%	0%	0%
Platinum	0%	0%	0%	0%	0%	0%	0%
South Kuskokwim Bay	**0%**	**50%**	**50%**	**0%**	**0%**	**0%**	**0%**
Kuskokwim Area Total[c]	**26%**	**18%**	**13%**	**0%**	**5%**	**8%**	**0%**

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Table E5.–Page 3 of 4.

Community	Percentage of household reasons for not meeting needs							
	Weather	Voluntary conservation	Human theft	Animal	COVID	Not enough sharing	Other	Unknown[e]
Kongiganak[a]	–	–	–	–	–	–	–	–
North Kuskokwim Bay	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
Tuntutuliak	0%	0%	0%	0%	0%	0%	0%	0%
Eek	0%	0%	0%	0%	0%	73%	0%	0%
Kasigluk	10%	0%	0%	0%	48%	0%	0%	0%
Nunapitchuk	0%	0%	0%	0%	0%	20%	17%	0%
Atmautluak	0%	0%	0%	0%	0%	0%	0%	0%
Napakiak	0%	0%	0%	0%	0%	0%	0%	0%
Napaskiak	0%	0%	0%	0%	0%	0%	0%	0%
Oscarville	37%	0%	32%	0%	0%	0%	0%	32%
Bethel[b]	–	–	–	–	–	–	–	–
Kwethluk	0%	0%	0%	0%	0%	0%	0%	0%
Akiachak	0%	0%	0%	0%	11%	0%	0%	7%
Akiak	0%	0%	0%	0%	0%	0%	0%	32%
Tuluksak	0%	0%	0%	0%	0%	0%	0%	0%
Lower Kuskokwim River[c]	**3%**	**0%**	**1%**	**0%**	**11%**	**12%**	**3%**	**8%**
Lower Kalskag	0%	0%	0%	0%	0%	0%	0%	0%
Upper Kalskag	0%	0%	0%	0%	0%	0%	0%	0%
Aniak	0%	0%	0%	0%	0%	0%	0%	100%
Chuathbaluk	0%	0%	0%	0%	0%	0%	0%	50%
Middle Kuskokwim River	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**35%**
Crooked Creek	0%	0%	0%	0%	0%	0%	0%	54%
Red Devil	0%	0%	0%	0%	0%	0%	0%	0%
Sleetmute	0%	0%	0%	0%	0%	0%	0%	50%
Stony River	0%	0%	0%	0%	0%	0%	0%	0%
Lime Village[a]	–	–	–	–	–	–	–	–
McGrath	0%	0%	0%	0%	0%	0%	0%	8%
Takotna	0%	0%	0%	0%	0%	0%	0%	0%
Nikolai	0%	0%	0%	0%	0%	0%	0%	0%
Upper Kuskokwim River[c]	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**18%**
Kuskokwim River Total[c,d]	**2%**	**0%**	**1%**	**0%**	**7%**	**7%**	**2%**	**13%**
Quinhagak	0%	0%	0%	0%	0%	0%	0%	0%
Goodnews Bay	0%	0%	0%	0%	0%	0%	0%	0%
Platinum	0%	0%	0%	0%	0%	0%	0%	0%
South Kuskokwim Bay	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**
Kuskokwim Area Total[c]	**2%**	**0%**	**1%**	**0%**	**7%**	**7%**	**2%**	**13%**

-continued-

Source ADF&G Division of Subsistence household surveys, 2021.

Note Dashes indicate that data are unavailable.

a. No surveys were conducted in these communities.

b. Questions about needs being met were not asked in Bethel for the 2021 fishing season.

c. Percentages in subtotals only include communities where data is available.

d. Kuskokwim River Total includes the lower Kuskokwim River, middle Kuskokwim River, and upper Kuskokwim River.

e. Unknown includes irrelevant responses, such as 'Didn't get enough.'