

An Overview of the Subsistence Fisheries of the Bristol Bay Management Area, Alaska

by

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and

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Alaska Department of Fish and Game

Division of Subsistence



Symbols and Abbreviations

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

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**AN OVERVIEW OF THE SUBSISTENCE FISHERIES OF THE BRISTOL
BAY AREA**

by

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EXECUTIVE SUMMARY

- Bristol Bay subsistence fisheries are an essential component of the local economy and way of life of Bristol Bay communities. About 58% of the subsistence harvest by local community residents, as measured in pounds usable weight, is Pacific salmon *Oncorhynchus* and about 9% is other fishes.
- The Alaska Board of Fisheries (board) has found that all finfishes of the Bristol Bay Area (BBA) are customarily taken or used for subsistence purposes. As established by the board, amounts reasonably necessary for subsistence uses (ANS) include 157,000–172,171 salmon (including 55,000–65,000 Kvichak River drainage sockeye salmon *O. nerka*) and 250,000 pounds usable weight of other finfishes.
- The number of Bristol Bay subsistence salmon permits issued has been stable since 1990. The recent 5-year average (2013–2017) is 1,143 permits.
- Most subsistence permit holders are residents of Bristol Bay communities: for the 2008–2017 period 81% of permit holders were Bristol Bay residents.
- Most subsistence permits are issued for the Nushagak and Naknek-Kvichak districts.
- Sockeye salmon make up the largest portion of the Bristol Bay subsistence salmon harvest. As reported on subsistence permits: sockeye comprise 78% of the historical average (1983–2017), followed by king *O. tshawytscha* (10%), coho *O. kisutch* (6%), chum *O. keta* (4%), and pink salmon *O. gorbuscha* (2%).
- Annual subsistence salmon harvests in the Bristol Bay Area (BBA) declined from the early 1990s to the early 2000s. Since 1983, the average annual harvest has been approximately 142,737 salmon whereas the recent 5-year average (2013–2017) was 122,342 salmon. Estimated harvests in 2016 (116,537) and 2017 (115,393), are among some of the lowest since 2010 (113,238) and 2002 (109,587 salmon).
- Within the BBA, the Nushagak District continues to support the largest king salmon subsistence harvest, followed by the Naknek-Kvichak District, and is reflected in the 10-year average of both watersheds. Permits issued for subsistence are the highest for the Nushagak District (554 permits between 2008–2017), followed by the Naknek-Kvichak District (463 permits).
- A general decline has occurred since 1991 in the Kvichak River watershed subsistence sockeye salmon fishery, historically the largest component of the Bristol Bay subsistence salmon harvest. The long term (1963–2017) average annual harvest for this fishery is 62,065 sockeye salmon. The recent 5-year average annual harvest is 36,266 sockeye salmon. Harvests in 2016 (30,649) and 2017 (27,832) were some of the lowest on record. Declines are due to lower harvests per permit rather than less fishing effort, as permits issued have remained stable.
- Other fishes taken for subsistence purposes in the BBA include Pacific herring *Clupea pallasii*, various species of smelt, Dolly Varden *Salvelinus malma*, lake trout *S. namaycush*, rainbow trout *O. mykiss*, Arctic grayling *Thymallus arcticus*, northern pike *Esox lucius*, various species of whitefishes *Coregonus*, *Prosopium*, burbot *Lota lota*, and Alaska blackfish *Dallia pectoralis*. Although there are no Alaska

Department of Fish and Game (department) annual subsistence harvest assessment programs for these species, harvest estimates are available through periodic subsistence household surveys. These fishes are taken throughout the year with a variety of harvest methods and are an important part of annual subsistence uses in the general Bristol Bay area.

Key words: subsistence fishing, Kvichak River, Nushagak River, Bristol Bay, subsistence permit, sockeye salmon, Board of Fisheries.

1. INTRODUCTION

In an area that is world-renowned for its commercial fisheries and its recreational fishing opportunities, subsistence uses of wild renewable resources remain the most consistent and the most reliable component of the local economy of Bristol Bay communities (Figure 1-1). Subsistence fishing, hunting, and gathering provide hundreds of pounds of highly nutritious food for residents of the area. Much of the seasonal round of activities is shaped by the natural cycles of fishes, birds, mammals, and plants. Knowledge that is fundamental to making a living in the region is preserved and communicated through gathering and processing of wild resources, including fishing and hunting activities. Values that support families and communities are expressed, emphasized, and taught during the harvest, preparation, and sharing of wild foods. In the 20th century, much economic, social, cultural, and demographic change took place in Bristol Bay during the evolution of its economy, which is a mixture of cash and subsistence sectors. In the 21st century, subsistence activities and values remain a cornerstone of area residents' way of life, a link to the traditions of the past, and one of their bases for survival, sustainability, and prosperity.

This report briefly describes the subsistence fisheries of the Bristol Bay Area (BBA), with a primary focus on the fisheries for Pacific salmon *Oncorhynchus*. It is based on information gathered from the subsistence salmon permit program administered by the department's divisions of Subsistence and Commercial Fisheries, as well as research conducted by the Division of Subsistence. This current 2018 report contains updated harvest and permit information, as well as historical harvest and permit numbers values that remain relevant for the Bristol Bay Area. The last report on the subsistence fisheries of Bristol Bay was submitted to the board in 2015 (Krieg et al. 2015).

THE BRISTOL BAY REGION

Population, Communities, and Cash Economy

According to the Alaska Department of Labor and Workforce Development, the population of the general Bristol Bay area in 2017 was 9,179 in 26 communities, which also include those remainder populations outside of established communities (Table 1-1). There are two regional centers: Dillingham (population 2,335 in 2017) and the Bristol Bay Borough, which consists of Naknek, South Naknek, and King Salmon (population 887 in 2017). The portion of the Lake and Peninsula Borough, within the Bristol Bay Management Area, had a 2017 total population of 3,367, which consisted of 13 communities. According to the 5-year American Community Survey average (2012–2016), the Alaska Native population of the BBA was 5,883 people, or 84% (Table 1-1). The Dillingham Census Area has the highest Alaska Native population at 95%, followed by the Lake and Peninsula Borough at 73%. Alaska Native peoples of the area include Central Yup'ik, Dena'ina Athabascan, and Alutiiq.

Commercial fishing and services dominate the cash economy of the area, and thus the economy is highly seasonal. According to the 2012–2016 American Community Survey¹, the 5-year estimated per capita income for the Dillingham area is \$23,520, \$41,420 for the Bristol Bay Borough, and \$22,684 for the Lake and Peninsula Borough, which all range around the Alaska

1. United States Census Bureau FactFinder: <https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF>. Accessed 9/20/2018

average of \$34,191 (U.S. Census Bureau 2011). Studies by the Division of Subsistence have also documented a pattern of seasonal employment, reliance on commercial fishing, and relatively low cash incomes (Fall et al. 2006; D. L. Holen et al. 2012; Holen et al. 2011; Krieg et al. 2009) (see also the Division of Subsistence Community Subsistence Information System².)

General Patterns of Subsistence Harvests

Since 1990, under state regulations, all Alaska state residents have been eligible to participate in subsistence salmon fishing in all Bristol Bay drainages. Subsistence harvests in the BBA are among the largest in the state and are very diverse. Based on the results of the most recent comparative analysis of permit returns and postseason household surveys conducted by the Division of Subsistence, the 2014 estimated annual BBA harvest of salmon was 194 usable pounds per person (Figure 1-2) (Fall 2016)³. The BBA has the highest percentage of the total noncommercial harvest of wild resources that is composed of salmon (58%); this is more than any other management area or the combined urban Alaska areas (nonsubsistence areas) (Figure 1-3). As shown in Figure 1-4, salmon made up 58% of the estimated 2014 harvest; land mammals (mostly moose *Alces alces* and caribou *Rangifer tarandus*) were 20%, fishes other than salmon composed 9%, and other resources, such as marine mammals, birds and eggs, marine invertebrates, and wild plants, provided 13% of the harvest.

Wild resource harvests are generally higher in smaller communities of the BBA than in the 2 regional centers of Dillingham and the Bristol Bay Borough. The harvest estimate from the 1980s–2000s for the smaller communities was 426 pounds per person per year, with a household average of 1,541 pounds. The composition of subsistence harvests in the smaller communities for this same period, was similar to that of the area overall at 51% salmon, 25% land mammals, 11% other fishes, and 13% other resources.

THE BRISTOL BAY AREA SUBSISTENCE SALMON FISHERIES

Regulations

The Alaska Board of Fisheries (board) has found that salmon of the BBA support customary and traditional (subsistence) uses (5 AAC 01.336). In 1993, the board established a range of 157,000–172,171 salmon as the amount reasonably necessary for subsistence uses (ANS). The recent 5-year, 10-year, and 20-year averages for the total BBA subsistence salmon harvest show that harvests were below the ANS, with high harvest years (over 157,000 fish) occurring prior to 1994 (Table 1-2). In 2001, the finding was amended to specify that, of the total ANS, 55,000–65,000 Kvichak River drainage sockeye salmon *O. nerka* (excluding Alagnak River stocks) were necessary to provide a reasonable opportunity for subsistence uses. For historical context, subsistence fishing seasons were tied to commercial opener dates from the beginning of the subsistence permit system in 1960 (5 AAC 104.90 to 5 AAC 104.93). In 1969, the first weekly fishing periods was established in the Naknek River, which opened subsistence fishing for one 24-hour period and closed the remaining six days. This restriction was put in place to reduce alleged illegal fishing and had the effect that most subsistence fishers then chose to retain their subsistence fish off their commercial catch⁴ (Morris 1985). This regulation was repealed in 1971

2. ADF&G Community Subsistence Information System: <http://www.subsistence.adfg.state.ak.us/CSIS>. Hereinafter cited as CSIS.

3. An update through 2016 is currently in preparation by the Division of Subsistence.

4. Bristol Bay Data Report No.19 Subsistence Fishing in Bristol Bay, 1963- 1969. ADF&G, Division of Commercial Fish, Dillingham, Alaska, March 27, 1970.

(5 AAC 06.920., Register 37). In 1974 the Nushagak District restricted subsistence fishing for three 24-hour periods between June 16 through July 17 (5 AAC 06.920.). No historical reference was found for the three 24-hour restriction in the subsistence fishery for the Nushagak District, but it may be related to a similar condition as the Naknek River restriction. Anecdotal evidence suggests that waste of salmon by inexperienced subsistence fishers and an increased population in the early 1980s and onwards for the Dillingham area, prompted a restriction by day and time in the subsistence fishery.

In 2016, the board adopted Global Positioning System (GPS) coordinates for all boundaries of the Nushagak District, which clarified subsistence areas and boundaries (5 AAC 01.310(d)) (Elison et al. 2018). Starting in the 2017–2018 regulatory year, subsistence fishing in the Naknek, Ugashik, and Egegik districts opened 7-days per week, which repealed the 24-hour subsistence openers which had previously characterized those areas (5 AAC 01.310 [e] repealed 4/16/2016).

The following is a synopsis of the key provisions of state subsistence salmon fishing regulations for the BBA.

- Permits: Required. Limit of one per household. Must be returned with a record of harvest.
- Seasonal limits: With one exception, none established in regulation, although the department may set harvest limits for conservation reasons. The exception is in the Naknek District, where there is an annual possession limit of 200 sockeye salmon taken after August 15, with additional fish allowed upon request.
- Gear: Drift and set gillnets in waters open to commercial fishing. Set gillnets only in other waters, with certain exceptions. Spears and drift gear may be used in the Togiak River. Nets may be up to 25 fathoms in length except in the Naknek, Egegik, and Ugashik rivers, in Dillingham beach areas, and during emergency openings in the Nushagak District, where they may be no more than 10 fathoms in length. In December 2009, the board allowed for 25 fathom nets to be used in the Nushagak River, above Lewis Point and Red Bluff. Subsistence fishing by hook and line, unless through the ice, is prohibited.
- In 1998, the board adopted new regulations for the taking of “redfish” (spawning sockeye salmon) in portions of the Naknek District. In 2006, the board adopted regulations to allow harvest of salmon by spear in Lake Clark (excluding its tributaries) and by beach seines in Iliamna Lake, Sixmile Lake, and Lake Clark. Beach seines may not exceed 25 fathoms in length. In 2016, beach seines were added as an allowable gear type in various sections of Naknek Lake (5 AAC 01.320. [2]). In 2016, subsistence fishing was also opened from August 30 through December 31, including fishing in the mouth of the Brooks River, which opened from September 18 through December 31. These dates reflect the “redfish” season for spawning sockeye salmon. Gillnets, spears, and dip nets may be used along a 100-yard portion of the west shore of Naknek Lake near its outlet to the Naknek River from August 30 through September 30; at Johnny’s Lake from August 15 through September 15; and at the mouth of the Brooks River from October 1 through November 15.
- Seasons: Except as follows, fishing is open at any time.

- In areas open to commercial fishing: from May 1–31 and October 1–31, from 9:00 a.m. Monday to 9:00 a.m. Friday; from June 1–September 30, during open commercial fishing periods. When the district is closed to commercial fishing, subsistence is also closed except for the Nushagak District where the commissioner, by emergency order, shall provide for subsistence during periods of extended closure.
- In the area of the Nushagak District generally called the “Dillingham beaches:” from July 2–July 17, three 24-hour periods per week (from 9:00 a.m. Monday to 9:00 a.m. Tuesday, 9:00 a.m. Wednesday to 9:00 a.m. Thursday, and 9:00 a.m. Saturday to 9:00 a.m. Sunday). This area is defined by latitude and longitude markers, more generally described as two miles south of Bradford Point to Nushagak Point, to a point at Red Bluff on the west shore of the Wood River, and to Lewis Point on the north shore on the Nushagak River.

Brief Synopsis of Federal Subsistence Regulations

Federal subsistence regulations apply on waters within or adjacent to the Togiak National Wildlife Refuge (NWR), Becharof NWR, Alaska Peninsula NWR, Alagnak Wild and Scenic River corridor, Katmai National Preserve (not Park), and the Lake Clark National Park and Preserve. Subsistence regulations on federal lands in Bristol Bay follow closely to State statutes and permits are required for all subsistence fishing for salmon. Unlike State regulations, there is no limit for salmon for residents of the Naknek and Kvichak River drainages. Special provisions include the use of beach seine for salmon in Lake Clark, excluding its tributaries, by federally qualified residents. Subsistence salmon can also be harvested by snagging (by handline or rod and reel), without a permit, in Lake Clark, including its tributaries.

The Subsistence Permit Program

As noted above, subsistence salmon fishers in the BBA are required to obtain an annual subsistence permit from the department. These permits are issued free of charge and are issued only to Alaska residents. The permit includes a harvest calendar for recording daily harvests by species and location. These permits are available at department offices in Dillingham, King Salmon, and Anchorage, and from vendors in most area communities. The divisions of Subsistence and Commercial Fisheries share the responsibility of administering the Bristol Bay subsistence permit program.

Since 1963, subsistence salmon harvest data based on permit returns have been reported in the department’s Bristol Bay Annual Management Report series (“AMRs”) prepared by the Division of Commercial Fisheries. Since 1983, the Division of Subsistence has performed data entry and analysis for the permit program. To ensure high permit return rates, staff mail three reminder letters to permit holders, visit area communities, and contact permit recipients by telephone, as time and funding permit. According to Jones et al. (2013), “Most fishermen are obtaining permits and reporting their catches, and overall permit returns have averaged between 85% and 90% annually. However, fish removed for home use from commercial catches are not included in most reported subsistence harvest totals. Also, fish caught later in the season, such as coho salmon and spawning salmon, are probably not documented as consistently as king and sockeye salmon” (Jones et al. 2013:18). Most subsistence fishing households in the BBA that obtain salmon permits also return them along with the harvest record on the back of the permit.

Participation

Figure 1-5 illustrates the number of subsistence permits issued for the BBA from 1983 through 2017 (see also Table 1-2, Appendix A1). The historical average from 1985–2017 of Bristol Bay subsistence permits issued is 1,100 annually, with the harvest per permit estimated at 132 fish. The recent 10-year average (2008–2017) is 1,127 permits. Since the early 1990s, the number of subsistence permits issued annually for Bristol Bay has been stable, which is also reflected in the recent 5-year average of 1,143 issued permits. Appendix A2 reports participation and harvest levels by district and subdistrict for 2017, the most recent study year for which data are available. The Nushagak District reported the highest number of issued permits (562), followed by the Naknek-Kvichak District (441 permits).

The majority of participants in the Bristol Bay subsistence salmon fishery are year-round residents of Bristol Bay communities. For the 10-year period from 2008–2017, 81% of the permits were issued to Bristol Bay residents and 19% to other Alaska residents. These percentages have been fairly steady since 1992 (Figure 1-5).

Subsistence Salmon Harvests

Figure 1-6 illustrates the estimated subsistence salmon harvests for the BBA for 1983–2017 (see also Table 1-2 and Appendix A1). The estimate is based on permit returns and then expanded using a weight that takes into consideration nonreturned permits. The expansion method is ($Wt = Pi/Pr$), where Wt is the weight, Pi is the number of permits issued by community, and Pr is the number of permits returned by community.

The BBA 34-year average estimated harvest is 142,737 salmon, the most recent 10-year (2008–2017) average is 123,565 salmon, and the most recent 5-year average is 122,342 salmon (Table 1-2). These data show that after about two decades of relative stability through the 1990s, a downward trend in total subsistence salmon harvests began in Bristol Bay. Although harvests in 2003–2009 rebounded from near record lows from 2000–2002, these were still years of low returns of sockeye salmon and low subsistence salmon harvests in the BBA. The lowest subsistence harvest for the BBA occurred in 2002 (109,587 fish) but rebounded the following year to 131,667 fish. A relatively high harvest persisted for six years after 2003 yet dropped again to 113,238 fish in 2010. Another reduction in total harvest (116,537) occurred in 2016 but was slightly higher than the 2017 harvest of 115,393 salmon. Data for 2018 are not yet available.

These low harvest years coincided with equally low numbers of salmon harvested per permit, which had a consistent decline from 1983 onwards. The 1990s show a steady drop in salmon per permit, beginning at 157 fish in 1990, and ending at 119 fish per permit in 1999. Since then, harvests have not reached greater than 120 fish per permit except in 2005 (Table 1-2).

Average harvests per permit in the BBA subsistence salmon fishery declined over the 1983–2002 period and especially from 1991–2002 (Figure 1-7). They have increased since 2002. For the overall period from 1983–2017, the average harvest per permit is about 132 salmon; for the most recent 10-year period, this average is 110 salmon; and for the most recent 5-year period, the average is 107 salmon. The average harvest per permit in 2017 was 105 salmon (Table 1-2).

From 1983–2017, sockeye salmon has been the dominant species for subsistence fishers in the BBA, with a historical harvest of 78% of the total subsistence salmon harvest (Table 1-2 and Figure 1-8). King salmon *O. tshawytscha* ranked second at 10%, followed by coho salmon *O.*

kisutch (6%), chum salmon *O. keta* (4%), and pink salmon *O. gorbuscha* (2%). This composition has remained relatively stable over time.

Figure 1-9 and Table 1-3 illustrate the most recent 10-year (2008–2017) estimated, expanded average subsistence salmon harvest for each of the five Bristol Bay districts. The Naknek-Kvichak District accounted for the largest portion of the subsistence harvest at 54% (66,174 estimated salmon); the Nushagak District ranked second at 40% (49,024), followed by Togiak at 4% (5,300), Egegik at 1% (1,660) and Ugashik at 1% (1,056)

For the most recent 10-year period (2008–2017), 90% of the total harvest was taken by local permit holders (who account for 81% of the permits), and 10% by other Alaska residents (who account for 19% of the permits) (figures 1-5 and 1-10). Within the BBA, average subsistence salmon harvests per permit differ by district. The largest annual average harvest from 2008 through 2017 occurred in the Naknek-Kvichak District at 143 fish per permit, followed by the Nushagak District (88 salmon/permit), Togiak District (87 salmon/permit), Ugashik District (62 salmon/permit), and the Egegik District (49 salmon/permit) (Table 1-3 and Figure 1-11).

Table 1-1.—Population of the Bristol Bay Area, Alaska 1980, 1990, 2000, 2010, and 2017.

Area	U.S. Census										5-year American Community Survey (2012–2016)			ADLWD
	1980	1990			2000			2010			Total	Alaska Native		Total
	total	Total	Alaska Native		Total	Alaska Native		Total	Alaska Native			population		
population	population	Number	Percent	population	Number	Percent	population	Number	Percent	population	Number	Percent	population	
<i>Dillingham Census Area</i>														
Aleknagik	154	185	154	83.2%	221	187	84.6%	219	185	84.5%	189	171	90.5%	208
Clarks Point	79	60	53	88.3%	75	69	92.0%	62	55	88.7%	47	47	100.0%	55
Dillingham	1,563	2,017	1,125	55.8%	2,466	1,503	60.9%	2,329	1,549	66.5%	2,296	1,531	66.7%	2,335
Ekuk	7	3	2	66.7%	a	a	a	a	a	a	a	a	a	a
Ekwok	77	77	67	87.0%	130	122	93.8%	115	109	94.8%	79	76	96.2%	98
Koliganek	117	181	174	96.1%	182	159	87.4%	209	202	96.7%	162	140	86.4%	208
Manokotak	294	385	368	95.6%	399	378	94.7%	442	425	96.2%	787	631	80.2%	487
New Stuyahok	331	391	375	95.9%	471	452	96.0%	510	491	96.3%	566	562	99.3%	504
Portage Creek	48	5	3	60.0%	36	31	86.1%	2	1	50.0%	0	0	0.0%	1
Togiak	470	613	535	87.3%	809	750	92.7%	817	767	93.9%	771	690	89.5%	870
Twin Hills	70	66	61	92.4%	69	65	94.2%	74	72	97.3%	74	73	98.6%	86
Remainder	22	29	8	27.6%	64	37	57.8%	68	39	57.4%	d	d	d	73
<i>Subtotal</i>	<i>3,232</i>	<i>4,012</i>	<i>2,925</i>	<i>72.9%</i>	<i>4,922</i>	<i>3,753</i>	<i>76.2%</i>	<i>4,847</i>	<i>3,895</i>	<i>80.4%</i>	<i>4,971</i>	<i>4,704</i>	<i>94.6%</i>	<i>4,925</i>
<i>Bristol Bay Borough</i>														
King Salmon	545	696	108	15.5%	442	133	30.1%	374	132	35.3%	343	84	24.5%	309
Naknek	318	575	236	41.0%	678	319	47.1%	544	283	52.0%	544	255	46.9%	504
South Naknek	145	136	108	79.4%	137	115	83.9%	79	66	83.5%	55	47	85.5%	74
Remainder	86	3	3	100.0%	1	0	0.0%	0	0	0.0%	d	d	d	0
<i>Subtotal</i>	<i>1,094</i>	<i>1,410</i>	<i>455</i>	<i>32.3%</i>	<i>1,258</i>	<i>567</i>	<i>45.1%</i>	<i>997</i>	<i>481</i>	<i>48.2%</i>	<i>942</i>	<i>386</i>	<i>41.0%</i>	<i>887</i>
<i>Lake and Peninsula Borough^b</i>														
Egegik	75	122	86	70.5%	116	89	76.7%	109	51	46.8%	80	26	32.5%	76
Igiugig	33	33	26	78.8%	53	44	83.0%	50	35	70.0%	47	42	89.4%	57
Iliamna	94	94	62	66.0%	102	59	57.8%	109	71	65.1%	86	62	72.1%	100
Kokhonak	83	152	137	90.1%	174	158	90.8%	170	153	90.0%	145	133	91.7%	173
Levelock	79	105	87	82.9%	122	116	95.1%	69	62	89.9%	97	96	99.0%	89
Newhalen	87	160	151	94.4%	160	146	91.3%	190	175	92.1%	143	128	89.5%	230
Nondalton	173	178	159	89.3%	221	199	90.0%	164	137	83.5%	186	172	92.5%	144
Pedro Bay	33	42	38	90.5%	50	32	64.0%	42	30	71.4%	13	9	69.2%	32
Pilot Point	66	53	45	84.9%	100	86	86.0%	68	57	83.8%	49	46	93.9%	76

-continued-

Table 1-1.--Page 2 of 2.

Area	U.S. Census									5-year American Community Survey (2012–2016)			ADLWD	
	1980	1990		2000		2010		2010			2017			
	total population	Total population	Alaska Native Number	Alaska Native Percent	Total population	Alaska Native Number	Alaska Native Percent	Total population	Alaska Native Number	Alaska Native Percent	Total population	Alaska Native Number	Alaska Native Percent	Total population
<i>Lake and Peninsula Borough^b (continued)</i>														
Pope-Vannoy Landing		^c	^c	^c	8	4	50.0%	6	3	50.0%	0	0	0.0%	4
Port Alsworth	22	55	1	1.8%	104	23	22.1%	159	42	26.4%	156	16	10.3%	238
Port Heiden	92	119	86	72.3%	119	93	78.2%	102	87	85.3%	73	54	74.0%	110
Ugashik	13	7	6	85.7%	11	9	81.8%	12	9	75.0%	14	9	64.3%	13
Remainder	19	31	5	16.1%	22	9	40.9%	19	4	21.1%	^d	^d	^d	8
<i>Subtotal</i>	<i>2,849</i>	<i>1,151</i>	<i>889</i>	<i>77.2%</i>	<i>3,362</i>	<i>1,067</i>	<i>31.7%</i>	<i>3,279</i>	<i>916</i>	<i>27.9%</i>	<i>1,089</i>	<i>793</i>	<i>72.8%</i>	<i>3,367</i>
Total	7,175	6,573	4,269	64.9%	9,542	5,387	56.5%	9,123	5,292	58.0%	7,002	5,883	84.0%	9,179

Sources Alaska Department of Labor and Workforce Development (ADLWD), Research and Analysis Section, "2010–1880 Census Data for Alaska: Year: Places," <http://live.laborstats.alaska.gov/cen/hist.cfm> (accessed September 2018) for 1980, 1990, 2000, and 2010; U.S. Census Bureau for American Community Survey (ACS) 2016 estimate (5-year average: 2012–2016), "Community Facts," https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml (accessed September 2018) for 2016; and Alaska Department of Labor and Workforce Development, Research and Analysis Section, "Alaska Population Estimates by Borough, Census Area, City, and Census Designated Place (CDP), 2010–2017," <http://live.laborstats.alaska.gov/pop/index.cfm> (accessed September 2018) for 2017.

a. The community of Ekuk is now counted with neighboring Clarks Point since the only resident is a cannery security guard.

b. Port Heiden is in the Alaska Peninsula Management Area; Chignik, Chignik Lagoon, Chignik Lake, Ivanof Bay, and Perryville of this borough are in the Chignik Management Area and are excluded from this table. The "remainder" may include some population living outside the Bristol Bay Management Area.

c. Pope-Vannoy Landing residents were previously counted with the remainder of the Lake and Peninsula Borough.

d. These data are not available from the American Community Survey's 5-year average data set.

Table 1-2.—Estimated historical subsistence salmon harvests, Bristol Bay Area, Alaska, 1983–2017.

Year	Permits		Estimated salmon harvest					Total	Salmon per permit
	Issued	Returned	King	Sockeye	Coho	Chum	Pink		
1983	829	674	13,268	143,639	7,477	11,646	1,073	177,104	214
1984	882	698	11,537	168,803	16,035	13,009	8,228	217,612	247
1985	1,015	808	9,737	142,755	8,122	5,776	825	167,215	165
1986	930	723	14,893	129,487	11,005	11,268	7,458	174,112	187
1987	996	866	14,424	135,782	8,854	8,161	673	167,894	169
1988	938	835	11,848	125,556	7,333	9,575	7,341	161,652	172
1989	955	831	9,678	125,243	12,069	7,283	801	155,074	162
1990	1,042	870	13,462	128,343	8,389	9,224	4,455	163,874	157
1991	1,194	1,045	15,245	137,837	14,024	6,574	572	174,251	146
1992	1,203	1,028	16,425	133,605	10,722	10,661	5,325	176,739	147
1993	1,206	1,005	20,527	134,050	8,915	6,539	1,051	171,082	142
1994	1,193	1,019	18,873	120,782	9,279	6,144	2,708	157,787	132
1995	1,119	990	15,921	107,717	7,423	4,566	691	136,319	122
1996	1,110	928	18,072	107,737	7,519	5,813	2,434	141,575	128
1997	1,166	1,051	19,074	118,250	6,196	2,962	674	147,156	126
1998	1,234	1,155	15,621	113,289	8,126	3,869	2,424	143,330	116
1999	1,219	1,157	13,009	122,281	6,143	3,653	420	145,506	119
2000	1,219	1,109	11,547	92,050	7,991	4,637	2,599	118,824	97
2001	1,226	1,137	14,412	92,041	8,406	4,158	839	119,856	98
2002	1,093	994	12,936	81,088	6,565	6,658	2,341	109,587	100
2003	1,182	1,058	21,231	95,690	7,816	5,868	1,062	131,667	111
2004	1,100	940	18,012	93,819	6,667	5,141	3,225	126,865	115
2005	1,076	979	15,212	98,511	7,889	6,102	1,098	128,812	120
2006	1,050	904	12,617	95,201	5,697	5,321	2,726	121,564	116
2007	1,063	917	15,444	99,549	4,880	3,991	815	124,679	117
2008	1,178	1,083	15,153	103,583	7,627	5,710	2,851	134,924	115
2009	1,063	950	14,020	98,951	7,982	5,052	442	126,447	119
2010	1,082	979	10,852	90,444	4,623	4,692	2,627	113,238	105
2011	1,122	1,039	14,106	101,017	7,493	3,794	333	126,744	113
2012	1,107	932	12,136	100,728	3,837	4,007	1,874	122,582	111
2013	1,158	986	12,860	98,010	8,569	5,199	337	124,974	108
2014 ^a	1,156	1,011	17,041	96,140	7,109	6,633	2,784	129,707	112
2015	1,169	1,072	13,874	99,535	7,659	3,573	458	125,100	107
2016 ^a	1,128	984	17,757	83,349	5,476	5,216	4,740	116,537	103
2017	1,103	985	12,880	88,903	8,291	4,821	498	115,393	105
5-year average (2013–2017)	1,143	1,008	14,882	93,187	7,421	5,088	1,763	122,342	107
10-year average (2008–2017)	1,127	1,002	14,068	96,066	6,867	4,870	1,694	123,565	110
Historical average (1983–2017)	1,100	964	14,677	111,536	8,063	6,208	2,251	142,737	132

Source ADF&G Division of Subsistence, ASFDB 2017 (ADF&G 2017).

a. Data are preliminary.

Table 1-3.—Ten-year average subsistence salmon harvest by district, Bristol Bay Area, Alaska, 2008–2017.

District	Permits issued	Average salmon harvest					Total	Salmon per permit
		King	Sockeye	Coho	Chum	Pink		
Naknek–Kvichak District	463	627	64,214	742	262	328	66,174	143
Nushagak District ^a	554	12,501	26,208	5,185	3,953	1,177	49,024	88
Togiak District	61	930	3,276	469	532	93	5,300	87
Egegik District	34	84	1,282	266	22	5	1,660	49
Ugashik District	17	39	830	171	10	6	1,056	62
Total Bristol Bay Area	1,128	14,182	95,811	6,833	4,778	1,610	123,214	109

Source ADF&G Division of Subsistence, Bristol Bay subsistence salmon permit database.

a. Note The data for 2014 and 2016 that were used in calculating these averages are preliminary.

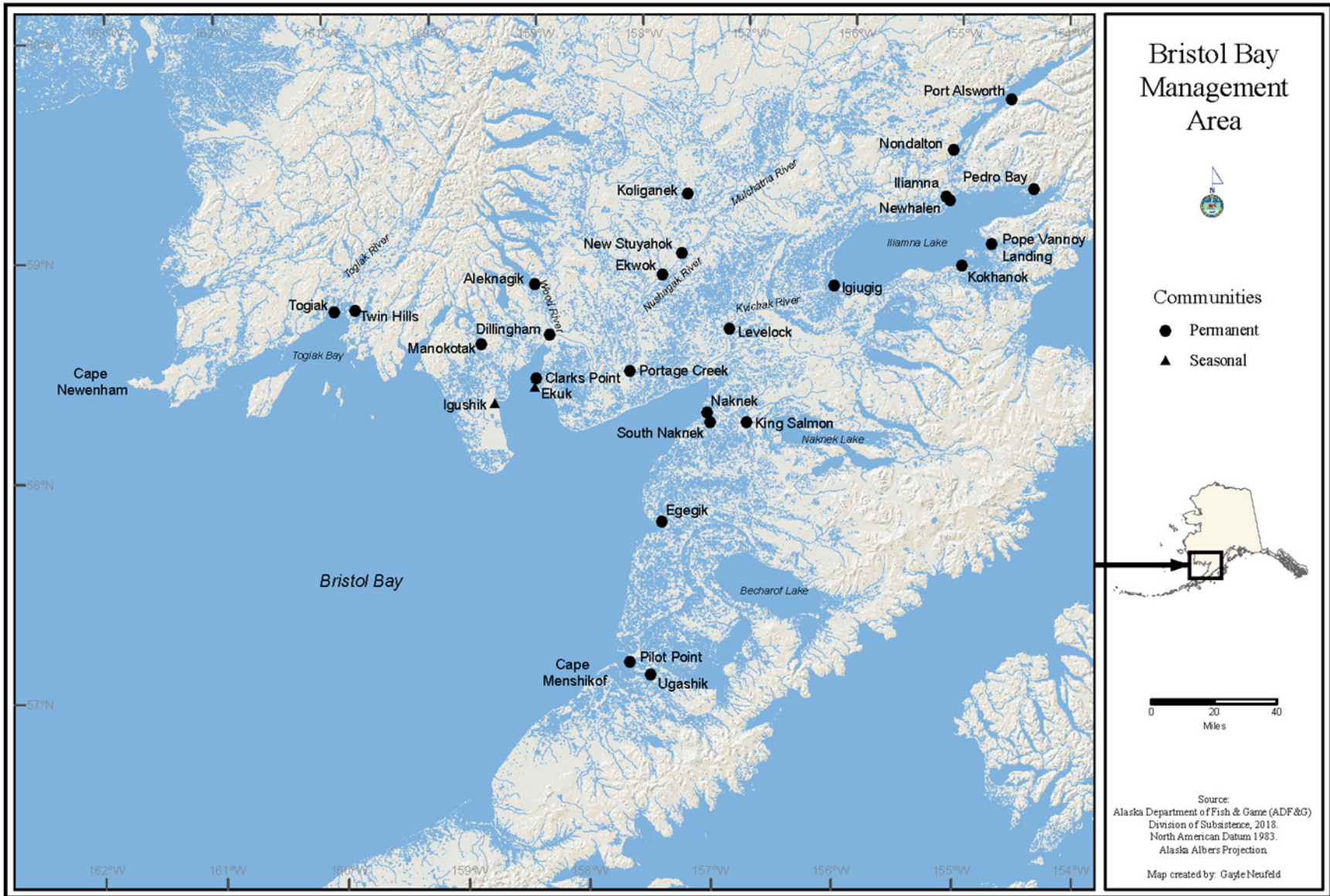


Figure 1-1.—Map of the Bristol Bay Area.

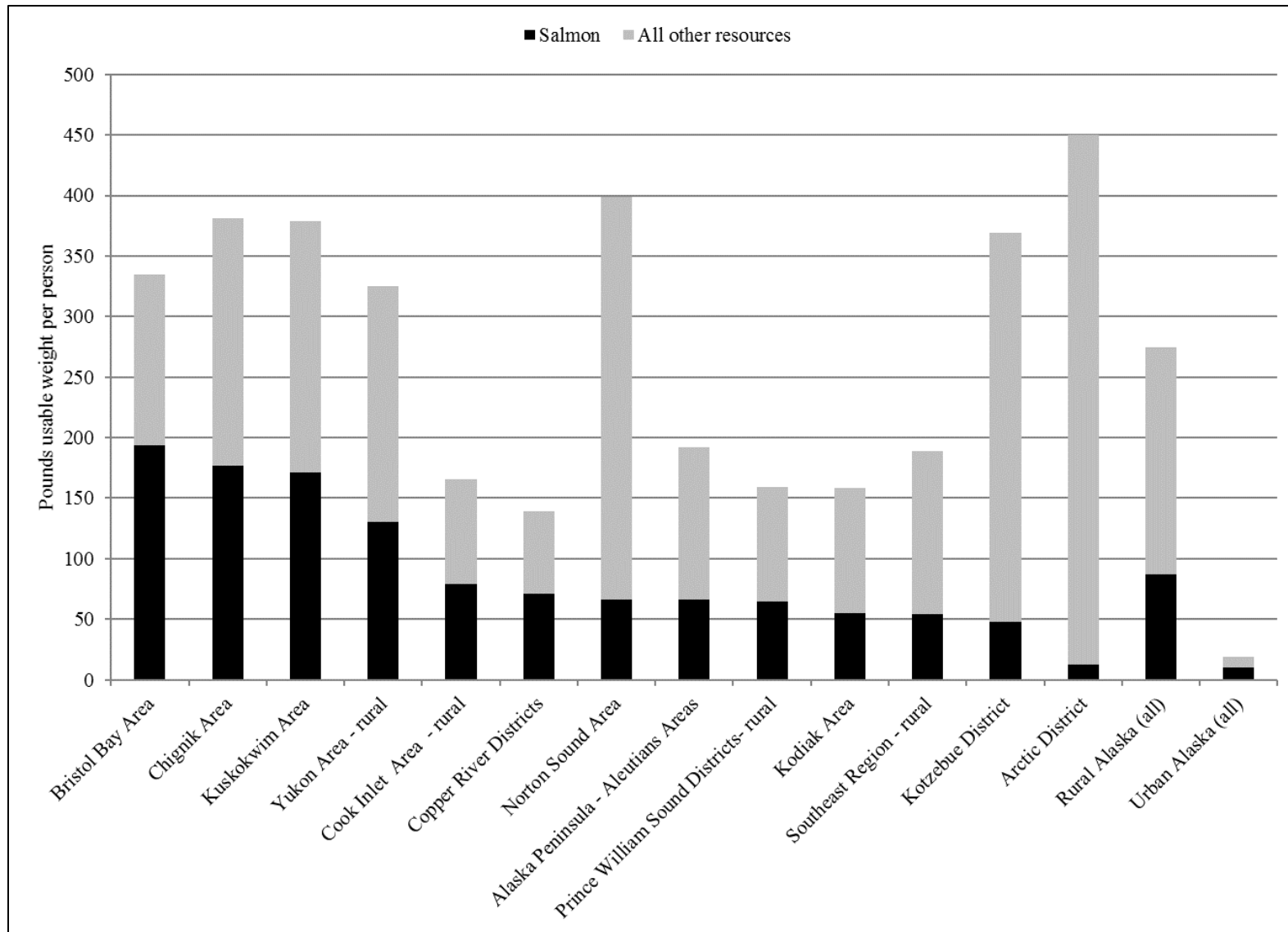


Figure 1-2.—Estimated noncommercial harvests of salmon, by residents of Alaska salmon management areas, pounds usable weight per person, 2014.

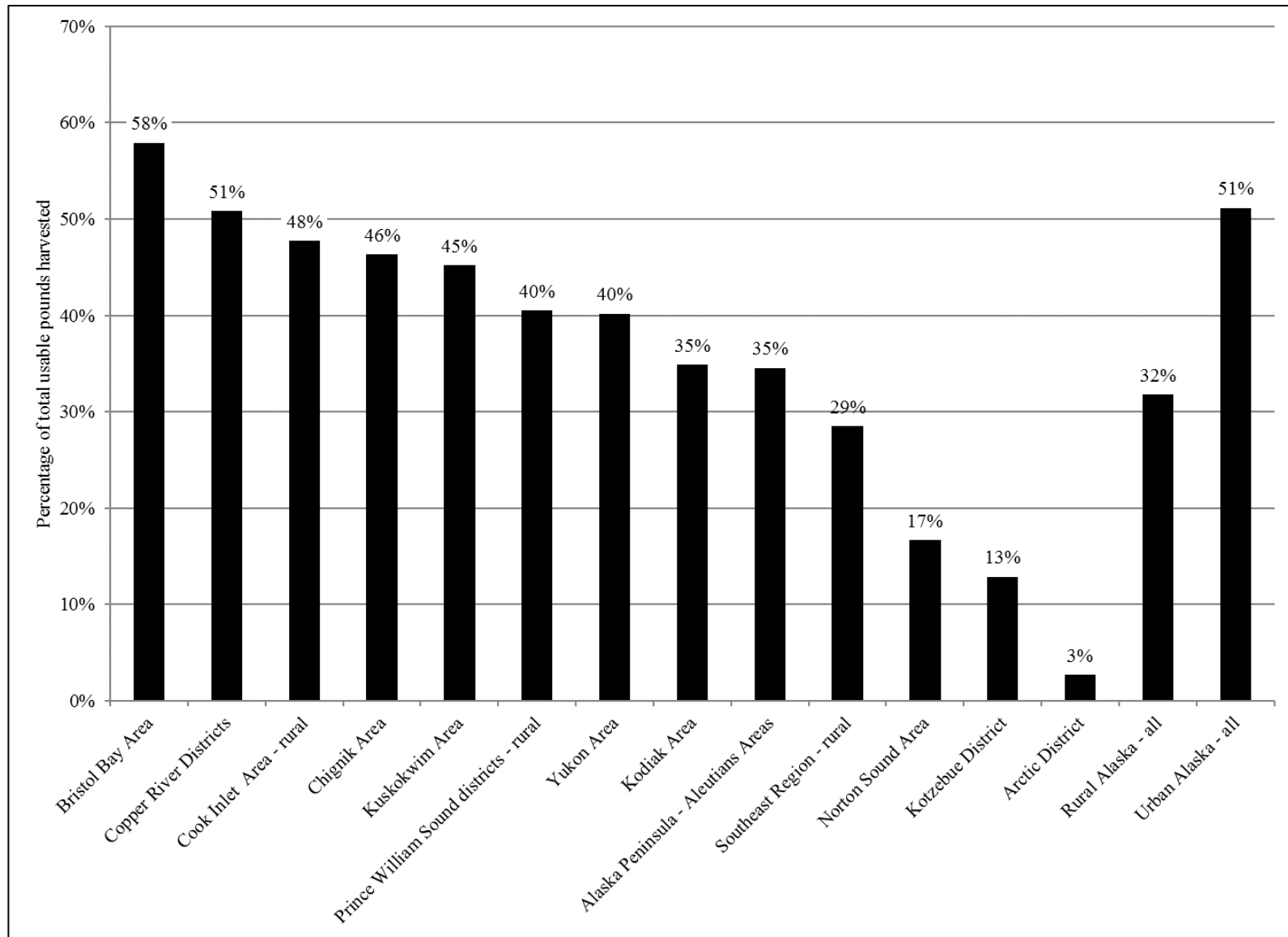


Figure 1-3.—Percentage of total noncommercial harvest composed of salmon, residents of Alaska salmon management areas, 2014.

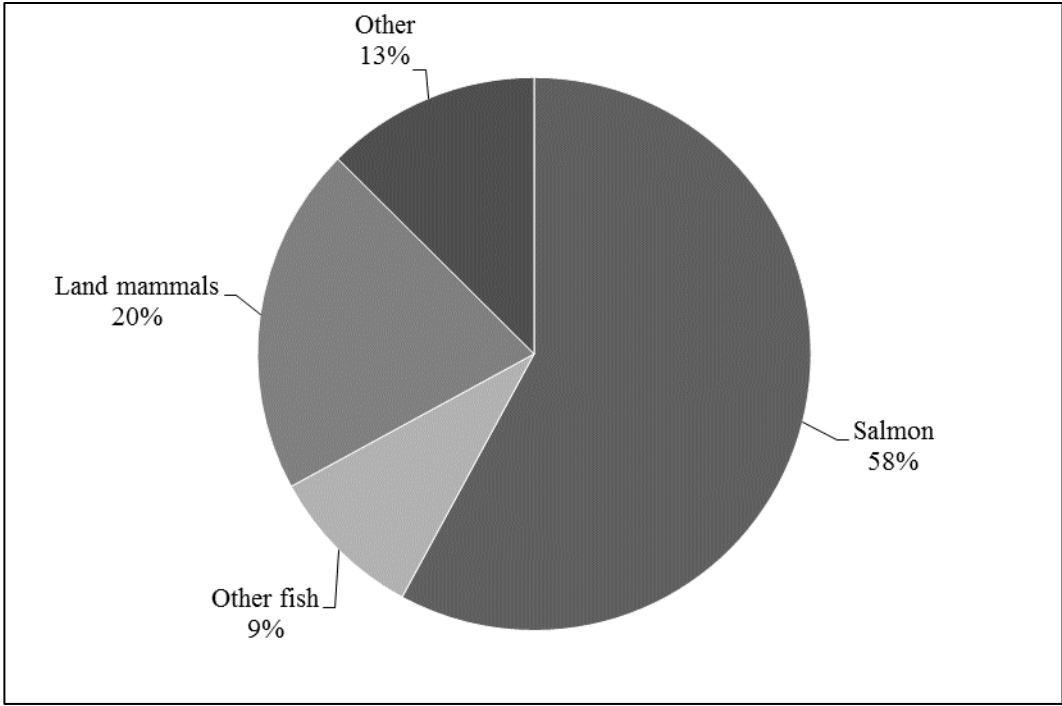


Figure 1-4.—Composition of wild food harvests, Bristol Bay Area, Alaska, 2014.

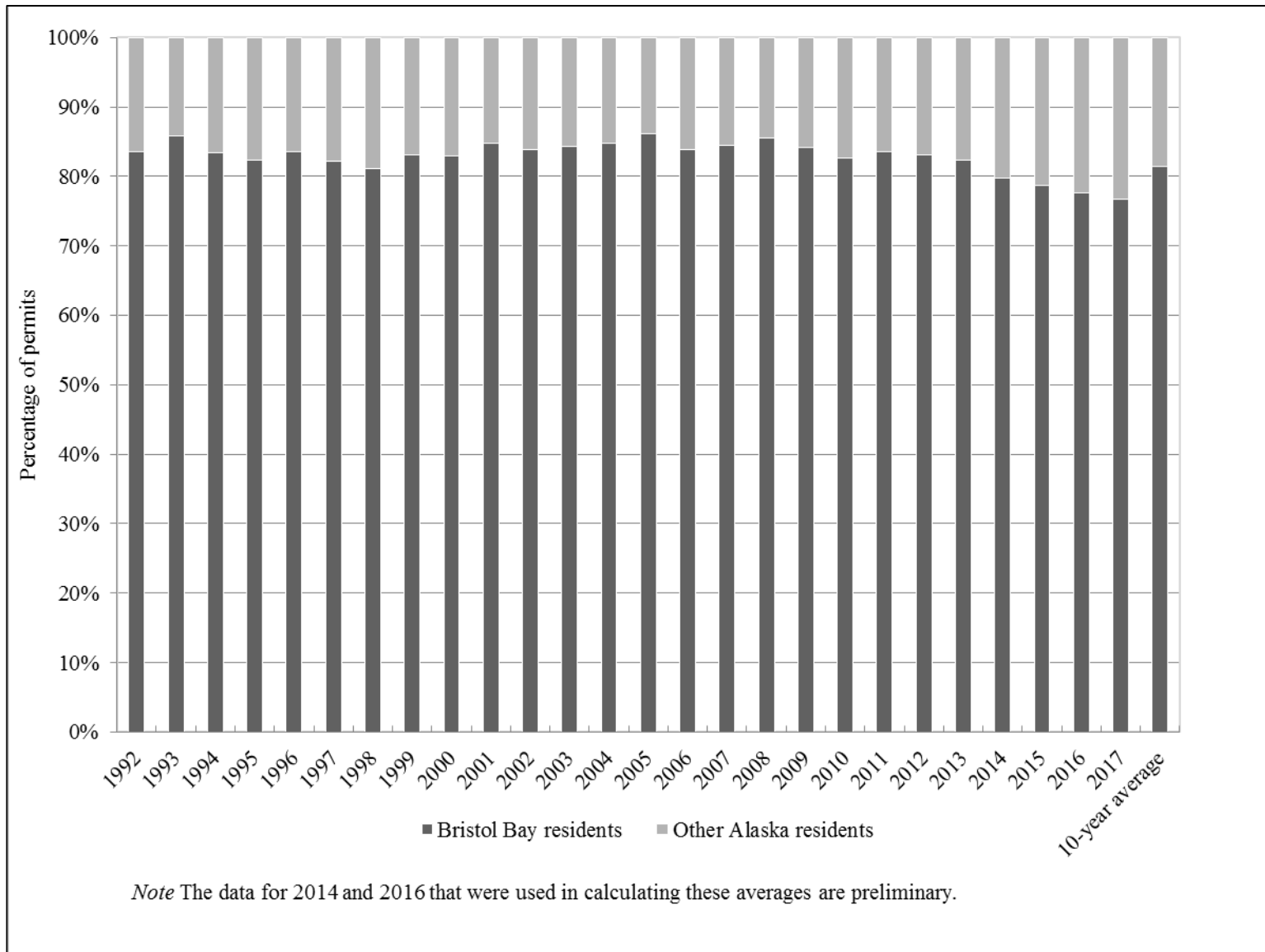


Figure 1-5.—Percentage of Bristol Bay subsistence salmon permits issued by area of residence of permit holder, 1992–2017.

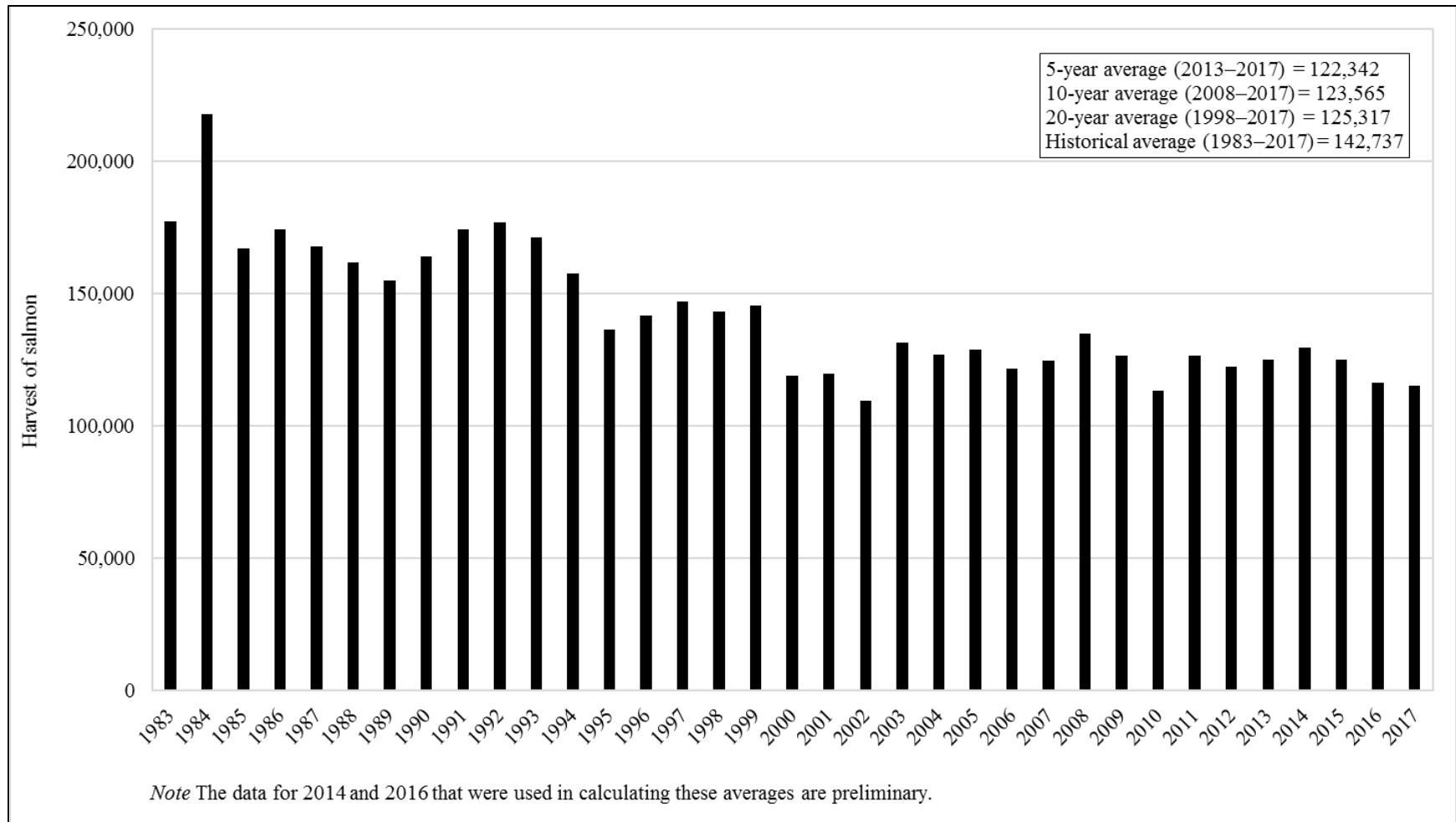


Figure 1-6.—Estimated subsistence salmon harvests, Bristol Bay Area, Alaska, 1983–2017.

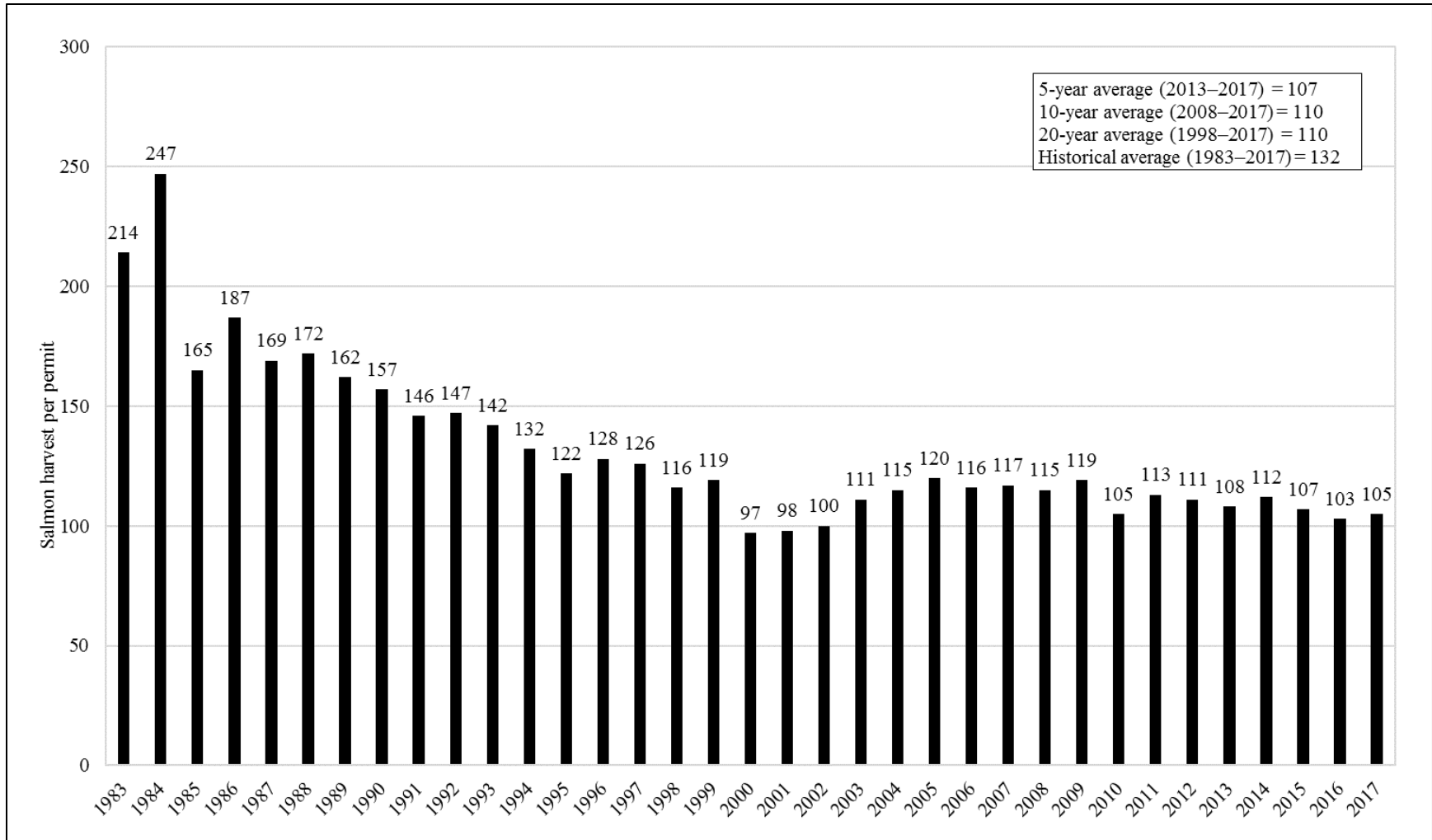


Figure 1-7.—Average harvests per permit, Bristol Bay Area, Alaska, 1983–2017.

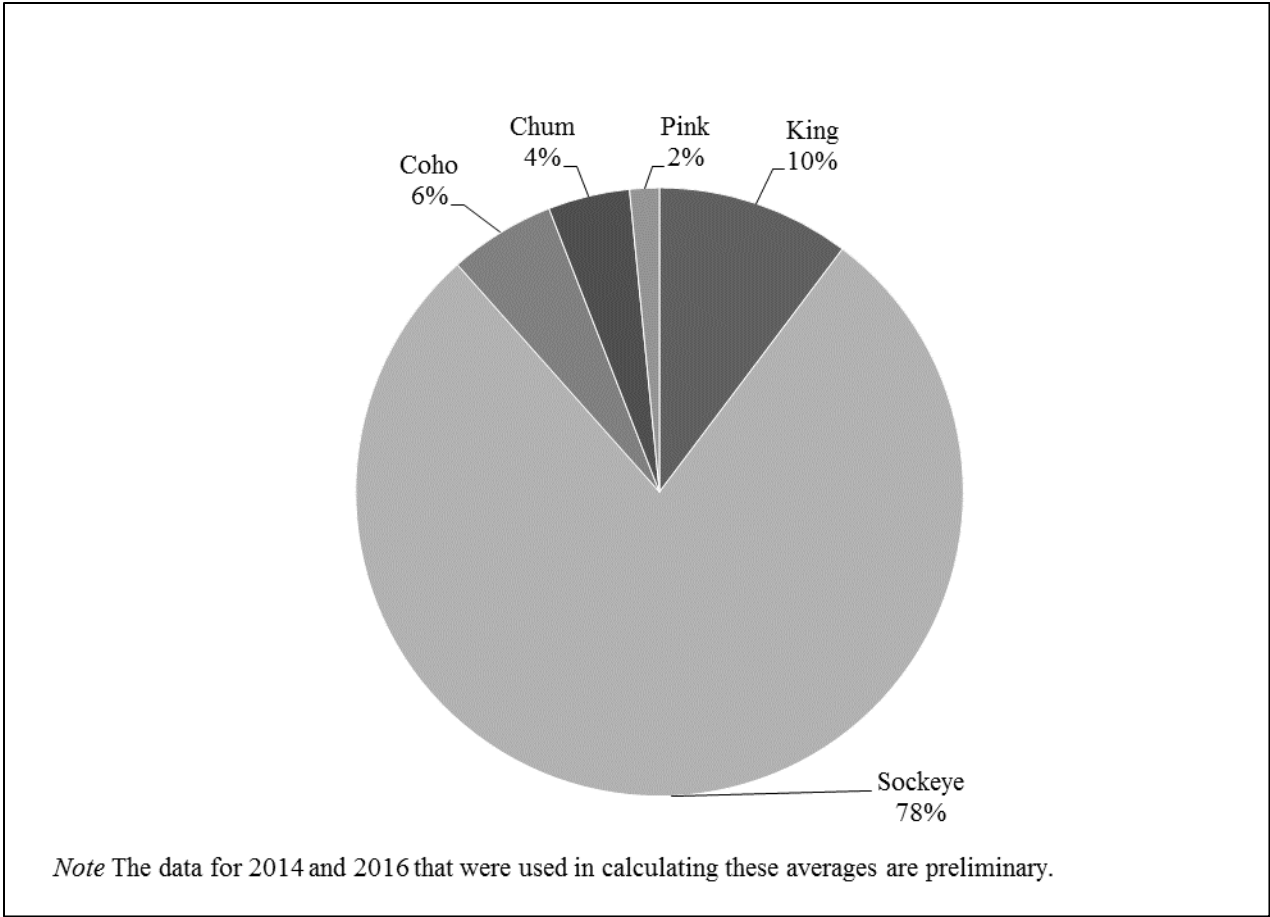


Figure 1-8.—Composition of total subsistence salmon harvest, Bristol Bay Area, Alaska, 1983–2017.

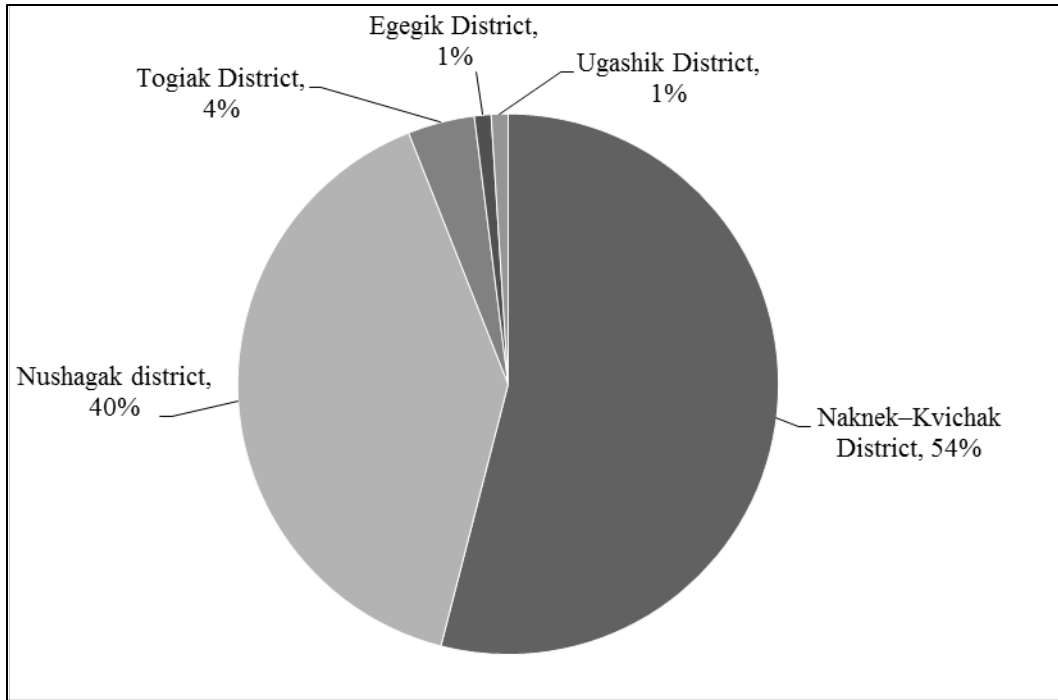


Figure 1-9.—Comparison of Bristol Bay subsistence salmon harvest by district, 2008–2017.

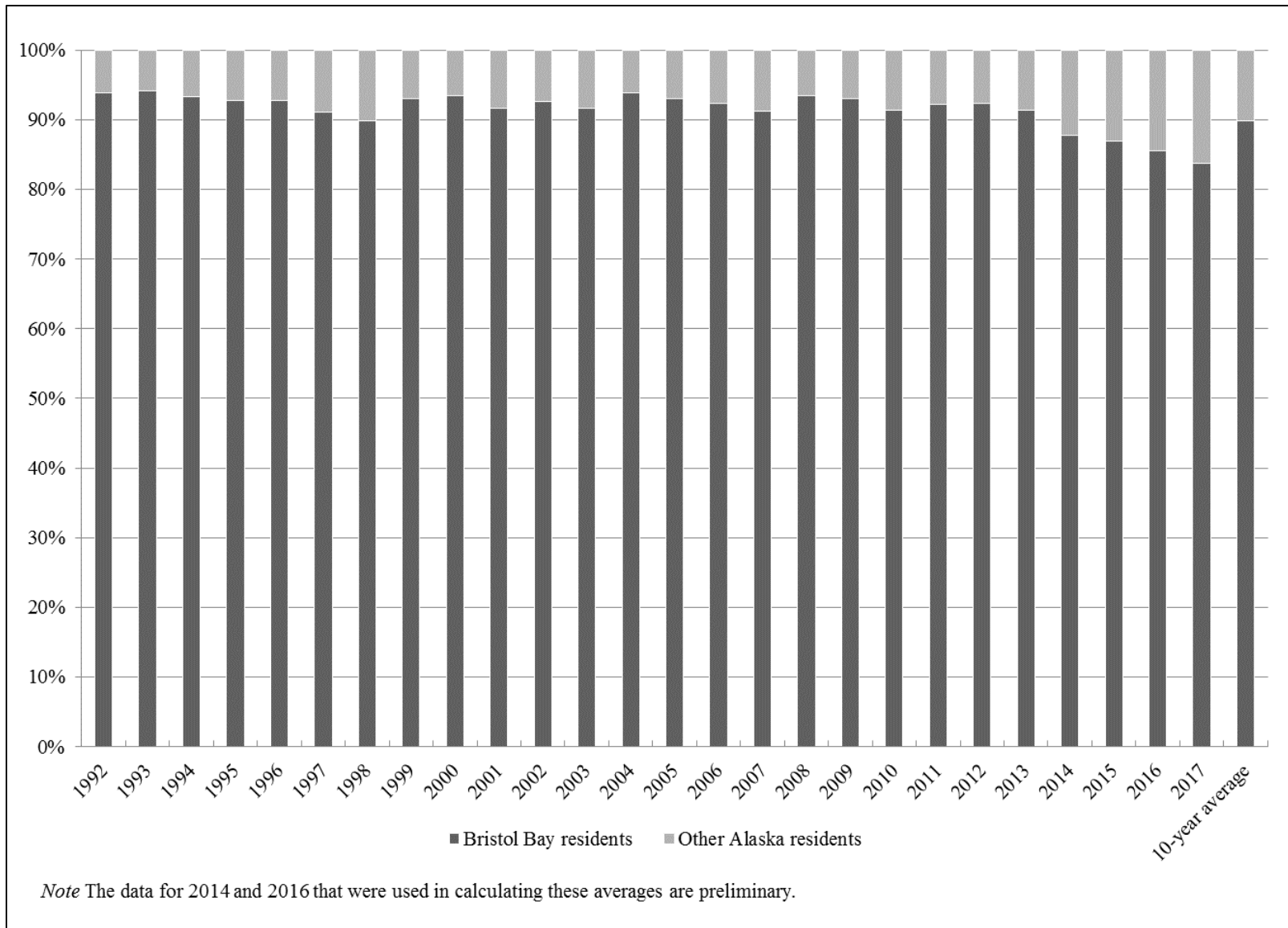


Figure 1-10.—Percentage of Bristol Bay subsistence harvest by area of residence, 1992–2017.

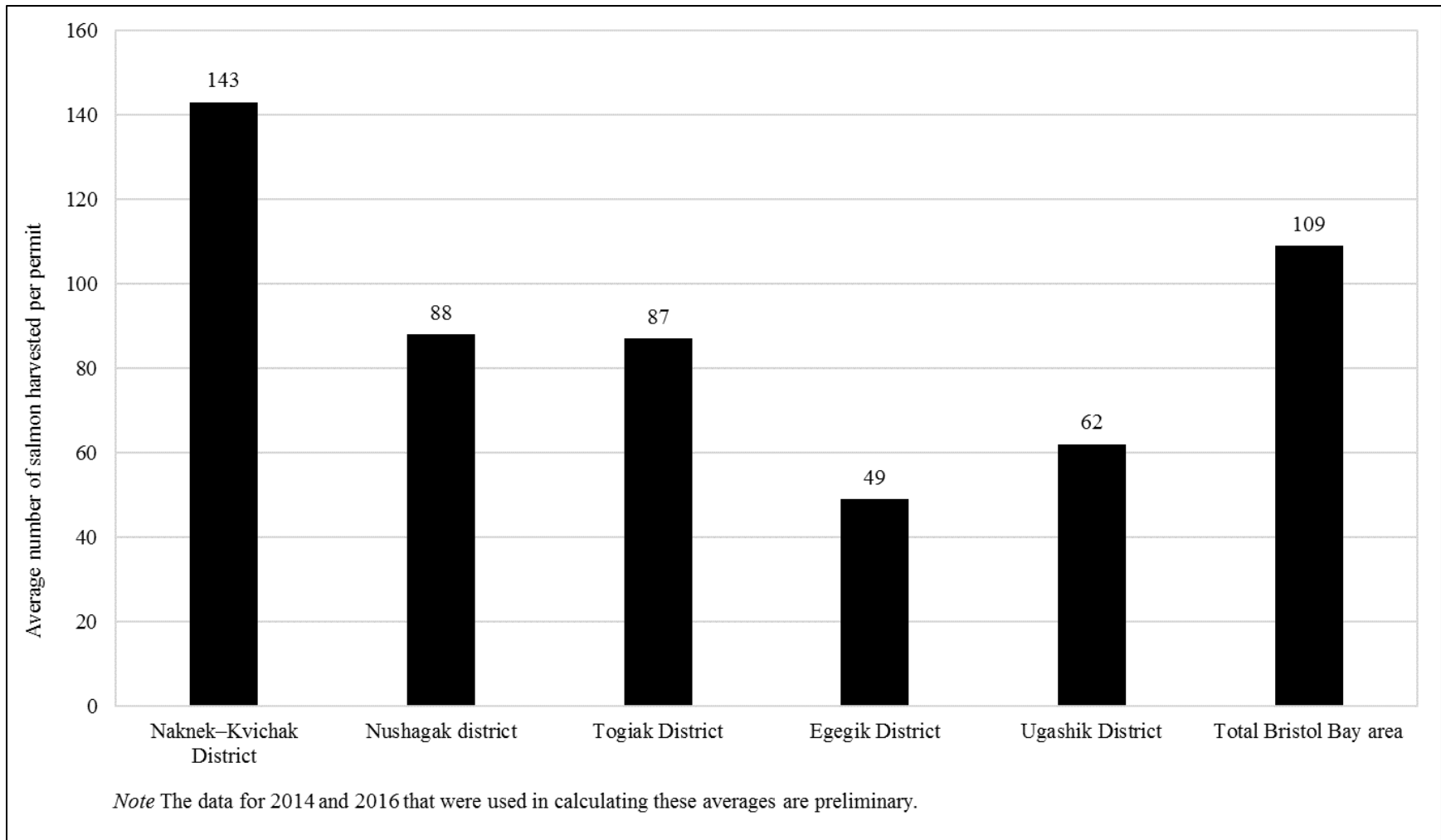


Figure 1-11.—Average subsistence salmon harvest per permit, 10-year average, 2008–2017, Bristol Bay Area, Alaska, by district.

2. KVICHAK DISTRICT SOCKEYE SALMON SUBSISTENCE FISHERY

Communities and Population

Historically, subsistence salmon harvests in the Kvichak River watershed, including Iliamna Lake and Lake Clark, have been the largest within the BBA. There are eight year-round communities within the watershed with 2017 populations estimated as Igiugig (57), Iliamna (100), Kokhanok (173), Levelock (89), Newhalen (230), Nondalton (144), Pedro Bay (32), and Port Alsworth (238) (Table 1-1). Table 2-2 shows the historical harvest by community from 1963–2017. Virtually all the subsistence salmon harvest in the watershed is sockeye salmon; other salmon species are much less abundant upstream of the confluence of the Alagnak (Branch) River with the Kvichak River.

General Patterns of Subsistence Harvests

The number of subsistence salmon permits issued for fishing in the Kvichak River watershed has been relatively stable since the early 1990s, when nonlocal residents were again allowed to obtain permits (Table 2-1). The number of issued permits dropped in 2003 to 175, the lowest number issued since 1991 (Table 2-1). This reflects, in part, a prohibition by the National Park Service (NPS) against subsistence fishing in Lake Clark National Park and Preserve except by federally-qualified local rural residents, a prohibition that took effect in May 2001 (Weiland et al. 2002:40). The prohibition especially affected seasonal residents of Port Alsworth (Fall et al. 2010). However, the NPS prohibition does not account for drops in subsistence harvests because most subsistence fishers in the Kvichak River watershed live in area communities (Fall et al. 2010). This is evident for the most recent 10-year period (2008–2017) and the 25-year average (1993–2017), when 82% of the subsistence permits were issued to local community residents (Table 2-1). Figure 2-1 illustrates that in 2016 and 2017 issued permits decreased to 165 and 158 respectively, the lowest since 1987.

Estimated subsistence sockeye salmon harvests from the Kvichak River watershed for the period 1963–2017 average an estimated 62,065 sockeye salmon (Table 2-2 and Figure 2-2). Figure 2-2 shows the historical average (1963–2017) sockeye harvest was 62,065, compared to the 20-year average of 43,376 salmon. As shown in Table 2-2 and Figure 2-2, subsistence sockeye salmon harvests by residents of this drainage declined markedly from the early 1990s to the early 2000s, with an especially low harvest in 2001, when residents reported that salmon returned “in ‘bunches’ and ‘spurts’, unlike the steadier runs of previous years” (Holen et al. 2005:7). The average annual harvest for the most recent 10-year period (2008–2017) was 41,595 salmon. Although 2001 and 2002 were two of the lowest harvests of sockeye salmon (32,808 and 33,001 respectively) recorded, 2017 marked the lowest to date at 27,832 fish (Table 2-2, Figure 2-2). In recent years, opportunity to harvest sockeye salmon for subsistence in the watershed has not been restricted in regulation or by emergency order. As discussed in Krieg et al. (2015), the number of permit holders has remained somewhat steady, with fewer fish are now being harvested.

As illustrated in (Figure 2-3), average sockeye salmon harvests per subsistence permit in the Kvichak River watershed declined from the late 1980s to a record low of 158 sockeye salmon per permit in 2001. For all Kvichak watershed permit holders, an increase of sockeye salmon per

permit occurred after 2001 and continued until 2006. Variable harvests were recorded until 2017, which then saw another relatively low harvest per permit of 176 sockeye salmon (Figure 2-3). Likewise, permit holders who were local community residents of the Kvichak River drainage show a similar pattern of declining subsistence harvests per permit from the early 1990s to 2001, when the lowest average harvest per permit, 176 sockeye salmon in 2001, was recorded (Figure 2-4). The average sockeye salmon harvest per permit for local residents followed a similar pattern, with a low in 2001, followed by an increase in 2006 (314 salmon/permit), and variable harvests until 2017, which saw 210 sockeye salmon per permit (Figure 2-4).

The most recent household-based subsistence salmon research to take place in this region occurred in 2008 (Iliamna, Newhalen, Nondalton, Port Alsworth), 2005 (Igiugig, Kokhanok, Levelock), and 2004 (Pedro Bay) and findings may be found in the Community Subsistence Information System (CSIS).

Table 2-1.—Number of subsistence permits issued, Kvichak River watershed, Alaska, 1983–2017.

Year	Igiugig	Iliamna/ Newhalen	Kokhanok	Levelock	Nondalton	Pedro Bay	Port Alsworth	Other Kvichak residents	Subtotal, local residents	Other Alaska residents	Total
1983	3	63	17	18	38	15	18	0	172	2	174
1984	8	53	19	19	43	15	16	2	175	3	178
1985	4	66	15	17	37	20	23	2	184	74	258
1986	6	58	20	21	29	17	24	5	180	3	183
1987	0	57	17	19	29	17	21	0	160	1	161
1988	0	59	22	18	31	14	19	1	164	5	169
1989	4	56	16	17	39	14	18	1	165	5	170
1990	7	49	14	18	37	17	23	1	166	17	183
1991	8	48	17	3	18	26	26	0	146	25	171
1992	4	61	14	16	24	23	27	0	169	33	202
1993	7	57	22	14	49	22	28	0	199	35	234
1994	5	51	21	7	38	17	29	0	168	41	209
1995	7	54	21	15	14	18	28	0	157	44	201
1996	6	60	21	9	28	20	25	0	169	42	211
1997	4	59	16	6	32	14	24	0	155	37	192
1998	4	55	15	6	36	18	29	0	163	42	205
1999	5	45	18	4	26	17	44	0	159	57	216
2000	8	47	22	14	24	10	38	1	164	48	212
2001	8	49	24	9	33	17	30	0	170	37	207
2002	8	53	27	7	20	15	19	0	149	31	180
2003	9	48	26	8	27	11	22	0	151	24	175
2004	6	60	25	3	40	22	25	0	181	25	206
2005	6	48	33	11	33	16	24	0	171	23	194
2006	7	44	28	2	25	21	24	0	151	28	179
2007	6	54	29	1	29	19	30	0	168	28	196
2008	7	58	25	1	28	18	38	0	175	40	215

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Table 2-1.–Page 2 of 2.

Year	Igiugig	Iliamna/ Newhalen	Kokhanok	Levelock	Nondalton	Pedro Bay	Port Alsworth	Other Kvichak residents	Subtotal, local residents	Other Alaska residents	Total
2009	8	39	27	3	19	21	37	0	154	33	187
2010	11	36	26	7	13	20	43	0	156	24	180
2011	14	50	25	9	24	20	50	0	192	20	212
2012	11	43	26	2	30	15	50	0	177	30	207
2013	6	30	28	4	28	16	44	0	156	35	191
2014	6	41	13	9	29	16	47	0	161	39	200
2015	7	40	19	6	22	14	51	0	159	40	199
2016	6	28	23	7	9	13	39	0	125	40	165
2017	4	27	19	2	14	12	39	0	117	41	158
5-year average (2013–2017)	6	33	20	6	20	14	44	0	144	39	183
10-year average (2008–2017)	8	39	23	5	22	17	44	0	157	34	191
Historical average (1983–2017)	6	50	21	9	28	17	31	0	164	30	194

Source ADF&G Division of Subsistence, Bristol Bay subsistence salmon permit database.

Note For 1983 through 1986, includes a small number of permits issued for fishing in areas outside the Kvichak watershed to local residents.

Note In 1983, 1984, and 1986 through 1989, only local watershed residents were eligible for permits.

Note Due to updates to the database, these data may differ slightly from those published in annual management reports.

Table 2-2.—Estimated subsistence harvest of sockeye salmon by community, in numbers of fish, Kvichak River drainage, Bristol Bay, Alaska, 1963–2017.

Year	Iliamna/						Port	All local	Other ^c	Total
	Levelock	Igiugig	Pedro Bay	Kokhanok	Newhalen	Nondalton	Alsworth	communities		
1963	600		14,000	7,000	10,000	25,000		56,600	56,600	
1964	1,000	4,000	12,000	8,000	19,000	35,000		79,000	79,000	
1965	1,000	3,300	9,800	10,200	9,700	35,500		69,500	69,500	
1966	600	1,200	6,000	10,500	6,600	45,800		70,700	70,700	
1967	1,400	3,400	9,900	10,200	9,100	29,600		63,600	63,600	
1968	1,400	4,800	9,800	10,200	8,700	33,700		68,600	68,600	
1969	1,000	5,100	4,200	15,000	4,900	44,000		74,200	74,200	
1970	1,600	11,200	11,200	22,300	16,400	42,900		105,600	105,600	
1971	1,600	6,500	10,100	12,800	8,500	22,100		61,600	61,600	
1972	1,600	2,200	4,000	8,300	10,000	24,100		50,200	50,200	
1973	4,800	2,200	2,900	9,200	10,200	8,500	1,300	39,100	39,100	
1974	8,600	6,200	14,400	21,500	16,400	29,500	1,500	98,100	98,100	
1975	5,300	6,400	8,300	18,000	26,700	48,700	2,100	115,500	115,500	
1976	5,300	6,800	4,400	17,100	16,300	20,500	5,500	75,900	75,900	
1977	2,600	6,000	5,600	14,300	11,400	27,200	4,900	72,000	72,000	
1978	8,900	8,800	11,200	23,700	11,000	17,300	3,000	83,900	83,900	
1979	4,400	6,600	3,500	16,200	15,900	14,700	4,200	65,500	65,500	
1980	6,100	8,100	7,400	22,600	11,100	11,300	6,000	72,600	72,600	
1981	6,600	5,400	9,700	16,500	15,400	15,200	6,800	75,600	75,600	
1982	5,400	1,900	8,200	16,600	13,500	11,200	4,500	61,300	61,300	
1983	4,800	3,300	10,400	20,100	23,800	29,400	4,700	96,500	96,500	
1984	8,100	6,300	12,100	24,400	15,900	29,100	4,600	100,500	100,500	
1985	6,600	3,400	12,900	21,900	22,300	14,900	4,500	86,500	86,500	
1986	6,400	1,600	6,700	18,300	17,000	6,600	3,300	59,900	59,900	
1987	5,700	^a	7,300	16,500	27,500	11,800	3,200	72,000	72,000	
1988	3,500	^a	5,500	14,400	29,800	20,700	3,200	77,100 ^b	77,100	

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Table 2-2.—Page 2 of 3.

Year	Levelock	Igiugig	Pedro Bay	Iliamna/			Port	All local	Other ^c	Total
				Kokhanok	Newhalen	Nondalton	Alsworth	communities		
1989	5,100	1,200	6,700	13,000	24,700	18,500	2,200	71,400	^b	71,400
1990	4,700	2,200	6,600	12,400	18,800	27,300	3,200	75,200	1,400	76,600
1991	1,029	1,712	9,739	17,184	29,094	4,163	2,755	65,676	1,110	66,786
1992	4,374	1,056	6,932	11,477	29,633	13,163	2,954	69,589	2,559	72,148
1993	4,699	1,397	6,226	18,810	19,067	17,890	3,254	71,343	2,780	74,123
1994	1,467	1,201	8,747	15,771	15,553	15,246	3,074	61,059	3,284	64,343
1995	3,756	497	5,359	14,412	20,134	4,188	2,892	51,238	3,441	54,679
1996	1,120	2,309	5,219	14,011	14,787	11,856	3,263	52,565	2,307	54,872
1997	1,062	2,067	5,501	8,722	19,513	17,194	2,348	56,407	3,101	59,508
1998	2,454	1,659	3,511	10,418	16,165	13,136	2,678	50,021	3,635	53,656
1999	1,276	1,608	5,005	10,725	14,129	17,864	4,282	54,889	2,834	57,723
2000	1,467	1,981	1,815	7,175	6,679	11,953	3,200	34,270	2,720	36,990
2001	908	779	2,118	9,447	8,132	7,566	1,958	30,908	1,901	32,808
2002	625	2,138	2,687	9,847	9,417	5,508	1,201	31,423	1,578	33,001
2003	737	1,081	2,135	9,771	13,824	8,016	1,370	36,934	1,591	38,525
2004	1,000	1,026	4,803	11,869	21,652	8,789	2,455	51,594	1,631	53,225
2005	914	1,017	4,162	16,801	12,010	8,824	2,457	46,185	2,078	48,263
2006	0	1,252	4,319	19,028	11,488	8,885	2,418	47,390	2,460	49,850
2007	102	1,803	5,487	15,106	11,453	7,902	3,211	45,064	2,474	47,538
2008	30	1,558	4,884	14,755	13,569	8,917	3,307	47,020	2,543	49,563
2009	759	1,457	7,802	15,759	9,871	5,709	3,155	44,512	2,260	46,771
2010	940	2,901	2,609	13,973	8,815	3,185	3,250	35,673	5,015	40,688
2011	933	1,931	3,898	9,895	15,433	7,947	4,026	44,062	1,164	45,226
2012	750	2,608	4,028	16,530	12,933	9,247	4,420	50,514	1,855	52,369
2013	984	345	3,971	13,392	7,632	10,550	3,377	40,251	2,305	42,556
2014	1,170	513	3,999	6,440	11,388	9,004	4,296	36,810	4,206	41,016
2015	398	1,153	2,519	8,098	9,691	8,722	6,588	37,169	2,109	39,279
2016	1,265	297	2,036	7,087	9,900	2,320	4,196	27,101	3,548	30,649

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Table 2-2.–Page 3 of 3.

Year	Levelock	Igiugig	Pedro Bay	Kokhanok	Iliamna/ Newhalen	Nondalton	Port Alsworth	All local communities	Other ^c	Total
2017	168	700	1,678	5,430	6,403	6,548	3,623	24,550	3,282	27,832
5-year average (2013–2017)	797	602	2,841	8,089	9,003	7,429	4,416	33,176	3,090	36,266
10-year average (2008–2017)	740	1,346	3,742	11,136	10,564	7,215	4,024	38,766	2,829	41,595
Historical average (1963–2017)	2,711	3,003	6,473	13,875	14,708	17,353	3,438	60,771	2,542	62,065

Sources Weiland et al. (2003:112) for 2000 to 2002; ADF&G (2000:120) for 1979 to 1999; ADF&G (1985) for 1965 to 1978; Schroeder et al. (1987:365) for 1963 and 1964.

Note Harvests are extrapolated for all permits issued, based on those returned. Harvest estimates from before 1991 are rounded to the nearest hundred fish. This table reports harvest estimates as they have appeared in Annual Management Reports. Harvest estimates prior to 1990 are based on the community where the permit was issued; estimates from 1990 to the present are based on community of residence and include fish caught only in the Kvichak District.

- a. No permits issued.
- b. No permits issued. Only residents of the Naknek/Kvichak watershed could obtain subsistence permits.
- c. Subsistence harvests by non-Kvichak River watershed residents.

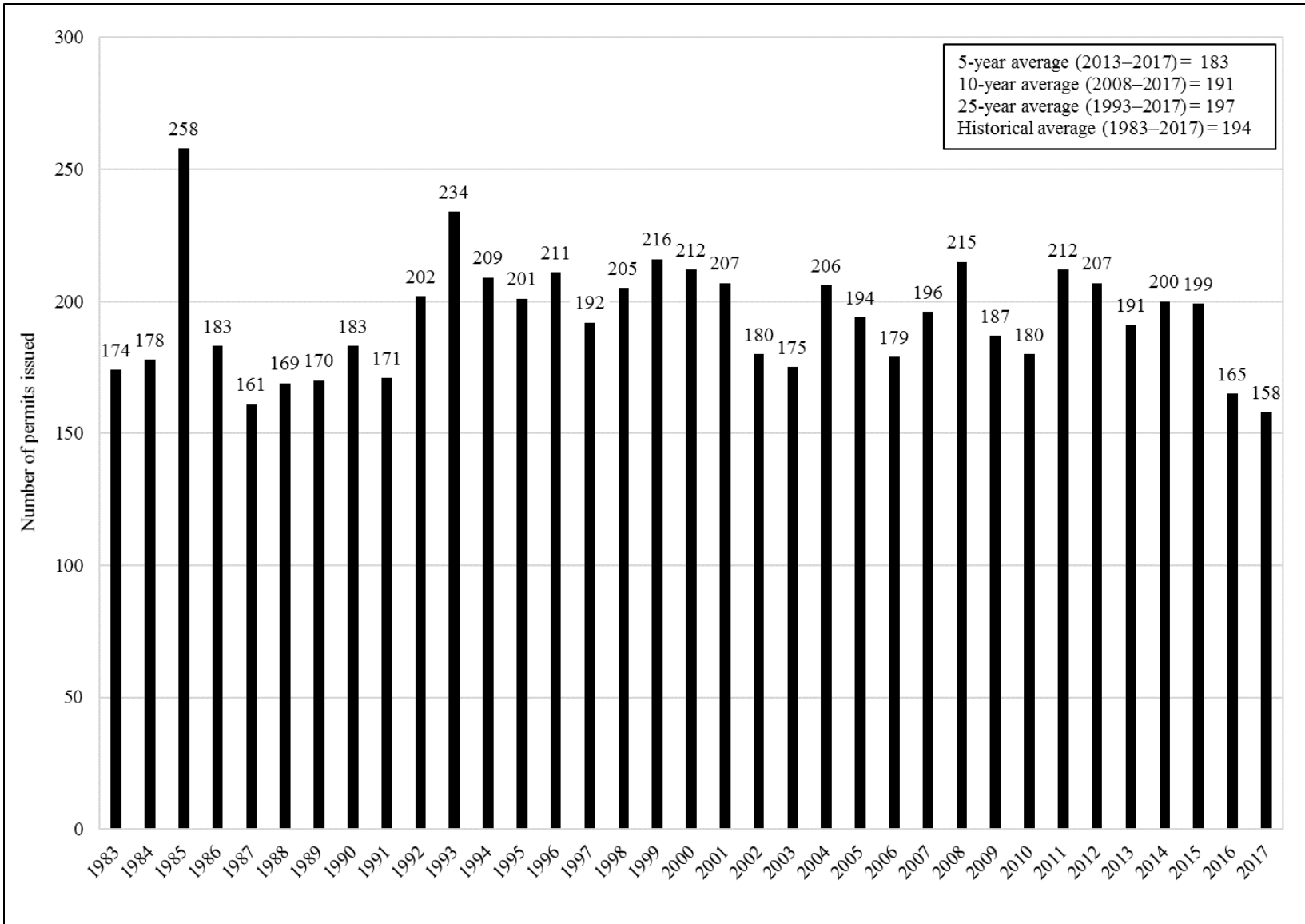


Figure 2-1.—Number of subsistence salmon permits issued, Kvichak Watershed, Bristol Bay Area, Alaska, 1983–2017.

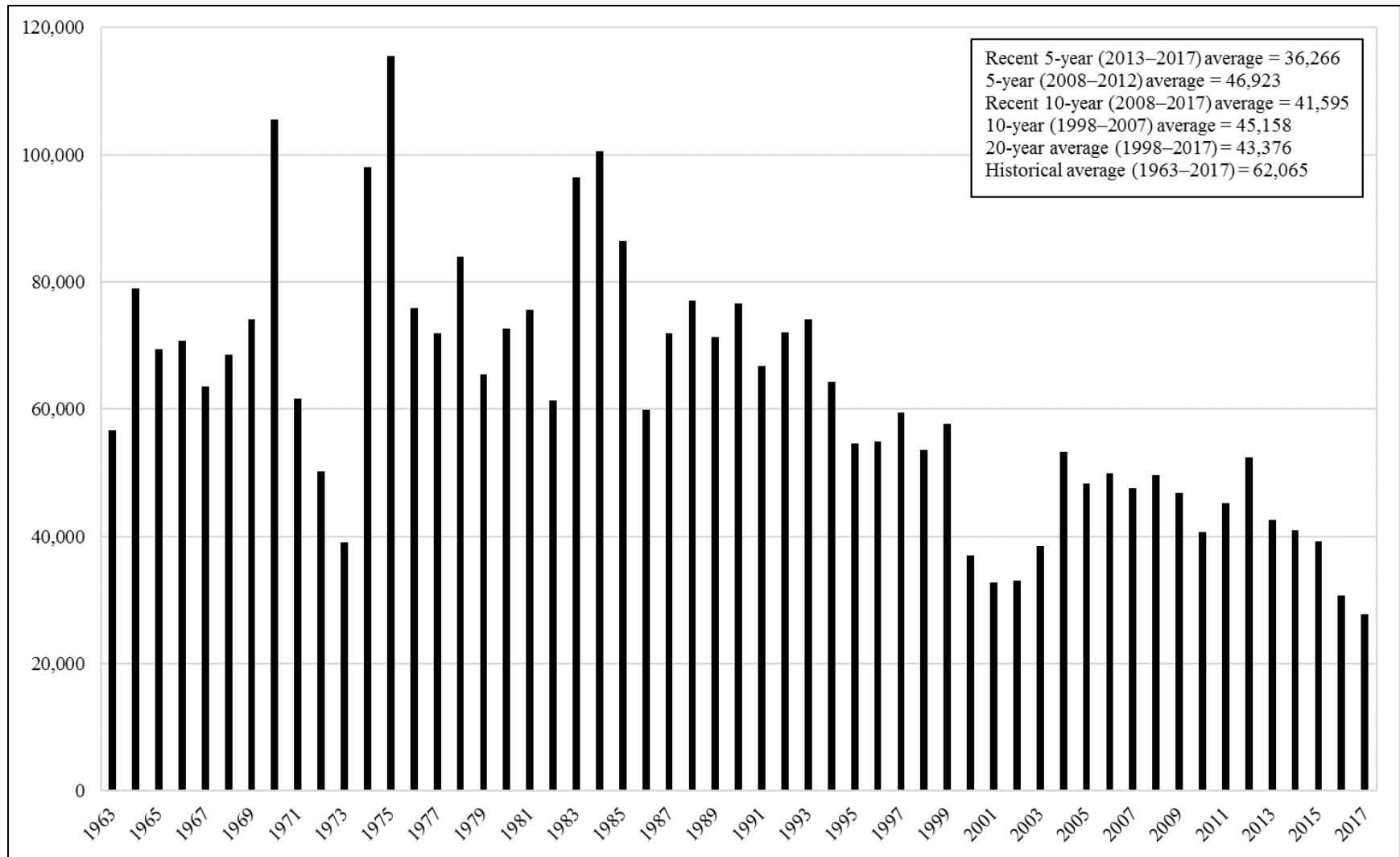


Figure 2-2.—Estimated subsistence harvests of sockeye salmon, Kvichak watershed, Alaska, 1963–2017.

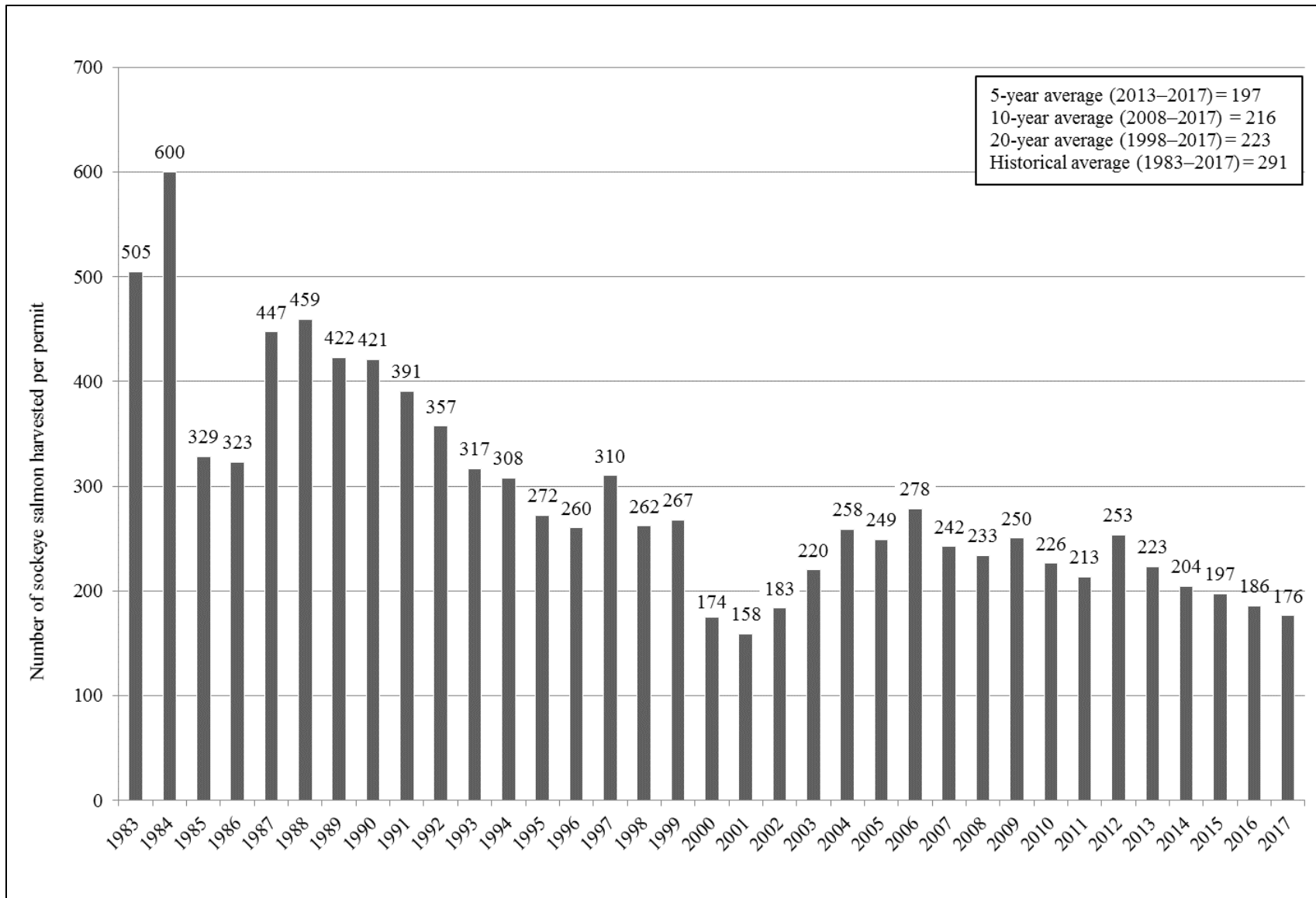


Figure 2-3.—Average subsistence sockeye salmon harvest per permit, Kvichak watershed, Alaska, 1983–2017.

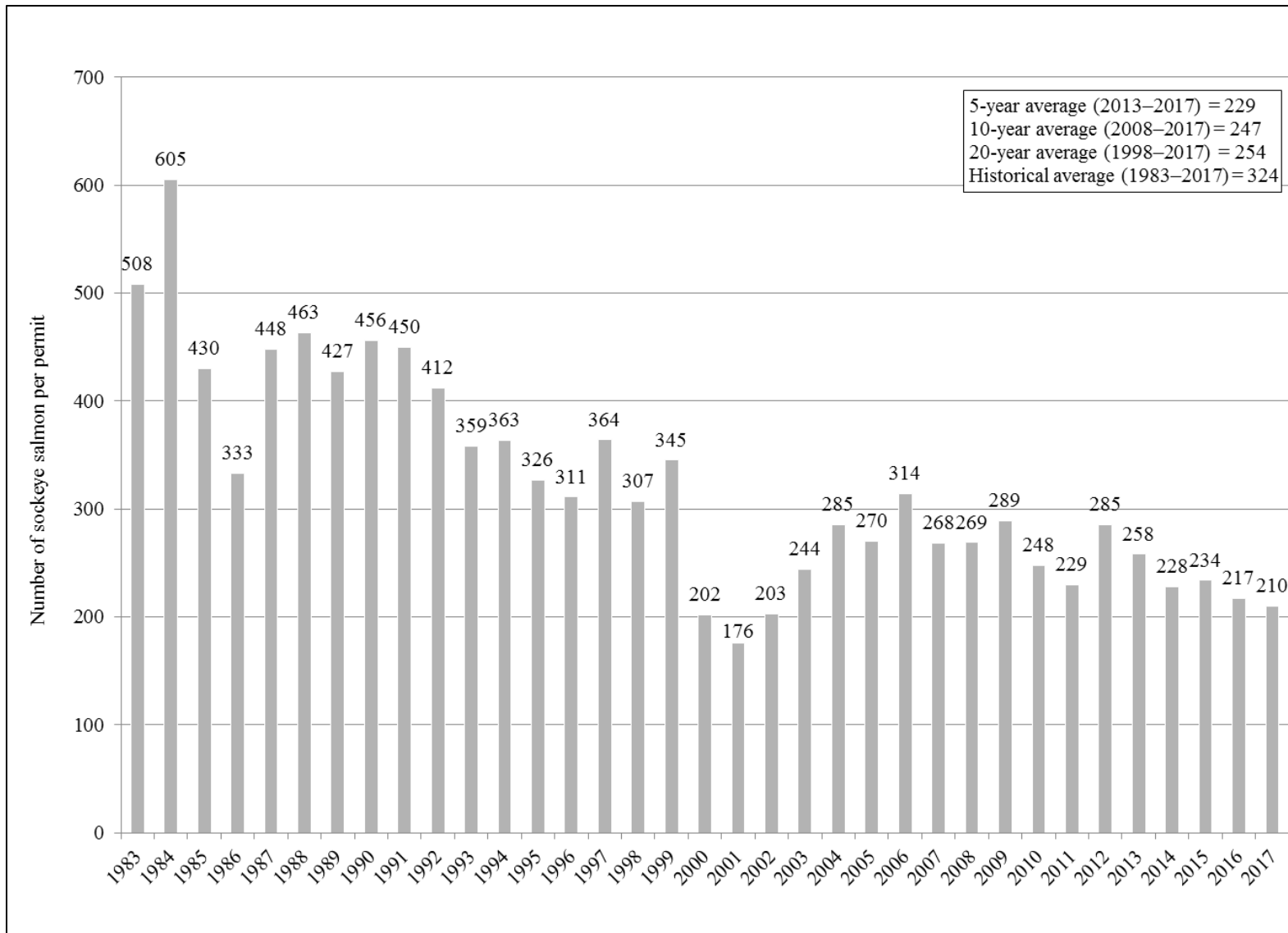


Figure 2-4.—Average subsistence sockeye salmon harvest per permit, local community residents, Kvichak River watershed, Alaska, 1983–2017.

3. NUSHAGAK SALMON SUBSISTENCE FISHERY

Communities and Population

The communities in the Nushagak District and their 2017 estimated populations include Dillingham (2,335), Manokotak (487), Aleknagik (208), New Stuyahok (504), Ekwok (98), Clarks Point (which also includes Ekuk) (55) and Koliganek (208) (Table 1-1). The most recent household-based salmon research occurred in these communities in 2013, 2014, and 2016.

General Patterns of Subsistence Harvests

In 2017, based on permit returns, 52,218 salmon were harvested in the Nushagak District (Table 3-1). This is slightly below the highest harvest area, the Naknek-Kvichak District, which harvested an estimated 52,826 salmon (Appendix A2). As Figure 3-1 shows, the salmon harvest in the Nushagak District is varied across species, with high harvests of sockeye, king, and coho salmon (see also Appendix A1). Figure 3-1 illustrates the recent 5-, 10-, and 20-year harvest averages of the five Pacific salmon species in the Nushagak District. Table 3-2 shows the historical harvest by community from 1985–2017.

Table 3-1 and Figure 3-2 report estimated subsistence salmon harvests based on permit return data from the Nushagak District watershed for the period 1983–2017. Since 1983 and prior to 2014, salmon harvests have shown an overall decline in the Nushagak District, from a high of 86,400 fish in 1986 to a low of 37,960 salmon in 2012. The 10-year (2008–2017) average harvest was 48,925 fish. The 2017 harvest of 52,218 salmon was slightly higher than the recent 5-year average of 51,861 salmon, yet slightly lower than the historical average (1983–2017) of 52,276 (Table 3-1 and Figure 3-2).

The number of subsistence salmon permits issued in the Nushagak District has remained relatively stable since 1983 (Table 3-2). In 2017, 562 permits were issued. This is lower than the 5-year average of 586 permits and comparable to the 10-year average of 560 issued permits (Table 3-2). As illustrated in Figure 3-3, average salmon harvests per subsistence permit (expanded to estimate harvest by nonreturned permits holders) in the Nushagak District began to decline in 1993, even though the number of permits issued increased. The average salmon harvests per subsistence permit reached a low of 73 fish per permit in 2012 (see also Table 3-2). A slight increase appeared in 2013 (93 fish per permit) and then the average decreased again to 78 fish per permit in 2015. In 2017 the average salmon per permit was 93, which is comparable to the recent 5-year average (2013–2017) of 90 fish per permit, and slightly higher than the 20-year average (1998–2017) of 88 salmon per permit. The historical average (1983–2017) of harvest per permit was 104 fish (Table 3-2). Overall, permits issued have increased for the Nushagak District (Figure 3-3). Since the most recent lowest year in 2006 (461 permits), permits have steadily risen. The number of permits issued has been over 582 since 2013 with a peak of 613 permits issued in 2016. In 2017 there was a decrease of issued permits (562), which was lower than the 5-year average of 586 permits, but higher than the 20-year average of 541 permits (Figure 3-3).

The Nushagak District continues to rank highest in subsistence permit use (Appendix A2). The Naknek-Kvichak District is second highest, with 441 permits in 2017. Togiak District ranks third, with 69 permits issued, and then Egegik and Ugashik districts at 23 and 19 respectively. The Bristol Bay Area in total has also seen steady trends of permits issued, with the 5-year

average being 1,143 permits issued and the historical (1983–2017) average being nearly the same at 1,116 permits (Appendix A1).

As mentioned above, king salmon returns and subsistence harvests are larger in the Nushagak River than the other Bristol Bay watersheds. A forthcoming Technical Paper by the Division of Subsistence funded under the Chinook Salmon Research Initiative (CSRI) project will present specific characteristics of the Nushagak subsistence fishery. The Nushagak portion of the CSRI documented local and traditional knowledge of the subsistence salmon fishery of Dillingham, Clarks Point, Ekwok, New Stuyahok, and Koliganek. This multi-year study incorporated three years of harvest survey information for these communities.

The Nushagak District continues to produce the most king salmon for subsistence as compared to all other Bristol Bay districts combined. In 2017, 12,968 king salmon were harvested for subsistence in the entire BBA, with 11,060 exclusively in the Nushagak. In addition, for 2017, 31,206 sockeye, 3,965 chum, 5,732 coho, and 254 pink salmon (which are strongest in even-numbered years) were harvested (Appendix A1, Appendix A2).

Nushagak Noncommercial Harvest

The Nushagak District subsistence salmon harvest requires, by regulation, that permit holders record the date and areas of all salmon harvested. The district includes the following areas identified as general subsistence use locations: Igushik/Snake River, Nushagak Bay Commercial, Nushagak Bay Noncommercial, Nushagak River, Wood River, and “site unknown.” Each subsistence permit should have more specific harvest location information identified by the permit holder. Within the Nushagak Bay Noncommercial category are the local areas known as the “Dillingham beaches”, which include Snag Point, and the Scandinavian, Kanakanak, and “City Dock” areas. Also included are both sides of the lower Wood River from Red Bluff (59° 9.58" N. lat. 158° 32.36" W. long), and the Nushagak River to Lewis Point (58° 59.46' N. lat. 158° 05.57' W. long). These areas only allow 10 fathom set nets as subsistence gear from July 2–July 17 and are open for only three 24-hour periods per week (see Regulations section above).

Nushagak Noncommercial areas produced the largest proportion of subsistence salmon harvest within the district (19,250 estimated salmon for 2017) and had the highest portion of issued permits (39%) (Appendix A2). Figure 3-4 shows salmon harvests by Bristol Bay and non-Bristol Bay residents within this area and includes the totals for each group combined for the lower Wood River and the Nushagak Bay noncommercial areas. The harvest per permit for Bristol Bay residents has remained stable since 1997, with a 5-year average of 77 fish and a 10-year average of 75 fish. Likewise, no trend is seen for non-Bristol Bay residents (other Alaskans) harvest per permit, with a 5-year average of 49 fish per permit and a 10-year average of 46 fish. Similarly, for permits fished in the lower Wood River and the noncommercial areas, Bristol Bay residents were issued 239 permits (5-year average 2013–2017), a slight decrease than the 10-year average (2008–2017) of 261 permits. Yet, for other Alaskan residents who fish Bristol Bay for subsistence, permits issued have remained stable at 46 for a 5-year average, and 42 for a 10-year average (Figure 3-4). Only in 2017 did other Alaskan resident permits reach over the 50 value, at 60 issued permits. Table 3-3 shows the estimated historical (1997–2017) subsistence salmon harvests for the lower Wood River and the noncommercial areas by species. For example, non-Bristol Bay residents harvested on average (2013–2017) 281 king salmon (6%), compared to 4,101 (94%) harvested by Bristol Bay residents. The same pattern can be seen for all species combined. Other Alaskan residents, over the last 10 years, have harvested 9% of all the

subsistence salmon in the above-mentioned specific areas around Dillingham and the lower Wood River, compared to 91% harvested by Bristol Bay residents.

Table 3-1.—Estimated harvests of salmon in the Nushagak District subsistence fishery, 1983–2017.

Year	Estimated salmon harvest					Total
	Sockeye	King	Chum	Pink	Coho	
1983	38,400	11,800	9,200	500	5,200	65,100
1985	38,000	7,900	4,000	600	6,100	56,600
1986	49,000	12,600	10,000	5,400	9,400	86,400
1987	40,900	12,200	6,000	200	6,200	65,500
1988	31,086	10,079	8,234	6,316	5,223	60,938
1989	34,535	8,122	5,704	407	8,679	57,447
1990	33,003	12,407	7,808	3,183	5,919	62,320
1991	33,161	13,627	4,688	292	10,784	62,552
1992	30,640	13,588	7,076	3,519	7,103	61,926
1993	27,114	17,709	3,257	240	5,038	53,358
1994	26,501	15,490	5,055	2,042	5,338	54,426
1995	22,793	13,701	2,786	188	3,905	43,373
1996	22,935	15,941	4,704	1,573	5,217	50,370
1997	25,080	15,318	2,056	218	3,433	46,106
1998	25,217	12,258	2,487	1,076	5,316	46,355
1999	29,387	10,057	2,409	124	3,993	45,969
2000	24,451	9,470	3,463	1,662	5,983	45,029
2001	26,939	11,760	3,011	378	5,993	48,080
2002	22,777	11,281	5,096	1,179	4,565	44,897
2003	25,491	18,686	5,064	403	5,432	55,076
2004	17,491	15,610	3,869	1,944	4,240	43,154
2005	23,916	12,529	5,006	793	5,596	47,841
2006	20,773	9,971	4,448	1,591	3,590	40,373
2007	25,127	13,330	3,006	430	3,050	44,944
2008	26,828	12,960	4,552	1,923	5,133	51,395
2009	26,922	12,737	4,510	355	6,777	51,300
2010	22,326	9,150	3,660	1,672	2,983	39,791
2011	28,006	12,461	3,055	230	5,746	49,497
2012	20,587	10,350	3,072	1,309	2,642	37,960
2013	30,183	11,567	4,380	204	6,763	53,980
2014 ^a	24,362	15,672	5,656	2,119	5,553	53,362
2015	25,240	12,117	2,953	295	5,644	46,248
2016 ^a	24,790	15,735	4,596	4,160	4,219	53,500
2017	31,206	11,060	3,965	254	5,732	52,218

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Table 3-1.–Page 2 of 2.

Year	Estimated salmon harvest					Total
	Sockeye	King	Chum	Pink	Coho	
5-year average (2013–2017)	27,156	13,230	4,310	1,406	5,582	51,861
10-year average (2008–2017)	26,045	12,381	4,040	1,252	5,119	48,925
Historical average (1983–2017)	28,093	12,625	4,671	1,376	5,485	52,276

Source ADF&G Division of Subsistence, ASFDB 2017 (ADF&G 2017).

a. Data are preliminary.

Table 3-2.—Estimated subsistence harvest of salmon by community, by individual fish, Nushagak District, Bristol Bay, Alaska, 1983–2017.

Year	Permits issued		Manokotak	Aleknagik	Ekwok	New		Other Alaska residents ^d	Total	Salmon per permit
	Dillingham ^c					Stuyahok	Koliganek			
1983	389	20,100	5,300	1,900	5,800	18,700	13,300	65,100	167	
1985	406	22,900	3,600	1,600	7,000	14,500	6,800	56,400	139	
1986	424	31,900	5,500	6,900	7,800	26,400	8,200	86,700	204	
1987	474	33,500	5,900	3,100	6,400	11,400	4,900	65,200	138	
1988	441	29,600 ^b	5,500	2,400	6,100	11,700	5,700	61,000	138	
1989	432	31,800 ^b	5,800	2,000	4,700	9,700	3,800	57,800	134	
1990	441	28,860 ^b	6,600	2,300	4,900	9,900	8,000	61,260	139	
1991	528	34,399 ^b	5,873	3,043	4,532	8,326	5,438	63,774	121	
1992	476	31,702 ^b	4,317	2,184	5,971	11,325	3,708	61,842	130	
1993	500	25,315 ^b	3,048	2,593	2,936	12,169	4,180	52,779	106	
1994	523	30,145 ^b	3,491	2,289	4,343	8,056	4,513	55,159	105	
1995	484	24,998 ^b	2,453	1,468	2,046	6,911	2,983	43,265	89	
1996	481	27,161 ^b	3,883	1,733	2,866	8,892	3,319	49,967	104	
1997	538	23,255 ^b	3,988	1,989	1,797	6,427	4,179	46,233	86	
1998	562	24,072 ^b	4,069	1,112	3,555	5,419	3,166	46,351	82	
1999	548	26,502 ^b	3,413	1,532	1,805	4,556	2,772	45,969	84	
2000	541	27,931 ^b	3,173	1,111	3,946	3,715	2,792	45,029	83	
2001	554	26,435 ^b	3,700	2,129	2,218	7,294	2,209	48,080	87	
2002	520	25,004 ^b	3,254	1,517	2,735	6,043	3,098	44,897	86	
2003	527	26,955 ^b	4,214	2,044	2,291	10,817	5,721	55,076	105	
2004	511	23,308 ^b	2,052	2,206	1,891	6,714	3,619	43,154	84	
2005	502	21,898 ^b	1,576	1,795	1,388	9,673	8,422	47,841	95	
2006	461	22,081 ^b	1,654	2,047	1,499	6,160	3,885	40,373	88	
2007	496	25,190 ^b	2,443	1,382	1,267	8,284	3,054	44,944	91	

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Table 3-2.–Page 2 of 2.

Year	Permits issued	Dillingham ^c	Manokotak	Aleknagik	Ekwok	New Stuyahok	Koliganek	Other Alaska residents ^d	Total	Salmon per permit
2008	571	27,388 ^b	5,429	3,309	1,902	5,690	4,423	3,255	51,395	90
2009	530	30,117 ^b	2,068	2,646	2,345	6,855	3,700	3,568	51,300	97
2010	528	22,842 ^b	2,665	1,570	1,380	5,608	2,406	3,320	39,791	75
2011	525	26,850 ^b	1,433	3,016	1,805	7,980	3,539	4,875	49,498	94
2012	517	22,037 ^b	1,212	2,457	1,253	5,062	2,834	3,105	37,959	73
2013	584	27,011 ^b	1,375	2,368	2,448	11,104	7,290	3,290	54,176	93
2014 ^e	581	31,838 ^b	1,658	3,560	2,700	7,613	4,654	6,403	58,426	101
2015	591	26,049 ^b	2,946	2,186	1,618	5,860	2,085	5,504	46,248	78
2016 ^e	613	33,220 ^b	2,486	2,349	1,418	5,716	2,510	5,800	53,499	87
2017	562	30,194 ^b	2,320	2,767	1,622	5,785	2,286	7,243	52,218	93
5-year average (2013–2017)	586	29,662	2,157	2,646	1,961	7,216	3,765	5,648	52,913	90
10-year average (2008–2017)	560	27,755	2,359	2,623	1,849	6,727	3,573	4,636	49,451	88
Historical average (1983–2017)	511	27,134	3,482	2,312	3,185	8,834	4,514	3,634	52,432	105

Source ADF&G Division of Subsistence, ASFDB 2017 (ADF&G 2017)

Note Harvests are extrapolated for all permits issued, based on those returned. Harvest estimates prior to 1991 are rounded to the nearest hundred fish.

Note Harvest estimates prior to 1990 are based on the community where the permit was issued; estimates from 1990 to the present are based on community of residence and include fish caught only in the Nushagak District.

a. No permits issued. Only residents of the Nushagak watershed could obtain subsistence permits.

b. Includes permits issued in Clarks Point and Ekuik.

c. Includes the village of Portage Creek and Clarks Point.

d. Subsistence harvests by non-Nushagak watershed residents.

e. Data are preliminary.

Table 3-3.—Estimated historical subsistence salmon harvests, lower Wood River and Nushagak Bay noncommercial fisheries, Alaska, 1997–2017.

Year	Sockeye			King			Coho			Chum			Pink			Total		
	Bristol Bay resident	Other Alaska resident	Total	Bristol Bay resident	Other Alaska resident	Total	Bristol Bay resident	Other Alaska resident	Total	Bristol Bay resident	Other Alaska resident	Total	Bristol Bay resident	Other Alaska resident	Total	Bristol Bay resident	Other Alaska resident	Total
1997	8,549	1,115	9,664	5,420	325	5,745	1,591	50	1,641	727	68	795	92	0	92	16,380	1,558	17,938
1998	8,535	395	8,930	3,476	146	3,622	2,631	20	2,651	989	39	1,028	746	8	754	16,377	608	16,985
1999	12,929	1,197	14,126	2,267	174	2,441	1,905	158	2,062	1,005	38	1,043	36	0	36	18,142	1,567	19,709
2000	10,465	425	10,889	2,782	139	2,921	2,926	28	2,954	892	68	960	1,035	5	1,040	18,101	663	18,764
2001	9,250	710	9,960	3,492	148	3,641	2,442	114	2,556	997	76	1,073	127	19	146	16,308	1,067	17,375
2002	7,718	377	8,095	3,567	96	3,663	2,603	78	2,681	1,490	89	1,579	747	52	799	16,125	692	16,817
2003	8,481	968	9,449	9,282	127	9,409	3,042	73	3,115	1,046	55	1,101	75	10	85	21,926	1,234	23,160
2004	8,012	840	8,852	7,892	250	8,142	2,285	21	2,305	1,627	50	1,677	1,176	7	1,184	20,993	1,168	22,161
2005	8,885	616	9,501	5,124	179	5,303	2,973	227	3,200	963	49	1,012	170	6	176	18,114	1,077	19,191
2006	9,499	770	10,269	4,184	132	4,316	1,795	181	1,976	1,603	52	1,655	1,080	41	1,121	18,160	1,177	19,337
2007	12,663	1,418	14,081	6,003	612	6,615	1,581	53	1,634	1,109	109	1,218	183	1	184	21,539	2,194	23,733
2008	10,328	1,302	11,630	5,558	442	6,000	2,729	107	2,836	1,465	126	1,591	1,027	11	1,038	21,106	1,988	23,094
2009	13,442	1,283	14,725	6,592	204	6,795	3,624	233	3,857	2,037	129	2,165	164	4	168	25,858	1,852	27,710
2010	9,873	1,283	11,156	3,873	151	4,024	1,588	22	1,610	1,326	77	1,403	984	2	986	17,644	1,535	19,179
2011	12,685	1,108	13,793	5,612	321	5,933	3,530	172	3,702	1,368	107	1,475	166	3	169	23,362	1,711	25,073
2012	10,082	878	10,961	4,108	217	4,325	1,230	143	1,374	1,142	42	1,184	562	90	652	17,125	1,370	18,495
2013	11,708	1,423	13,131	2,972	93	3,065	3,602	166	3,767	1,128	64	1,193	78	2	80	19,488	1,748	21,236
2014	9,571	1,940	11,512	5,018	344	5,363	2,586	114	2,701	2,096	172	2,269	990	74	1,063	20,262	2,645	22,907
2015	7,363	1,649	9,012	3,909	186	4,095	2,239	100	2,339	920	71	992	189	2	191	14,620	2,009	16,629
2016	7,133	1,163	8,296	4,538	497	5,035	1,378	47	1,425	1,249	133	1,382	951	95	1,046	15,249	1,935	17,183
2017	13,056	2,034	15,090	4,068	282	4,350	2,553	243	2,796	2,064	137	2,201	226	12	238	21,967	2,708	24,675
5-year average (2013–2017)	9,766	1,642	11,408	4,101	281	4,382	2,472	134	2,606	1,492	116	1,607	487	37	524	18,317	2,209	20,526
10-year average (2008–2017)	10,524	1,406	11,931	4,625	274	4,899	2,506	135	2,641	1,479	106	1,585	534	29	563	19,668	1,950	21,618
Historical average (1997–2017)	10,011	1,090	11,101	4,749	241	4,991	2,421	112	2,532	1,297	83	1,381	515	21	536	18,993	1,548	20,541

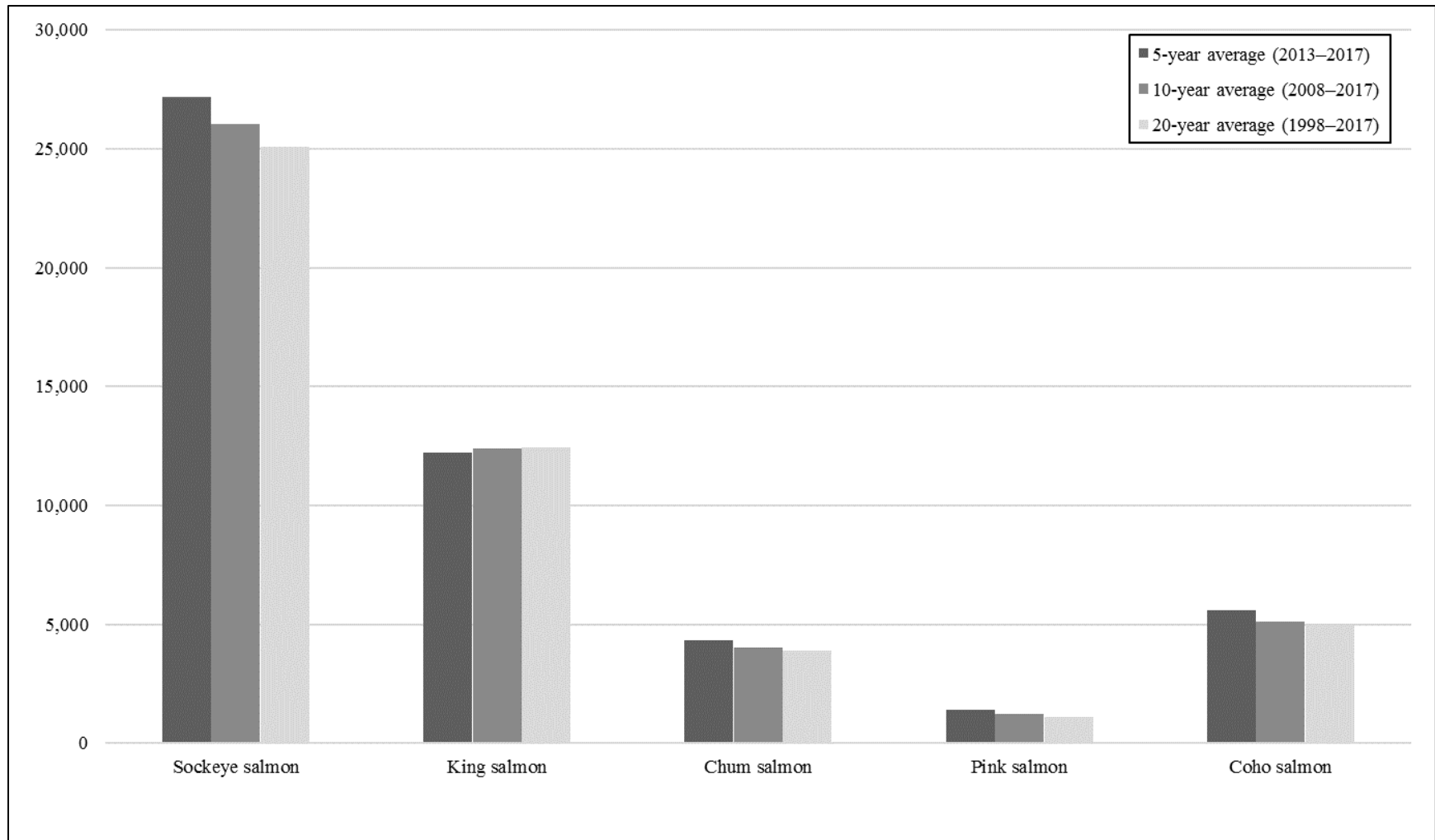


Figure 3-1.—Average number of salmon harvested in the Nushagak District subsistence fishery, Alaska, 1998–2017.

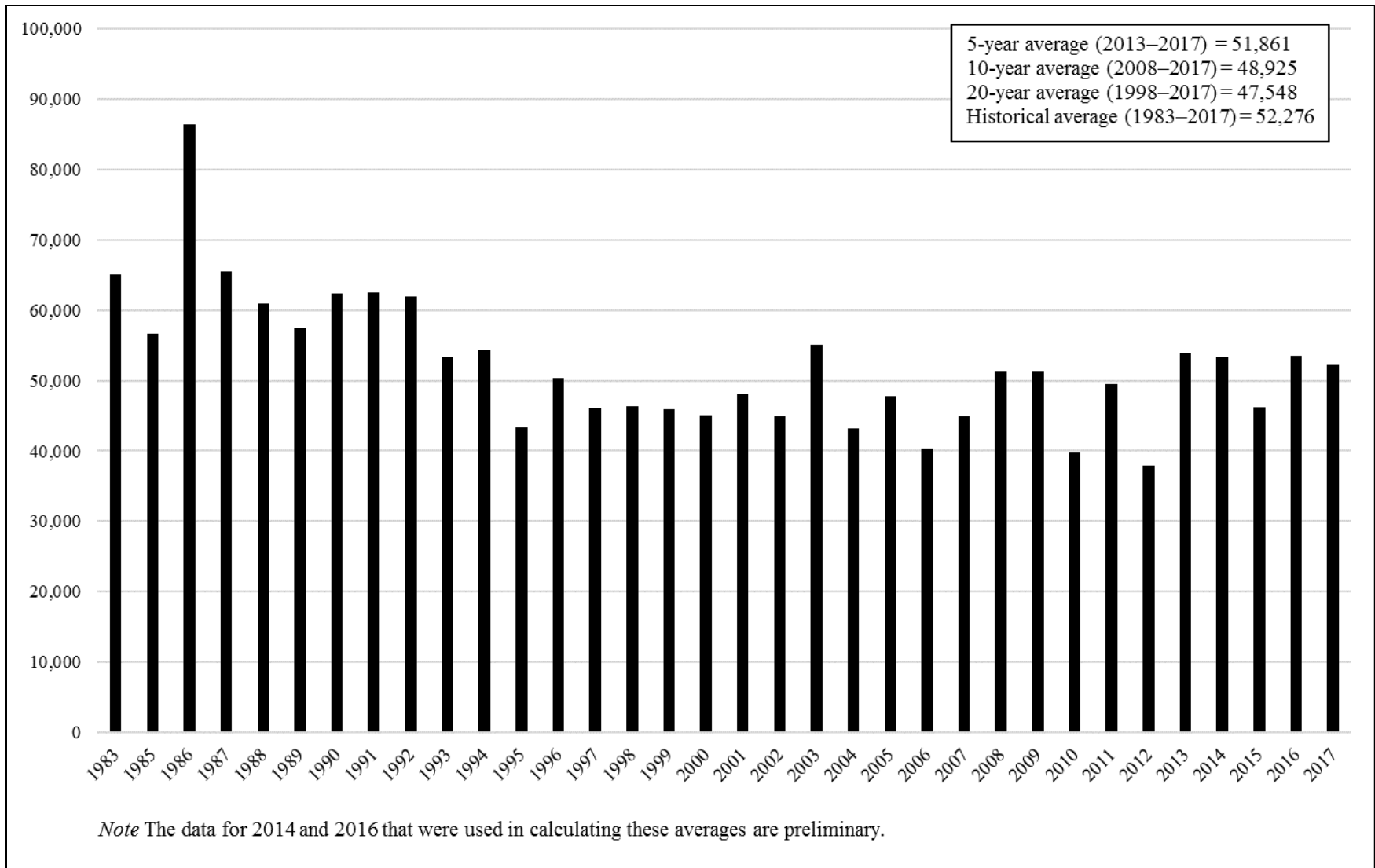


Figure 3-2.—Estimated subsistence harvests of salmon, Nushagak District, Alaska, 1983–2017.

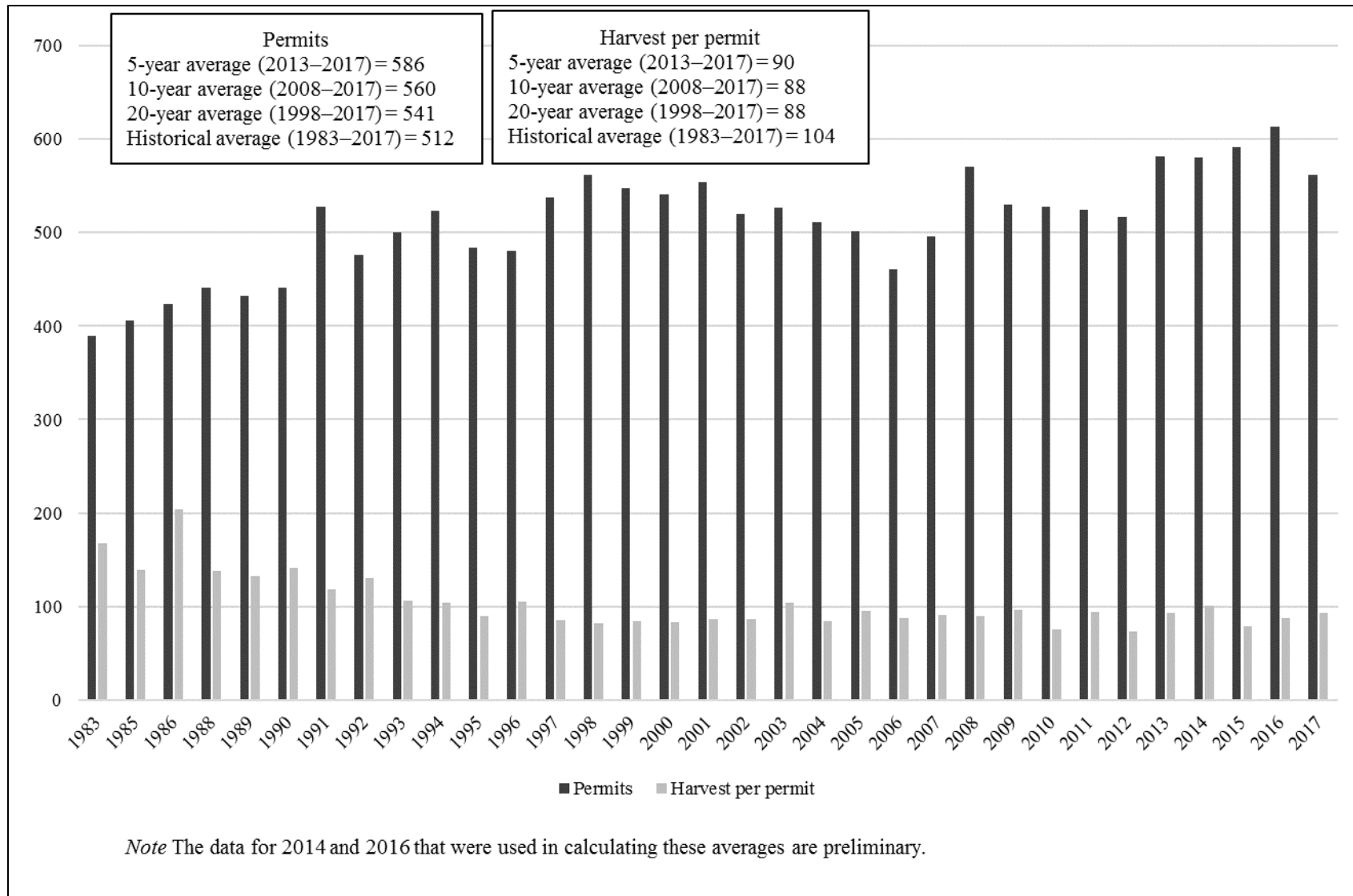


Figure 3-3.—Number of permits issued and harvest per permit in the Nushagak District, Alaska, 1983–2017.

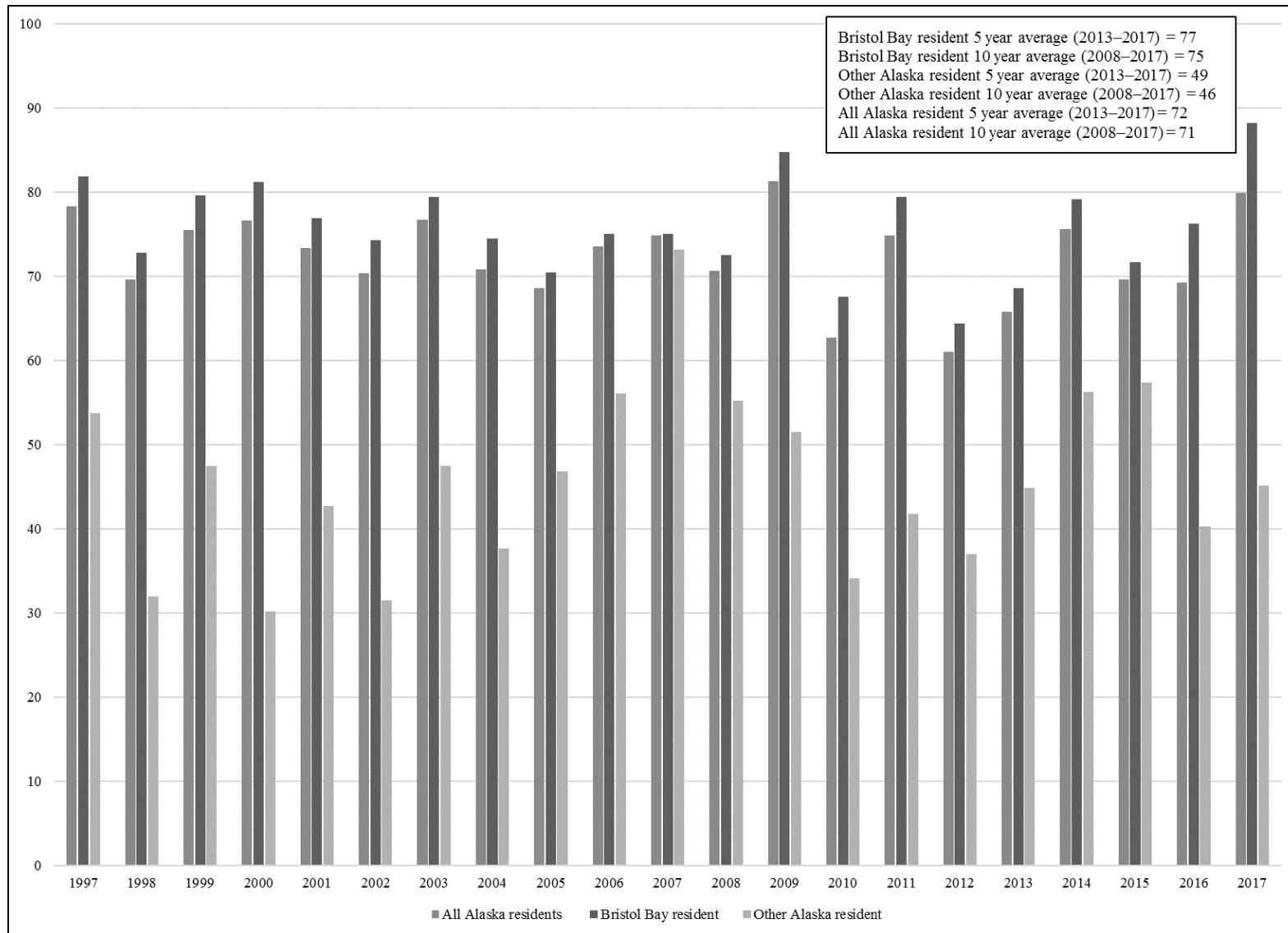


Figure 3-4.—Average harvest per permit, lower Wood River and Nushagak Bay noncommercial subsistence fisheries, Alaska, 1997–2017.

4. EGEGIK SALMON SUBSISTENCE FISHERY

Communities and Population

Egegik is within the Lake and Peninsula Borough (Figure 4-1) and had a 2017 population of 76 people (Table 1-1). The village is within the boundaries of the Egegik commercial fishing district.

General Patterns of Subsistence Harvests

Historical subsistence salmon harvest has been stable in Egegik and dominated by sockeye salmon harvests (Appendix A1). 2013 was the highest year for total estimated salmon harvested (2,380), with the second highest year being 2011 with 2,264 estimated salmon. The historical (1983–2017) average for all salmon harvested was 2,157 fish, and the most recent 5-year (2012–2017) average for salmon harvested was 1,587 (Appendix A1). Permits issued have declined somewhat over time, with a historical average of 43 permits issued and a 5-year average of 32 permits issued. Locations of subsistence salmon fishing occur primarily within the district. (Table 4-1).

The majority of permits issued in Egegik are fished by residents from outside of the district. Table 4-2 shows that number of permits issued to Egegik residents and other Alaskan residents from 2008–2017; these are further described below under subheading Egegik Local and Nonlocal Permit Information. The most recent published household-based subsistence salmon research in this region was in 2014 and findings appear in the Community Subsistence Information System (CSIS), Division of Subsistence, Alaska Department of Fish and Game (ADF&G) website. The publication of data collected for the 2016 harvest year is forthcoming.

Egegik Subsistence Harvest by Location

For the period of 2008–2017, the 2008 and 2009 subsistence permits did not identify specific Egegik salmon harvest locations (Table 4-1). For these two years, Egegik was the general location fished, with sockeye salmon as the primary species harvested, followed by coho. From 2010 onward, more specific harvest locations were identified on permits issued and fished in the Egegik Area (Table 4-1). Egegik subsistence permits request location information, which remains up to the individual fisher how specific they wish to indicate location. The locations reported on subsistence permits are the Commercial District, Egegik, Coffee Point, Egegik Beach, Egegik District Site Unknown, and the King Salmon River. Based on available data, the only locations reported that were outside of the commercial fishing boundary was the King Salmon River. Harvest locations may have also been used east of the boundary of the district which ends on the western side of Egg Island, but no specific place names were given. Since 2014, 11 total permits were fished in the King Salmon River, with an average of 66 salmon harvested per permit (Table 4-2). Most of all other subsistence salmon harvested were taken within the Egegik District and accounted for a total of 339 permits fished from 2008–2017. During this period, sockeye and coho salmon were the main species harvested with total harvests of 12,824 and 2,730 fish, respectively. Since the community of Egegik is within the Commercial District, and subsistence fishing is only open during commercial fishing times, the majority of subsistence salmon harvested are during the commercial openers within the district.¹ Between

1. Only the Nushagak District has a subsistence regulation that indicates that the Commissioner shall (by emergency order) open the subsistence fishery when commercial fishing is closed (5 AAC 01.310(b)).

2008 and 2017 an average of 34 salmon were harvested per permit in the district, (excluding the locations outside of the commercial fishing boundary: King Salmon River and Egegik District unknown site).

Egegik Local and Nonlocal Permit Information

Between 2008 and 2017, an average of eight permits were issued to Egegik residents, compared to an average of 26 permits issued to nonlocal Alaskans (Table 4-2). During the 5-year period 2008–2012 an average of 10 permits were issued to Egegik residents, which then declined to six for the more recent 5-year average during 2013–2017. The 5- and 10-year average number of permits issued to other Alaska residents was 26. Although other Alaskans who are non-local residents travel to Egegik to subsistence fish, this does not necessarily mean they do not have ties to the community; in fact, the opposite is likely the case. Community members regularly mentioned to department staff conducting household-based research in Egegik in 2017 that past residents who no longer live year-round in Egegik maintain strong ties to family, economy, and a way of life in the region.

A forthcoming Technical Paper for Division of Subsistence research from the 2016 harvest season will describe the subsistence harvest, sharing networks, and other characteristics of the lower region of Bristol Bay². This project was funded under the 2015 Fisheries Resource Management Program within the Office of Subsistence Management, US Fish and Wildlife Service. This study gathered one year of survey harvest information for Bristol Bay communities, which included Egegik.

2. Wiita, A., L. Hutchinson-Scarborough, and D. Gerkey. In prep. Description and Analysis of the Subsistence Salmon Network in Bristol Bay, Alaska. Alaska Department of Fish and Game Division of Subsistence Technical Paper No. NNN, Anchorage.

Table 4-1.—Estimated subsistence harvest by site, Egegik District, Alaska, 2008–2017.

Year	Site	Permits issued	King	Sockeye	Coho	Chum	Pink	Total	Harvest per permit
2008	Egegik	37	91	1,502	295	35	4	1,928	52
2009	Egegik	26	31	778	133	6	5	953	37
2010	Coffee Point	2	3	1	71	1	0	76	38
	Commercial District	2	1	20	0	0	0	21	11
	Egegik	36	92	1,637	275	59	8	2,070	58
2011	Commercial District	1	0	0	0	0	0	0	0
	Egegik	36	91	1,772	377	23	2	2,264	63
2012	Egegik	36	37	1,165	178	19	7	1,406	39
	Egegik Beach	3	0	7	12	0	0	19	6
2013	Coffee Point	2	1	68	1	1	0	71	36
	Commercial District	2	2	116	12	0	0	130	65
	Egegik	42	41	1,894	168	16	5	2,124	51
	Egegik Beach	1	0	30	25	0	0	55	55
2014	Coffee Point	5	0	0	0	0	0	0	0
	Commercial District	1	0	0	0	0	0	0	0
	Egegik	29	133	956	237	4	2	1,333	46
	Egegik District Site (unknown)	2	0	0	0	0	0	0	0
	King Salmon River	1	17	16	0	0	0	33	33
2015	Coffee Point	2	0	0	0	0	0	0	0
	Commercial District	2	0	41	0	0	0	41	21
	Egegik	12	42	427	250	5	1	725	60
	Egegik Beach	9	17	401	76	13	8	514	57
	Egegik District Site (unknown)	1	0	0	0	0	0	0	0
	King Salmon River	7	91	384	27	20	4	526	75
2016	Coffee Point	4	0	0	0	0	0	0	0
	Egegik	17	11	292	164	3	0	470	28
	Egegik Beach	3	16	49	0	0	0	68	23
	Egegik District Site (unknown)	3	0	0	0	0	0	0	0
	King Salmon River	1	0	25	0	0	0	25	25
2017	Coffee Point	2	0	0	0	0	0	0	0
	Egegik	20	19	1,071	430	13	6	1,539	77
	Egegik Beach	1	1	22	0	0	0	23	23
	King Salmon River	2	109	150	0	0	0	259	130

Source ADF&G Division of Subsistence

Table 4-2.—Number of subsistence permits issued, Egegik District, Alaska, 2008–2017.

Year	Number of permits issued		
	Egegik resident	Other Alaska resident	Total
2008	11	26	37
2009	8	18	26
2010	10	27	37
2011	10	27	37
2012	9	29	38
2013	10	33	43
2014	8	28	36
2015	6	26	32
2016	4	22	26
2017	2	21	23
5-year average (2013–2017)	6	26	32
10-year average (2008–2017)	8	26	34

Source ADF&G Division of Subsistence

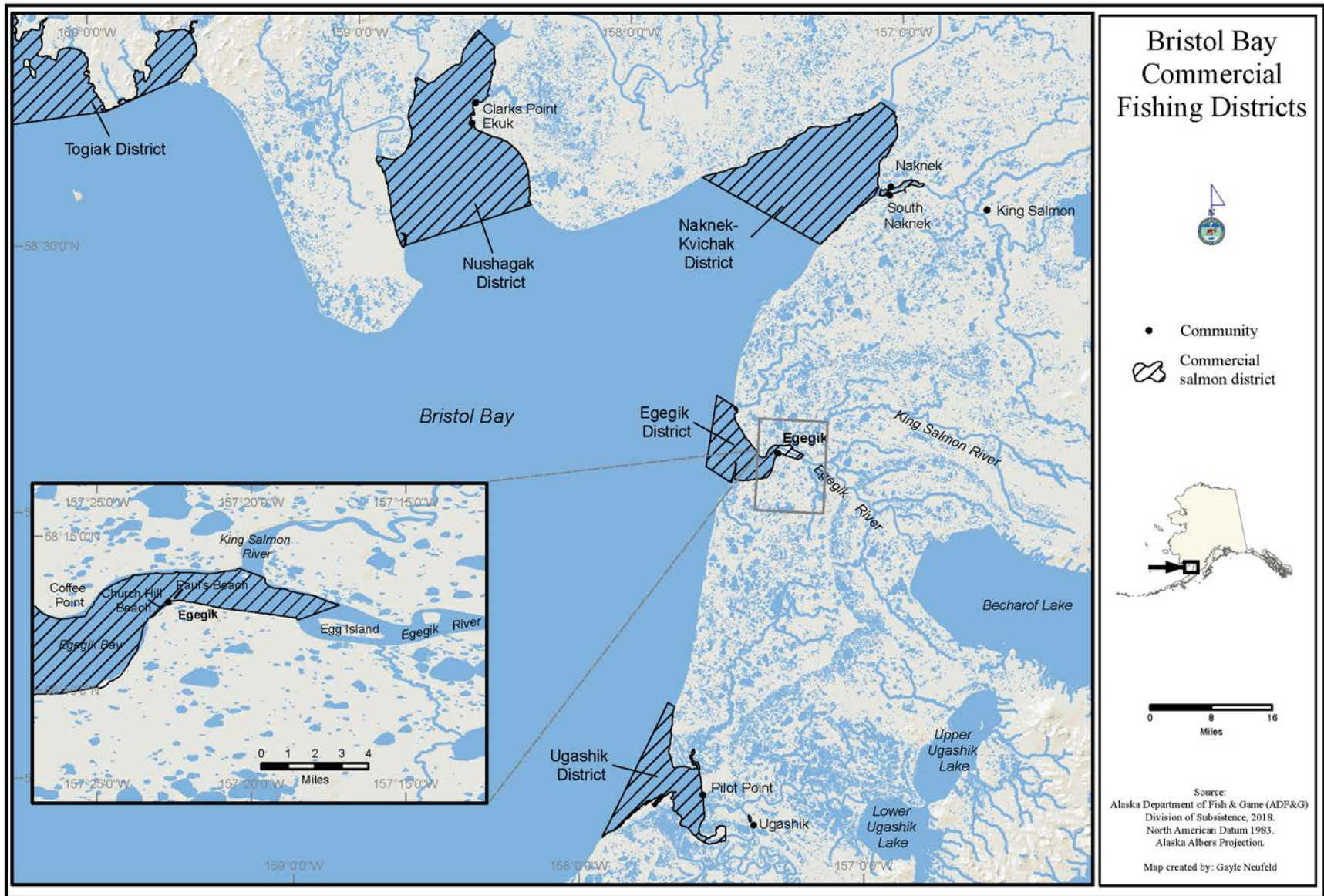


Figure 4-1.—Bristol Bay, Alaska commercial fishing districts.

5. UGASHIK SALMON SUBSISTENCE FISHERY

Communities and Population

The Ugashik District contains the community of Pilot Point with a population of 76 (2017). The community of Ugashik is upstream of the Ugashik District and had a 2017 population of 13 (Table 1-1).

General Patterns of Subsistence Harvests

Subsistence salmon harvest has been stable in the Ugashik District and dominated by sockeye salmon harvests (Appendix A1). 2016 was the highest year for total estimated salmon harvested (1,432), and the second highest year was 2008 (1,955). The 5-year (2013–2017) average for salmon was 948 and the most recent 10-year average (2008–2017) was 1,099 salmon. A sharp decline was reported for 2017 with only 581 salmon harvested. Permits issued have slightly declined with a historical average (1983–2017) average of 20 permits issued and a 5-year average of 18 permits issued. Between 2016 and 2017, 4 fewer permits were issued for the Ugashik (Appendix A1). The most recent household-based research in this region regarding subsistence salmon was in 2014 and findings may be found in the CSIS.

6. TOGIAK SALMON SUBSISTENCE FISHERY

Communities and Population

The Togiak District is home to two communities, Togiak and Twin Hills, with 2017 populations of 870 and 73, respectively (Table 1-1). The first subsistence gear exception for Bristol Bay, outside of using gillnets, occurred in the Togiak District, where spear fishing was allowed under subsistence regulations. Subsistence drifting (with a 10-fathom net) may also occur between the mouth of the Togiak River and upstream approximately two miles to a specific line across the river designated by latitude and longitude locations.

General Patterns of Subsistence Harvests

Appendix A1 shows the historical harvest in the Togiak District from 1985–2017. The majority of salmon harvested was sockeye salmon, followed by king salmon. Harvest in the Togiak District has been stable, with a 5-year average (2012–2016) of 5,620 salmon, and a 20-year average (1997–2016) of 5,144 estimated salmon. Permits issued have also remained stable with a 20-year average of 58 permits issued and a 5-year average of 55 permits issued (Appendix A1). The most recent household-based research regarding subsistence salmon in this region was in 2008, and findings may be found in the CSIS. More recent subsistence salmon survey data for Togiak and Twin Hills is forthcoming from the Division of Subsistence.

7. OTHER SUBSISTENCE FISHERIES

SUBSISTENCE REGULATIONS

The board has determined that all finfishes of the BBA support customary and traditional uses (5 AAC 01.336). The board determined that the ANS is 250,000 pounds usable weight. This amount was based upon estimates of nonsalmon fish harvests derived from systematic household surveys conducted by the Division of Subsistence (CSIS; CPDB). The board did not establish ANSs for specific species or more specific stocks of nonsalmon fishes.

For the most part, subsistence fishing for fishes other than salmon and rainbow trout *O. mykiss* is open year-round in the BBA with gear listed in 5 AAC 01.010. There are no seasonal limits established by regulation. The board repealed a subsistence permit requirement for trout and char in December 2003. The following regulations apply to subsistence fishing for fishes other than salmon in the area:

- Rainbow trout taken incidentally in other subsistence net fisheries or through the ice are lawfully taken and may be retained for subsistence uses (5 AAC 01.310(g)).
- Subsistence fishing with a line attached to a rod or pole is prohibited except when fishing through the ice (5 AAC 01.320(l)).
- Subsistence fishing with nets is prohibited in 18 waters of the Kvichak-Iliamna Lake drainage and within one-fourth mile of the terminus of those waters from September 1 through June 14.

SUBSISTENCE HARVESTS AND USES

A detailed description of subsistence uses of freshwater fishes in the BBA appears in Fall et al. 1996, and specifically for the Kvichak River watershed in Krieg et al. (2005). Wright and Chythlook (1985) describe uses of Pacific herring *Clupea pallasii* spawn on kelp in the Togiak District. Other recent reports documenting subsistence harvest of freshwater fishes in Bristol Bay include BBNA and ADF&G (1996), Coiley-Kenner et al. (2003), Fall et al. (2006), Hazell et al. (2015), Holen et al. (2012; 2011), and Krieg et al. (2005; 2009). Fishes other than salmon generally rank third behind salmon and land mammals in their contribution to total subsistence harvests in Bristol Bay communities.

Although subsistence harvests of fishes other than salmon are not annually monitored by the department, some findings of Division of Subsistence research regarding nonsalmon fishes are summarized in Table 7-1. The majority of households in the general Bristol Bay area use fishes other than salmon for subsistence purposes. Most households also participate in the harvest of these fishes. Harvests, as measured in pounds usable weight per person for available study years, vary from community to community, but are generally substantial. As shown in Figure 1-4 harvests of fishes other than salmon contributed about 9% of the annual subsistence harvests of wild foods in the general Bristol Bay area in 2014. Table 7-1 shows that for communities outside the regional centers (Dillingham and the Bristol Bay Borough) the harvest is about 44 pounds per person. Harvests ranged from a low of eight pounds per person (South Naknek in 2007) to 141 pounds per person (Ugashik in 2014) (Table 7-1). Harvests in 5 communities exceeded 50 pounds per person per year out of a total of 24 communities. Table 7-2 presents only those

nonsalmon fish species reported as both harvested and used by residents of Bristol Bay communities. Harvests and uses of other species may occur.

Generally, nonsalmon fishes taken in the largest quantities in the area as a whole include various species of smelt and whitefishes, as well as Dolly Varden *Salvelinus malma*, Arctic grayling *Thymallus arcticus*, and northern pike *Esox lucius*.⁷

In the general Bristol Bay area, harvests of nonsalmon finfishes occur throughout the year. Harvest effort by Bristol Bay residents for these fishes is generally lower in the summer because their attention is focused on salmon. Spring is an important harvest time for herring, herring spawn on kelp, and smelt. Substantial harvests of nonsalmon fishes occur in winter; effort increases in late winter prior to breakup as temperatures warm and daylight increases. Smelt harvesting is a popular activity in October and in late winter when these fish can be caught by jigging (Holen et al. 2011; Wright et al. 1985).

Many gear types are used to harvest nonsalmon fishes for home use in the general Bristol Bay area. Rod and reel⁸ is used for most fish, and some, such as Dolly Varden/Arctic char *S. malma*, herring, and some marine fishes, are removed from commercial catches. Other methods are used, including (but not necessarily limited to) the following:

- Fyke nets (“traps”): Alaska blackfish *Dallia pectoralis*, burbot;
- Set lines: burbot;
- Handline jigging during winter: Arctic grayling, Dolly Varden/Arctic char, lake trout *S. namaycush*, smelt, rainbow trout, whitefishes, northern pike;
- Set gillnets: Arctic grayling, Dolly Varden/Arctic char, lake trout, various species of suckers, rainbow trout, herring, northern pike, burbot, whitefishes;
- Beach seining: Dolly Varden/Arctic char, lake trout, whitefishes, smelt, herring;
- Handline in summer: Pacific halibut *Hippoglossus stenolepis*, rainbow trout;
- Dipnets: smelt, herring.

Herring spawn on kelp is usually picked by hand, although rakes, knives, and *uluuqs* (woman's knife) are also used (Schichnes and Chythlook 1988:127).

Maps of areas used by Bristol Bay communities to harvest nonsalmon fishes appear in the *Alaska Habitat Management Guide Reference Atlas Series* (ADF&G 1985), in Wright et al. (1985), in Krieg et al. (2005 for Kvichak River drainage communities only), in Fall et al. (2006), Holen et al. (2011), and in Krieg et al. (2009). Harvest activities occur throughout the region in most rivers and lakes, as well as along shorelines. It is likely that most effort occurs near each community and near seasonal camps, such as at Kulukak.⁹

7. See Fall et al. 1996 for more a more detailed discussion of harvest quantities, as reported, by species and by community.

8. Respondents to Division of Subsistence harvest surveys generally do not describe or mention that their subsistence fishing efforts occur under state sport fishing regulations or federal subsistence regulations. Therefore, effort could occur under state sport fishing regulations or federal subsistence regulations.

9. See Wright and Chythlook 1985 and Schichnes and Chythlook 1988 for maps of herring camps at Kulukak Bay. For frequency of use of various areas for freshwater fishing by Nushagak River communities, see Schichnes and Chythlook 1991.

BBA residents use a wide variety of methods to process and preserve their harvests of fishes other than salmon. These vary by species and community. Freezing of many species occurs and other methods include the following:

- Arctic grayling: dried, half-dried, fresh frozen, aged frozen and eaten with seal oil;
- Dolly Varden: dried, smoked, half dried (*egamaarrluk*);
- Northern pike: dried, half-dried, fresh frozen, aged frozen and eaten with seal oil;
- Rainbow trout: dried, half-dried, smoked;
- Whitefishes: dried, fresh frozen, aged frozen and eaten with seal oil.

Dried fish are usually eaten with seal oil. Some consumption of fat from brown bears *Ursus arctos* with dried fish also occurs. Smelt are fried, boiled, dried, or eaten frozen with seal oil (Fall et al. 1986:100). Herring are salted or split, dried, and smoked (Schichnes and Chythlook 1988:126). The heads and stomachs of northern pike are boiled and eaten (Schichnes and Chythlook 1991:139). Freshwater fishes that are usually eaten frozen with seal oil also form a category called *kumlaneq*. This includes Arctic grayling, whitefishes, lake trout, and northern pike (Fall et al. 1986:102).

Much traditional knowledge is associated with nonsalmon fishes. For example, a Central Yup'ik taxonomic classification system for freshwater fishes has three entries, and thus three taxa, for the fish that Western biologists classify as Dolly Varden char. Distinctions in Central Yup'ik taxonomy depend on the condition of the flesh for aging, drying, or freezing; harvest locations; and harvest methods (Fall et al. 1986).

Table 7-1.—Uses and harvests of fishes other than salmon, Bristol Bay, Alaska communities.

Community	Year ^a	Percentage of households					Average pounds harvested	
		Use	Fish for	Harvest	Receive	Give	Per household	Per person
Aleknagik	2008	78	69	66	50	44	95	26
Clarks Point	2008	100	100	100	73	73	71	34
Dillingham	1984	69	42	41	53	29	23	7
Egegik	2014	75	65	60	24	35	219	77
Ekwok	1987	76	72	62	62	38	229	69
Igiugig	2013	94	78	61	83	61	14	5
Iliamna	2013	79	69	69	59	31	79	30
King Salmon	2007	57	55	49	16	12	15	5
Kokhanok	2005	74	66	66	51	57	137	36
Koliganek	2005	96	93	93	75	68	323	90
Levelock	2005	86	86	86	50	57	71	40
Manokotak	2008	93	80	80	84	56	173	44
Naknek	2007	76	68	65	48	32	47	18
New Stuyahok	2005	88	78	78	67	47	123	28
Newhalen	2013	88	70	67	73	33	38	12
Nondalton	2013	84	73	73	62	60	147	45
Pedro Bay	2013	73	64	46	55	36	41	17
Pilot Point	2014	76	53	53	35	35	118	43
Port Alsworth	2013	41	37	37	14	8	14	4
Port Heiden	1987	92	62	62	70	46	33	12
South Naknek	2007	86	52	52	67	43	16	8
Togiak	2008	94	85	84	81	73	264	62
Twin Hills	1999	92	92	92	75	92	303	101
Ugashik	2014	100	100	100	0	50	177	141

Sources BBNA and ADF&G (1996); Coiley-Kenner et al. (2003); Fall et al. (2006); Hazell et al. (2015); Holen et al. (2011; 2012); Krieg et al. (2005; 2009); Scott et al. (2001).

a. Most recent year for which data are available.

Table 7-2.—Nonsalmon finfishes reported to be used for subsistence purposes in the general Bristol Bay Area, Alaska.

Common English name	Scientific name	Yup'ik name(s)	Dena'ina name(s)
Arctic grayling	<i>Thymallus arcticus</i>	<i>Nakrullugpak</i> <i>Culugpak</i>	<i>Ch'dat'an</i>
Alaska blackfish	<i>Dallia pectoralis</i>	<i>Can'giiq</i>	<i>Huzhegh</i>
Burbot	<i>Lota lota</i>	<i>Manignaq</i> ^a <i>Atgiaq</i> ^b	<i>Ch'unya</i>
Dolly Varden ^c	<i>Salvelinus malma</i>	<i>Yugyaq</i> ^d <i>Anerrluaq</i> <i>Anyuk</i>	<i>Qak'elay</i>
Lake trout	<i>Salvelinus namaycush</i>	<i>Cikignaq</i>	<i>Zhuk'udghuzha</i>
Longnose sucker	<i>Catostomus catostomus</i>	<i>Cungartak</i>	<i>Duch'ehdi</i>
Northern pike	<i>Esox lucius</i>	<i>Cuukvak</i>	<i>Ghelguts'i</i>
Rainbow smelt	<i>Osmerus mordax</i>	<i>Iqalluaq</i>	
Rainbow trout	<i>Oncorhynchus mykiss</i>	<i>Talaariq</i>	<i>Tuni</i>
Broad whitefish ^e	<i>Coregonus nasus</i>	<i>Akakiik</i>	<i>Telay</i>
Humpback whitefish ^e	<i>Coregonus pidschian</i>	<i>Uraruq</i>	<i>Q'untuq'</i>
Round whitefish ^e	<i>Prosopium cylindraceum</i>	<i>Uraruq</i>	<i>Hesten</i>
Least cisco	<i>Coregonus sardinella</i>	<i>Cavirrutnaq</i>	<i>Ghelguts'i k'una</i>
Pacific herring	<i>Clupea pallasii</i>	<i>Iqalluarpak</i>	
Herring spawn on kelp		<i>Melucuaq</i>	
Starry flounder	<i>Platichthys stellatus</i>	<i>Naternaq</i>	
Pacific halibut	<i>Hippoglossus stenolepis</i>	<i>Naternarpak</i>	
Pacific cod	<i>Gadus macrocephalus</i>	<i>Ceturruq</i>	
Sculpin	Various species	<i>Kayutaq</i>	
Capelin	<i>Mallotus villosus</i>	<i>Cikaaq</i>	
Yellowfin sole	<i>Limanda aspera</i>	<i>Sagiq</i>	

Source Fall et al. 1996.

a. Nushagak River villages.

b. Manokotak, Aleknagik, Twin Hills, Togiak.

c. Also includes the closely related Arctic char.

d. At Togiak, Manokotak, and Aleknagik, and perhaps elsewhere, there are 3 Yup'ik names for Dolly Varden/Arctic char. *Yugyak* probably refers to resident Dolly Varden/Arctic char. *Anerrluak*, called “Togiak trout” in the local English dialect, probably refers to anadromous fish taken in fresh water. Finally, *anyuk*, or “sea-run Dollies,” are Dolly Varden or Arctic char taken in salt waters. See Fall et al. (1996:16–20) for further discussion of these distinctions.

e. Broad whitefish are rare to absent in the Bristol Bay region. *Akakiik* is the word used at Aleknagik and Manokotak to refer to whitefishes they receive from Kuskokwim River communities, where broad whitefish are common. Humpback whitefish are harvested in the Iliamna Lake subregion and are called *uraruq*. *Uraruq* is also used for round whitefish in the Togiak and Nushagak drainages.

8. CONCLUSIONS

This overview has illustrated the continued importance of subsistence fisheries to the economy and way of life of the general Bristol Bay area of Southwest Alaska. Salmon and other fishes provide the largest portion of the substantial subsistence harvests of Bristol Bay communities. In addition to their nutritional and economic value, the subsistence fisheries of the region support cultural and social values that are a foundation of life for Bristol Bay residents. Historically, subsistence harvests of salmon and other fishes have been fairly stable and reliable, especially compared to the cash sector of the local economy. Subsistence salmon permit records demonstrate a decline in subsistence salmon harvests in the BBA during the 1990s; however, between 2004 and 2017, harvest and effort has remained relatively steady although year-to-year variations occur. The earlier decline occurred primarily in the Nushagak and Naknek-Kvichak districts and is the result of lower average harvests per permit rather than less participation by local community residents or regulations. Subsistence sockeye salmon harvests in the Kvichak River watershed, including Iliamna Lake and Lake Clark, which were historically the largest component of the Bristol Bay subsistence salmon fishery, declined by more than one-half during the 1990s and early 2000s. Local subsistence fishers attributed these lowered harvests to poor returns and scarcities of salmon in once reliable and abundant traditional harvest locations. However, although harvests have declined, effort has increased in harvesting salmon in these areas since the low harvest levels seen in early 2000.

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APPENDIX A: ADDITIONAL TABLES

Appendix A1.–Estimated subsistence salmon harvest by district and species, Bristol Bay, Alaska, 1983–2017.

Year	Permits						Total
	Issued	Sockeye	King	Chum	Pink	Coho	
Naknek–Kvichak District							
1983	385	107,900	1,000	400	300	900	110,500
1985	544	107,543	1,179	540	27	1,103	110,392
1986	412	77,283	1,295	695	2,007	650	81,930
1987	407	86,706	1,289	756	490	1,106	90,347
1988	391	88,145	1,057	588	917	813	91,520
1989	411	87,103	970	693	277	1,927	90,970
1990	466	92,326	985	861	1,032	726	95,930
1991	518	97,101	1,152	1,105	191	1,056	100,605
1992	571	94,304	1,444	2,721	1,601	1,152	101,222
1993	560	101,555	2,080	2,476	762	2,025	108,898
1994	555	87,662	1,843	503	460	1,807	92,275
1995	533	75,644	1,431	1,159	383	1,791	80,407
1996	540	81,305	1,574	816	794	1,482	85,971
1997	533	85,248	2,764	478	422	1,457	90,368
1998	567	83,095	2,433	784	1,063	1,592	88,967
1999	528	85,315	1,567	725	210	856	88,674
2000	562	61,817	894	560	845	937	65,053
2001	506	57,250	869	667	383	740	59,909
2002	471	52,805	837	909	1,137	943	56,632
2003	489	61,443	1,221	259	198	812	63,934
2004	481	71,110	1,075	469	1,080	566	74,300
2005	462	69,211	1,047	546	275	1,224	72,302
2006	468	69,097	881	341	757	720	71,796
2007	480	69,837	672	405	262	1,104	72,280
2008	481	69,823	719	404	801	1,437	73,184
2009	461	67,970	392	167	36	669	69,235
2010	437	62,309	422	233	835	645	64,445
2011	484	67,164	550	215	56	690	68,675
2012	483	72,708	785	127	474	485	74,579
2013	460	62,143	502	403	88	399	63,535
2014	473	65,810	562	272	386	573	67,603
2015	486	69,720	678	263	126	796	71,583
2016	426	53,922	941	254	347	609	56,073
2017	441	50,574	723	283	129	1,116	52,826
Historical Average (1983–2017)	484	76,263	1,113	649	563	1,027	79,615
10-year average (2008–2017)	463	64,214	627	262	328	742	66,174
5-year average (2013–2017)	457	60,434	681	295	215	699	62,324

continued

Year	Permits						Total
	Issued	Sockeye	King	Chum	Pink	Coho	
Egegik District							
1983	14	700					700
1985	23	582	14	21	1	203	821
1986	41	1,052	69	58	21	319	1,519
1988	52	1,405	97	87	54	333	1,976
1989	50	1,636	50	33	1	414	2,134
1990	61	1,105	53	85	39	331	1,613
1991	70	4,549	82	141	32	430	5,234
1992	80	3,322	124	270	51	729	4,496
1993	69	3,633	128	148	15	905	4,829
1994	59	3,208	166	84	153	857	4,468
1995	60	2,818	86	192	100	690	3,886
1996	44	2,321	99	89	85	579	3,173
1997	34	2,438	101	21	5	740	3,304
1998	36	1,795	44	33	52	389	2,314
1999	42	2,434	106	35	2	806	3,384
2000	31	842	16	11	0	262	1,131
2001	57	2,493	111	105	16	928	3,653
2002	53	1,892	65	34	12	356	2,359
2003	62	3,240	84	32	10	297	3,663
2004	46	2,618	169	410	91	1,423	4,711
2005	45	2,267	81	231	2	526	3,106
2006	41	1,641	94	34	7	641	2,418
2007	28	980	165	72	26	334	1,577
2008	37	1,502	91	35	4	295	1,928
2009	26	778	31	6	5	133	953
2010	37	1,657	93	59	8	275	2,091
2011	37	1,772	91	23	2	377	2,264
2012	38	1,172	37	19	7	190	1,425
2013	44	2,108	45	17	5	205	2,380
2014	36	972	150	4	2	237	1,366
2015	32	1,253	150	38	13	353	1,806
2016	26	366	27	3	0	167	563
2017	23	1,243	129	13	6	430	1,821
5-year average (2013–2017)	32	1,189	100	15	5	278	1,587
10-year average (2008–2017)	34	1,282	84	22	5	266	1,660
Historical Average (1983–2017)	43	1,873	89	76	26	474	2,517

continued

Year	Permits						Total
	Issued	Sockeye	King	Chum	Pink	Coho	
Ugashik District							
1983	8	500				100	600
1985	9	233	17	7		143	400
1986	27	1,080	83	48	21	335	1,567
1988	23	1,400	84	55	35	330	1,904
1989	22	1,309	32	35	2	214	1,592
1990	37	1,578	51	143	120	280	2,172
1991	38	1,403	121	168	42	614	2,348
1992	37	2,348	106	79	8	397	2,938
1993	39	1,766	86	107	24	495	2,478
1994	31	1,587	126	42	38	579	2,372
1995	20	1,513	56	18	6	290	1,883
1996	26	1,247	50	21	7	298	1,623
1997	28	2,785	169	39	23	311	3,327
1998	27	1,241	59	75	82	485	1,942
1999	25	1,365	35	5	0	271	1,675
2000	31	1,927	51	34	1	467	2,481
2001	24	1,197	61	8	2	357	1,624
2002	23	1,294	51	14	2	460	1,821
2003	23	1,113	31	30	0	392	1,567
2004	21	804	64	9	4	234	1,116
2005	22	818	27	18	2	249	1,114
2006	25	962	41	6	16	339	1,364
2007	17	1,056	43	88	79	281	1,546
2008	14	1,660	47	17	9	222	1,955
2009	15	1,061	33	4	41	131	1,270
2010	18	896	21	4	0	135	1,056
2011	15	531	15	3	2	136	687
2012	20	997	31	25	0	228	1,281
2013	14	537	19	10	0	106	672
2014	20	566	50	1	0	224	842
2015	20	935	53	8	0	217	1,214
2016	19	1,100	106	20	9	199	1,432
2107	15	444	18	5	2	113	581
5-year average (2013–2017)	18	716	49	9	2	172	948
10-year average (2008–2017)	17	873	39	10	6	171	1,099
Historical Average (1983–2017)	20	1,025	43	19	13	262	1,362

continued

Year	Permits						Total
	Issued	Sockeye	King	Chum	Pink	Coho	
Nushagak District							
1983	389	38,400	11,800	9,200	500	5,200	65,100
1985	406	38,000	7,900	4,000	600	6,100	56,600
1986	424	49,000	12,600	10,000	5,400	9,400	86,400
1988	441	31,086	10,079	8,234	6,316	5,223	60,938
1989	432	34,535	8,122	5,704	407	8,679	57,447
1990	441	33,003	12,407	7,808	3,183	5,919	62,320
1991	528	33,161	13,627	4,688	292	10,784	62,552
1992	476	30,640	13,588	7,076	3,519	7,103	61,926
1993	500	27,114	17,709	3,257	240	5,038	53,358
1994	523	26,501	15,490	5,055	2,042	5,338	54,426
1995	484	22,793	13,701	2,786	188	3,905	43,373
1996	481	22,935	15,941	4,704	1,573	5,217	50,370
1997	538	25,080	15,318	2,056	218	3,433	46,106
1998	562	25,217	12,258	2,487	1,076	5,316	46,355
1999	548	29,387	10,057	2,409	124	3,993	45,969
2000	541	24,451	9,470	3,463	1,662	5,983	45,029
2001	554	26,939	11,760	3,011	378	5,993	48,080
2002	520	22,777	11,281	5,096	1,179	4,565	44,897
2003	527	25,491	18,686	5,064	403	5,432	55,076
2004	511	17,491	15,610	3,869	1,944	4,240	43,154
2005	502	23,916	12,529	5,006	793	5,596	47,841
2006	461	20,773	9,971	4,448	1,591	3,590	40,373
2007	496	25,127	13,330	3,006	430	3,050	44,944
2008	571	26,828	12,960	4,552	1,923	5,133	51,395
2009	530	26,922	12,737	4,510	355	6,777	51,300
2010	528	22,326	9,150	3,660	1,672	2,983	39,791
2011	525	28,006	12,461	3,055	230	5,746	49,497
2012	517	20,587	10,350	3,072	1,309	2,642	37,960
2013	582	30,183	11,567	4,380	204	6,763	53,980
2014 ^a	581	27,073	16,049	5,731	2,110	7,463	58,425
2015	591	25,240	12,117	2,953	295	5,644	46,248
2016 ^a	613	24,790	15,735	4,596	4,160	4,219	53,500
2017	562	31,206	11,060	3,965	254	5,732	52,218
5-year average (2013–2017)	586	27,156	13,230	4,310	1,406	5,582	51,861
10-year average (2008–2017)	560	26,045	12,381	4,040	1,252	5,119	48,925
Historical Average (1983–2017)	541	28,093	12,625	4,671	1,376	5,485	52,276

continued

Year	Permits						Total
	Issued	Sockeye	King	Chum	Pink	Coho	
Togiak District							
1985	51	3,400	600	1,000	100	1,500	6,600
1986	29	2,400	700	800	100	500	4,500
1987	46	3,600	700	1,000		1,600	6,900
1988	29	2,413	429	716	45	792	4,395
1989	40	2,825	551	891	112	976	5,355
1990	37	3,689	480	786	60	1,111	6,126
1991	43	3,517	470	553	27	1,238	5,805
1992	40	3,716	1,361	626	135	1,231	7,069
1993	38	2,139	784	571	8	743	4,245
1994	25	1,777	904	398	77	910	4,066
1995	22	1,318	448	425	0	703	2,894
1996	19	662	471	285	59	199	1,676
1997	31	1,440	667	380	0	260	2,747
1998	42	2,211	782	412	76	310	3,791
1999	76	3,780	1,244	479	84	217	5,804
2000	54	3,013	1,116	569	90	342	5,130
2001	92	4,162	1,612	367	61	388	6,590
2002	36	2,319	703	605	10	241	3,878
2003	92	4,403	1,208	483	451	883	7,428
2004	46	1,795	1,094	383	108	204	3,584
2005	45	2,299	1,528	301	26	295	4,448
2006	61	2,728	1,630	492	354	408	5,612
2007	48	2,548	1,234	420	19	110	4,332
2008	91	3,770	1,337	701	114	541	6,463
2009	40	2,220	827	365	5	272	3,689
2010	64	3,256	1,162	735	113	514	5,779
2011	68	3,462	966	497	42	545	5,512
2012	53	5,265	933	764	84	293	7,339
2013	64	3,695	691	375	33	208	5,002
2014	59	4,586	607	669	190	486	6,539
2015	48	2,387	876	312	23	650	4,249
2016	50	3,171	949	343	224	283	4,969
2017	69	5,436	949	556	107	900	7,948
5-year average (2013–2017)	58	3,855	814	451	115	505	5,741
10-year average (2008–2017)	61	3,725	930	532	94	469	5,749
Historical Average (1998–2017)	50	3,012	909	553	92	602	5,166

continued

Year	Permits						Total
	Issued	Sockeye	King	Chum	Pink	Coho	
Total Bristol Bay area							
1985	1,033	149,758	9,710	5,568	728	9,049	174,813
1986	933	130,815	14,747	11,601	7,549	11,204	175,916
1987	998	135,493	14,356	7,895	689	9,453	167,886
1988	936	124,449	11,746	9,680	7,367	7,491	160,733
1989	955	127,408	9,725	7,356	799	12,210	157,498
1990	1,042	131,701	13,976	9,683	4,434	8,367	168,161
1991	1,197	139,731	15,452	6,655	584	14,122	176,544
1992	1,204	134,330	16,623	10,772	5,314	10,612	177,651
1993	1,206	136,207	20,787	6,559	1,049	9,206	173,808
1994	1,193	120,735	18,529	6,082	2,770	9,491	157,607
1995	1,119	104,086	15,722	4,580	677	7,378	132,443
1996	1,110	108,470	18,136	5,915	2,518	7,775	142,813
1997	1,166	116,991	19,159	2,974	668	6,201	145,992
1998	1,234	113,560	15,576	3,792	2,349	8,093	143,368
1999	1,219	122,281	13,009	3,653	420	6,143	145,506
2000	1,219	92,050	11,547	4,637	2,599	7,991	118,824
2001	1,226	92,041	14,412	4,158	839	8,406	119,856
2002	1,093	81,088	12,936	6,658	2,341	6,565	109,587
2003	1,182	95,690	21,231	5,868	1,062	7,816	131,667
2004	1,100	93,819	18,012	5,141	3,225	6,667	126,865
2005	1,076	98,511	15,212	6,102	1,098	7,889	128,811
2006	1,050	95,201	12,617	5,321	2,726	5,697	121,564
2007	1,063	99,549	15,444	3,991	815	4,880	124,679
2008	1,178	103,583	15,153	5,710	2,851	7,627	134,924
2009	1,063	98,951	14,020	5,052	442	7,982	126,447
2010	1,082	90,444	10,852	4,692	2,627	4,623	113,238
2011	1,122	101,017	14,106	3,794	333	7,493	126,744
2012	1,107	100,728	12,136	4,007	1,874	3,837	122,582
2013	1,158	98,010	12,860	5,199	337	8,569	124,974
2014 ^a	1,158	99,008	17,417	6,677	2,689	8,984	134,775
2015	1,169	99,535	13,874	3,573	458	7,659	125,100
2016 ^a	1,128	83,349	17,757	5,216	4,740	5,476	116,537
2017	1,103	88,903	12,880	4,821	498	8,291	115,394
5-year average (2013–2017)	1,143	93,761	14,958	5,097	1,744	7,796	123,356
10-year average (2008–2017)	1,127	96,353	14,106	4,874	1,685	7,054	124,071
Historical Average (1985–2017)	1,116	109,318	14,840	5,860	2,105	7,977	140,100

Note Harvests are extrapolated for all permits issued, based on those returned. Harvests prior to 1985 are rounded to the nearest hundred fish. Permit and harvest estimates prior to 1989 are based on the community where the permit was issued; estimates from 1989 to the present are based on the area fished, as first recorded on the permit.

a. Data are preliminary

Appendix A2.–Estimated subsistence salmon harvests by district and location fished, Bristol Bay Area, Alaska, 2017.

Area and river system	Number of permits issued ^a	Estimated salmon harvest					
		King	Sockeye	Coho	Chum	Pink	Total
Naknek-Kvichak District	441	723	50,574	1,116	283	129	52,826
Naknek River Subdistrict	277	708	21,815	1,100	280	127	24,029
Kvichak River/Iliamna Lake Subdistrict:	158	10	27,832	16	4	2	27,863
Igiugig	4	2	540	5	1	0	548
Iliamna Community	3	0	460	0	0	0	460
Iliamna Lake-General	34	0	5,367	0	0	0	5,367
Kijik	2	0	100	0	0	0	100
Kokhanok	18	7	4,433	11	3	1	4,455
Kvichak River	15	0	1,599	0	0	0	1,599
Lake Clark	50	0	4,199	0	0	0	4,199
Levelock	1	1	83	0	0	0	84
Newhalen River	28	0	8,933	0	0	0	8,933
Pedro Bay	8	0	928	0	0	0	928
Pile Bay	1	0	225	0	0	0	225
Six Mile Lake	6	0	1,426	0	0	0	1,426
Naknek or Kvichak (Site Unknown)	9	5	927	1	0	1	933
Egegik District	23	129	1,243	430	13	6	1,821
Ugashik District	19	106	1,100	199	20	9	1,432
Nushagak District	562	11,060	31,206	5,732	3,965	254	52,218
Igushik/Snake River	29	215	2,007	147	13	23	2,406
Nushagak Bay Commercial	52	880	1,557	688	247	32	3,403
Nushagak Bay Noncommercial	220	3,231	11,556	2,467	1,879	117	19,250
Nushagak River	125	4,046	6,748	1,525	1,281	26	13,626
Site Unknown	13	390	729	93	32	21	1,265
Wood River	165	2,298	8,609	812	512	36	12,267
Togiak District	69	949	5,436	900	556	107	7,948
Total	1,114	12,968	89,559	8,376	4,836	505	116,245

Source ADF&G Division of Subsistence, ASFDB 2017 (ADF&G 2018).

Note Harvests are extrapolated for all permits issued, based on those returned and on the area fished as recorded on the permit. Due to rounding, the sum of columns and rows may not equal the estimated total. Of 1,128 permits issued for the management area, 984 were returned (87.2%).

a. Sum of sites may exceed district totals, and sum of districts may exceed area total, because permittees may use more than one site.