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2017 Bristol Bay Sockeye Salmon Processing Capacity Survey Summary

by

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and

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April 2017

Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries



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

SPECIAL PUBLICATION NO. 17-09

**2017 BRISTOL BAY SOCKEYE SALMON PROCESSING CAPACITY
SURVEY SUMMARY**

by

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ABSTRACT

The 2017 Bristol Bay Sockeye Salmon Processing Capacity Survey Summary reports results of the Alaska Department of Fish and Game, Division of Commercial Fisheries survey of the 12 major processors of Bristol Bay sockeye salmon. There was a 100% response rate from those processors who in concert account for 99.1% of all 2016 sockeye salmon purchased in Bristol Bay. This survey provides estimates of total intended purchases, daily processing capacity, “in Bristol Bay” tender fleet capacity, and long haul tender fleet capacity for 2017. The results of this survey found the 2017 Bristol Bay total intended purchases of 36.27 million fish is approximately 8.80 million fish (20%) higher than the forecast harvest of 27.47 million fish. The survey estimated a maximum daily processing capacity of 2.44 million fish per day, which could be sustained for approximately 21 days.

Keywords: Bristol Bay, salmon, processing capacity, forecast

INTRODUCTION

The Alaska Department of Fish and Game (ADF&G) completed a survey of 12 salmon processors who intend to buy sockeye salmon in Bristol Bay during the 2017 season. This 2017 Bristol Bay sockeye salmon processing capacity survey had a 100% response rate. All 12 processing companies completed and returned the survey before the March 10, 2017 deadline. All the processors surveyed had purchased salmon in Bristol Bay during the 2016 season, and taken together, accounted for 99.1% of the sockeye salmon purchased in Bristol Bay during the 2016 season. Individual processor’s salmon capacities are considered confidential information under Alaska statute (AS 16.05.815(a)). This document provides a nonconfidential summary of the 2017 Bristol Bay sockeye salmon processing capacity survey.

The Bristol Bay area commercial salmon fishery includes all coastal and inland waters east of a line from Cape Newenham to Cape Menchikof (Figure 1). The area includes 9 major river systems: Naknek, Kvichak, Alagnak, Egegik, Ugashik, Wood, Nushagak, Igushik, and Togiak. Collectively, these rivers are home to the largest commercial sockeye salmon *Oncorhynchus nerka* fishery in the world. Sockeye salmon are by far the most abundant salmon species returning to Bristol Bay each year, but Chinook *O. tshawytscha*, chum *O. keta*, coho *O. kisutch*, and, in even years, pink salmon *O. gorbuscha* runs are important to the fishery as well. The Bristol Bay area is divided into 5 management districts (Naknek-Kvichak, Egegik, Ugashik, Nushagak, and Togiak) that correspond to major river systems. The management objective for each river is to achieve salmon escapements within established ranges while harvesting fish in excess of those ranges through orderly fisheries. In addition, regulatory management plans have been adopted for individual species in certain districts. The Bristol Bay sockeye salmon capacity survey estimates processing capacity for the entire Bristol Bay area and does not breakup capacity by district.

Results of the processing capacity survey should be viewed in relationship to the sockeye salmon forecast released by ADF&G (Appendix A). The primary function of the salmon forecast has always been to provide processors and harvesters an indication of what ADF&G is anticipating in salmon runs for the coming season. The 2017 forecast for sockeye salmon returning to Bristol Bay is 41.47 million, with a range of 31.20 to 51.73 million. Escapement goals for all Bristol Bay river systems are calculated to be 12.46 million. A run of this size is expected to produce a harvestable surplus of 27.47 million in Bristol Bay. A Bristol Bay harvest of this size is 2% lower than the most recent 10-year harvest, which has ranged from 15.43 to 37.53 million, and 34% greater than the long-term harvest average of 20.52 million (1963 to present).

BACKGROUND

The ADF&G Division of Commercial Fisheries conducted the first statewide salmon processing capacity survey in 1978. The division continued conducting voluntary and informal surveys of statewide processing capacity throughout the 1990s. Beginning in 2001, the department conducted formal salmon capacity surveys by mailing survey forms to selected processors who represented the majority of processing capacity in Alaska. These surveys were formal, but still voluntary. The voluntary nature of the surveys changed in 2004, when regulations were enacted that made participation a regulatory requirement (5 AAC 39.132). In addition, the regulations clarified that individual surveys were confidential under AS 16.05.815(a). In 2008, the division phased out salmon capacity surveys for all fishing regions except for Bristol Bay. Bristol Bay surveys were not conducted in the years 2012 to 2014 because processing capacity was not a preseason concern. The division decided to conduct a survey of processing capacity in 2015 and 2016 in light of the large forecasted returns of sockeye salmon to Bristol Bay in those years. Large harvests have the potential to cause processing capacity bottlenecks, especially if run timing is compressed. The division is likewise conducting a 2017 capacity survey to inform managers about processing capacity.

A large projected harvestable surplus can prompt questions about allowing foreign processing vessels into the internal waters of the State of Alaska. The Bristol Bay sockeye salmon processing capacity survey is an instrument that can be used to determine whether domestic processors have enough capacity to handle the expected harvest. The Magnuson-Stevens Fishery Conservation and Management Act provides the framework requirements that must be met before foreign processing ships are allowed into the internal waters of the state. Before allowing any foreign processors into state waters, the Magnuson-Stevens Fishery Conservation and Management Act requires the governor of Alaska to determine whether adequate domestic processing capacity exists, and whether that capacity will be used to process the available harvest (16 U.S.C. § 1856(c)). Should the governor receive a request to bring foreign processing ships into the internal waters of the state to process salmon in Bristol Bay in 2017, information from this survey would be considered by the governor, along with other information, in determining whether foreign vessels should be allowed to enter the internal waters of the State of Alaska to process salmon (16 U.S. Code § 1856(c); 5 AAC 39.198).

Capacity is measured as a combination of actual physical processing capacity, and the intent of processors to purchase and process salmon during the season in aggregate. Processors were asked to report the maximum amount of sockeye salmon in pounds that they intend to purchase and process during the upcoming Bristol Bay salmon fishing season. Information collected in this survey helps ADF&G plan for the expected return of salmon, and is used for management purposes during the commercial fishing season.

Results of the 2017 Bristol Bay sockeye salmon capacity survey should be interpreted as a snapshot of anticipated processing capacity. This point-in-time estimate is made months before the fishery opens. The 2017 Bristol Bay sockeye salmon forecast was released on November 15, 2016. Processors were asked to provide their best estimate of their capacity by March 10, 2017, several months before the summer salmon fishing season begins. As processors finalize operational plans and assess the domestic and world markets for salmon, their plans may change between the time of the survey and the salmon fishing season. The salmon capacity estimated in

this report is not guaranteed, nor is there an implied guarantee that all fishermen will have buyers for all of their salmon.

METHODS

Processors were selected to receive survey forms based on 2 sources of information: ADF&G 2015 Commercial Operator's Annual Report (COAR) data, and 2016 ADF&G fish ticket data. Processors were selected for inclusion in the survey if they reported buying more than 100,000 pounds of Bristol Bay sockeye salmon on their 2015 COAR reports or, if according to fish ticket records, the processor bought more than 100,000 pounds of Bristol Bay sockeye salmon in 2016. In the survey, processors were asked to estimate the amount of sockeye salmon they intended to purchase during the 2017 season from Bristol Bay. A copy of the ADF&G 2017 Bristol Bay sockeye salmon forecast was provided with the survey forms. A copy of the survey questions is provided in Appendix B.

The criteria outlined above identified 12 commercial salmon processing companies to receive surveys. These 12 companies represented 16 separate operations. Surveys were emailed on February 1, 2017. Processors were requested to return completed surveys by March 10, 2017. Compilation and analysis of the survey data began on March 20, 2017.

All processors that responded to the survey reported their intended purchases and capacity in pounds. To compare the survey capacity with the forecasted harvest (in numbers of fish), the survey capacity in pounds was divided by the 5-year (2012–2016) mean weight per fish for sockeye salmon to convert capacity to numbers of fish. There is considerable interannual variability in the mean weight of sockeye salmon returning to Bristol Bay (Table 1). Many factors affect the mean weight of returning sockeye salmon, and it is not possible to know with certainty the mean weight before the season begins. As such, the 5-year (2012–2016) mean weight of 5.55 pounds per fish was used to convert capacity from pounds to numbers of fish throughout this report. After the survey capacity was converted to numbers of fish, the projected capacity was compared to the forecasted run.

BRISTOL BAY SOCKEYE SALMON PROCESSING CAPACITY

TOTAL INTENDED PURCHASES

This survey provides an estimate of the total intended purchases for the entire season. The 12 surveyed processors indicated that they are prepared to purchase and process 201.30 million pounds or 36.27 million sockeye salmon during the 2017 Bristol Bay salmon season (Table 2). All processors that responded to the survey reported their total intended purchases in pounds. The 2017 Bristol Bay sockeye salmon total intended purchases is approximately 8.8 million fish (32%) above the forecast harvest of 27.47 million fish (Table 2).

DAILY PROCESSING CAPACITY

In the 2017 Bristol Bay sockeye salmon processing capacity survey (Appendix B), processors were asked to estimate their daily processing capacity and to estimate the number of days their facility could operate at that daily capacity. They were also asked by what date they expect their facility to operate at their quoted daily capacity.

The total daily capacity reported in the survey was 13.53 million pounds or 2.44 million fish (Table 3). Surveyed processors expect to be able to sustain daily processing capacity for approximately 21 days. The mean date processors expect to be at their reported daily capacity is June 27, 2017 (Table 3).

The comparison of projected capacity to harvest forecast and past peak daily harvests allows an evaluation of processor's capability to harvest this year's forecast. The projected daily capacity exceeds most historic peak daily harvests. At the maximum projected daily harvest capacity of 2.44 million fish per day, the forecast 27.47 million fish harvest could be achieved in approximately 11 days. The preseason processor survey indicates that the daily capacity of 2.44 million fish could be sustained for approximately 21 days. The 2017 projected 2.44 million fish daily processing capacity has only been exceeded 3 times in the past 5 years (Table 4). It should be noted that processor limits likely restricted the daily maximums listed in Table 4, but it is not accounted for in this review.

Operating at maximum daily capacity is contingent on a number of factors that include, but are not limited to, mechanical operations, logistics, and employee availability. Although it appears that if every processor is operating at their reported daily capacity there would be sufficient daily capacity to handle a peak landing of salmon, this does not guarantee that all Bristol Bay salmon permit holders will have a buyer at all times during this season. Processors may choose to limit the number of permit holders from whom they purchase salmon and still process the number of fish available for harvest.

IN BRISTOL BAY TENDER FLEET

Most Bristol Bay processors provide tenders that service locally inside of Bristol Bay waters. This fleet of tenders is considered the *in-Bristol Bay* tender fleet. Surveyed processors were asked if their company intends to provide tenders during the 2017 season, their tender fleet's *in-Bristol Bay* holding capacity, and the date they expect to have all their tenders available. Processors were asked to consider only their *in-Bristol Bay* fleet's capacity and exclude any additional capacity provided by their long-haul tender fleet.

Of the 12 companies surveyed, 11 will provide tenders inside Bristol Bay waters. The reported *in-Bristol Bay* tender fleet holding capacity is 47.18 million pounds, or 8.50 million salmon (Table 5). The mean date companies expect to have their tenders available is June 17, 2017.

LONG-HAUL TENDER FLEET

Some Bristol Bay processors provide long-haul tenders that transport fish from Bristol Bay to other processing facilities around the state. Long haul tenders allow processors to purchase a higher volume of salmon during the peak of the season than within Bristol Bay-only processing capacity would otherwise allow. Surveyed processors were asked if their company intends to provide long-haul tenders during the 2017 season, as well as their long-haul tender daily capacity, season capacity, and the date they expect to have their long-haul tenders available by.

Of the 12 companies surveyed, only 2 will be providing long-haul tender services. Because only 2 processors reported their long-haul tender capacity, the long-haul tender capacity data is confidential. There is no way to predict when and where long-haul tenders will be used, and it is unlikely that all will deploy at the same time.

SUMMARY

The 2017 Bristol Bay sockeye salmon processing capacity survey had a 100% response rate from the 12 processing companies surveyed before the March 10, 2017 deadline. The capacity survey is an estimate of the aggregate capacity for the entire season, and is made many months before the start of the season.

The results of this survey found the 2017 Bristol Bay sockeye salmon potential total intended purchases is approximately 8.80 million greater than the forecast harvest of 27.47 million fish. The survey estimated a maximum daily harvest capacity of 2.44 million, which could be sustained for approximately 21 days. Total processing capacity (estimated from total intended purchases from the 2017 survey) of 201.30 million pounds (36.27 million fish) remained almost the same as the 2016 estimated total processing capacity (35.46 million fish). The 2017 estimated daily processing capacity of 13.53 million pounds (2.44 million fish) is slightly less when compared with the 2016 estimated daily capacity of 14.75 million pounds (2.57 million fish). These estimates are not directly comparable for a variety of reasons (fish weight, forecast, tender numbers) but are useful to provide context and understand this year's processing capabilities.

TABLES AND FIGURES

Table 1.—Mean Bristol Bay sockeye salmon weights in pounds, 2001–2016.

Year	Mean weight
2001	6.7
2002	6.1
2003	6.3
2004	5.8
2005	6.3
2006	5.8
2007	5.8
2008	5.8
2009	5.9
2010	5.8
2011	6.1
2012	5.7
2013	6.0
2014	5.6
2015	5.3
2016	5.4
5-yr. Avg.	5.55

Table 2.—Comparison of the 2017 Bristol Bay sockeye salmon harvest forecast and projected intended purchases.

	Number of salmon	Pounds of salmon
Projected Harvest	27.47 million	152.46 million
Projected Intended Purchases	36.27 million	201.30 million
Difference (surplus of capacity)	8.80 million	48.84 million

Table 3.—Projected daily processing capacity, duration, and start date for 2017 Bristol Bay sockeye salmon.

Number of salmon	Pounds of salmon	Duration	Mean start date
2.44 million	13.53 million	21 Days	6/27/2017

Table 4.–Salmon daily landings, 5-year daily mean, minimum, and maximum, in numbers of fish, Bristol Bay, 2012–2016.

Landing Date (MM/DD)	2012	2013	2014	2015	2016	5 Yr. Daily Mean	5 Yr. Daily Minimum	5 Yr. Maximum
06/25	236,470	939,243	1,458,791	222,338	119,769	595,322	119,769	1,458,791
06/26	366,589	1,191,241	1,903,878	266,935	277,999	801,328	266,935	1,903,878
06/27	864,863	851,459	2,656,823	359,254	586,097	1,063,699	359,254	2,656,823
06/28	570,833	966,002	2,094,884	602,857	443,786	935,672	443,786	2,094,884
06/29	791,392	933,169	1,273,626	677,687	358,345	806,844	358,345	1,273,626
06/30	1,095,340	1,481,104	1,265,110	962,114	531,335	1,067,001	531,335	1,481,104
07/01	948,548	1,196,211	1,046,503	984,353	917,962	1,018,715	917,962	1,196,211
07/02	1,397,607	775,245	1,384,731	1,335,670	1,109,034	1,200,457	775,245	1,397,607
07/03	1,448,759	571,279	1,600,237	1,371,061	1,530,210	1,304,309	571,279	1,600,237
07/04	1,986,592	349,930	1,895,292	1,119,434	1,133,339	1,296,917	349,930	1,986,592
07/05	2,037,036	142,548	1,998,527	713,686	1,155,477	1,209,455	142,548	2,037,036
07/06	1,827,163	182,304	1,250,072	958,028	1,495,647	1,142,643	182,304	1,827,163
07/07	1,495,548	78,718	964,051	1,042,702	1,508,448	1,017,893	78,718	1,508,448
07/08	1,357,513	199,246	1,498,389	1,475,821	1,692,683	1,244,730	199,246	1,692,683
07/09	1,435,330	310,819	1,463,862	1,953,972	1,584,331	1,349,663	310,819	1,953,972
07/10	694,300	740,952	1,002,443	2,305,153	2,375,819	1,423,733	694,300	2,375,819
07/11	639,185	339,457	994,526	2,495,292	1,646,800	1,223,052	339,457	2,495,292
07/12	319,692	289,343	1,158,866	2,231,846	2,154,258	1,230,801	289,343	2,231,846
07/13	350,196	182,531	635,340	2,098,899	2,077,066	1,068,806	182,531	2,098,899
07/14	282,147	105,620	386,287	2,161,125	2,108,358	1,008,707	105,620	2,161,125
07/15	216,706	108,044	209,838	2,414,858	2,526,160	1,095,121	108,044	2,526,160
07/16	268,766	93,335	138,441	1,664,051	1,810,609	795,040	93,335	1,810,609
07/17	195,985	67,976	112,016	1,660,494	1,580,093	723,313	67,976	1,660,494
07/18	184,723	47,922	99,278	1,362,440	1,457,706	630,414	47,922	1,457,706
07/19	113,491	17,484	31,909	1,132,118	1,337,865	526,573	17,484	1,337,865
07/20	68,843	2,034	27,889	784,126	1,182,134	413,005	2,034	1,182,134

Table 5.–Estimated *in-Bristol Bay* tender fleet holding capacity, 2017.

Number of salmon	Pounds of salmon
8.50 million	47.18 million

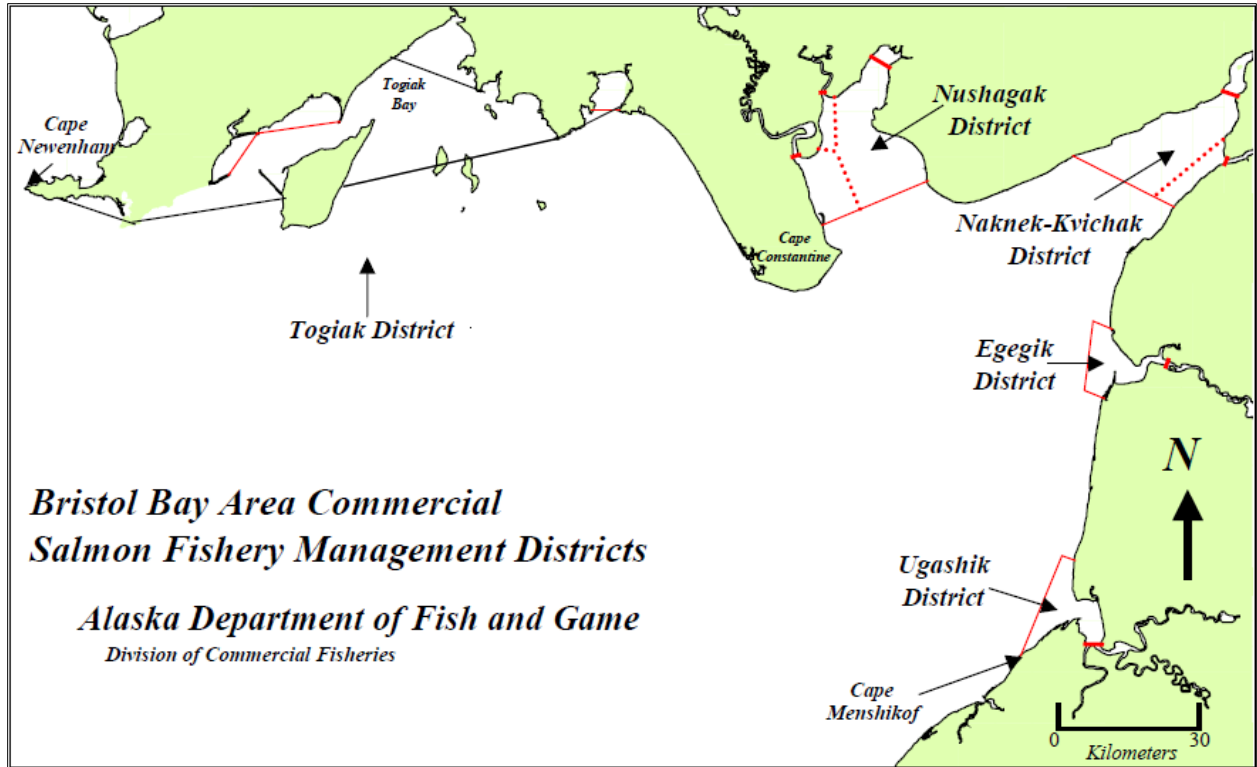


Figure 1.—Bristol Bay area commercial fisheries salmon management districts.

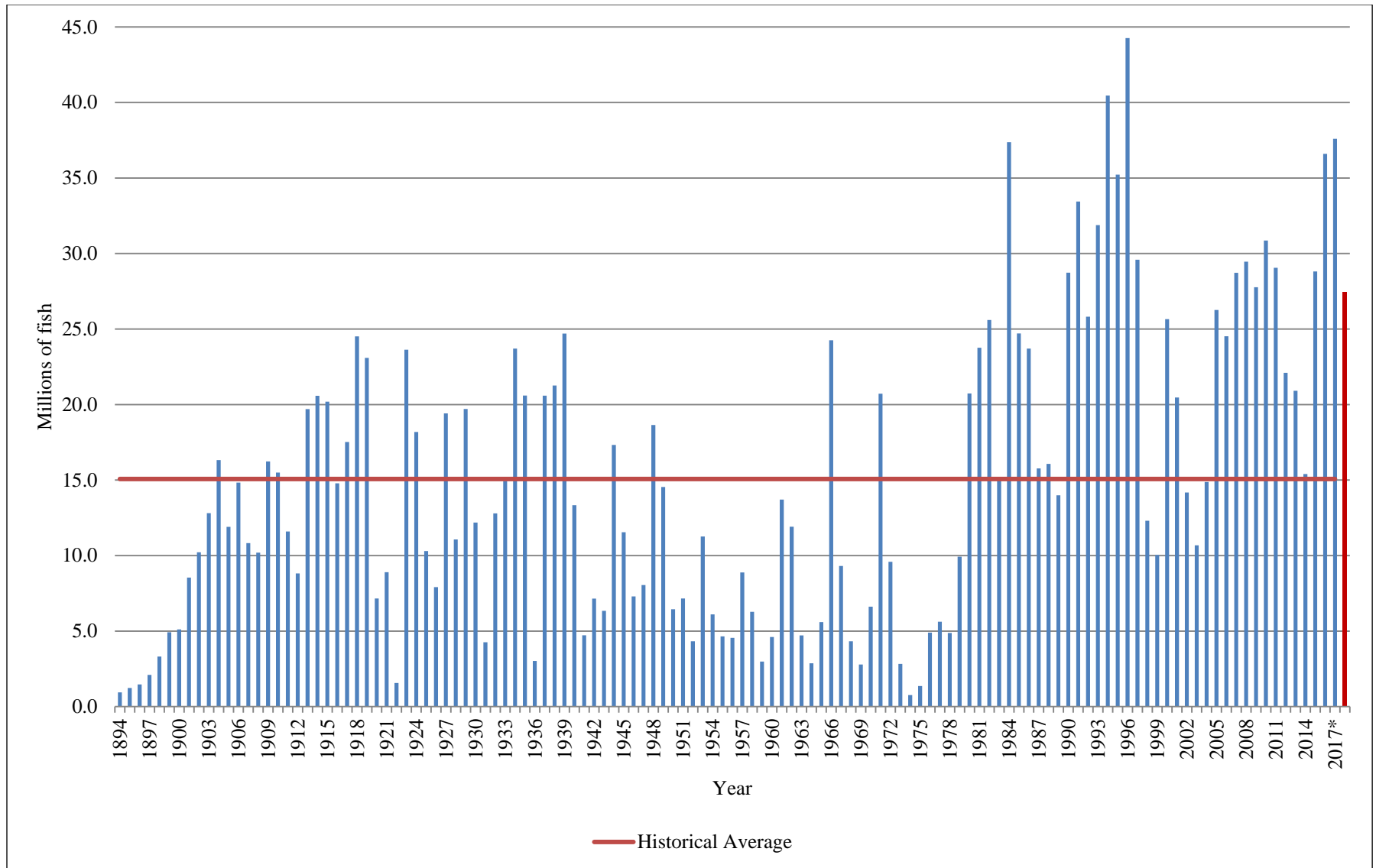


Figure 2.—Bristol Bay commercial sockeye salmon harvests, in thousands of fish, 1893–2016, with 2017 projected harvest and historical average (1893–2016).

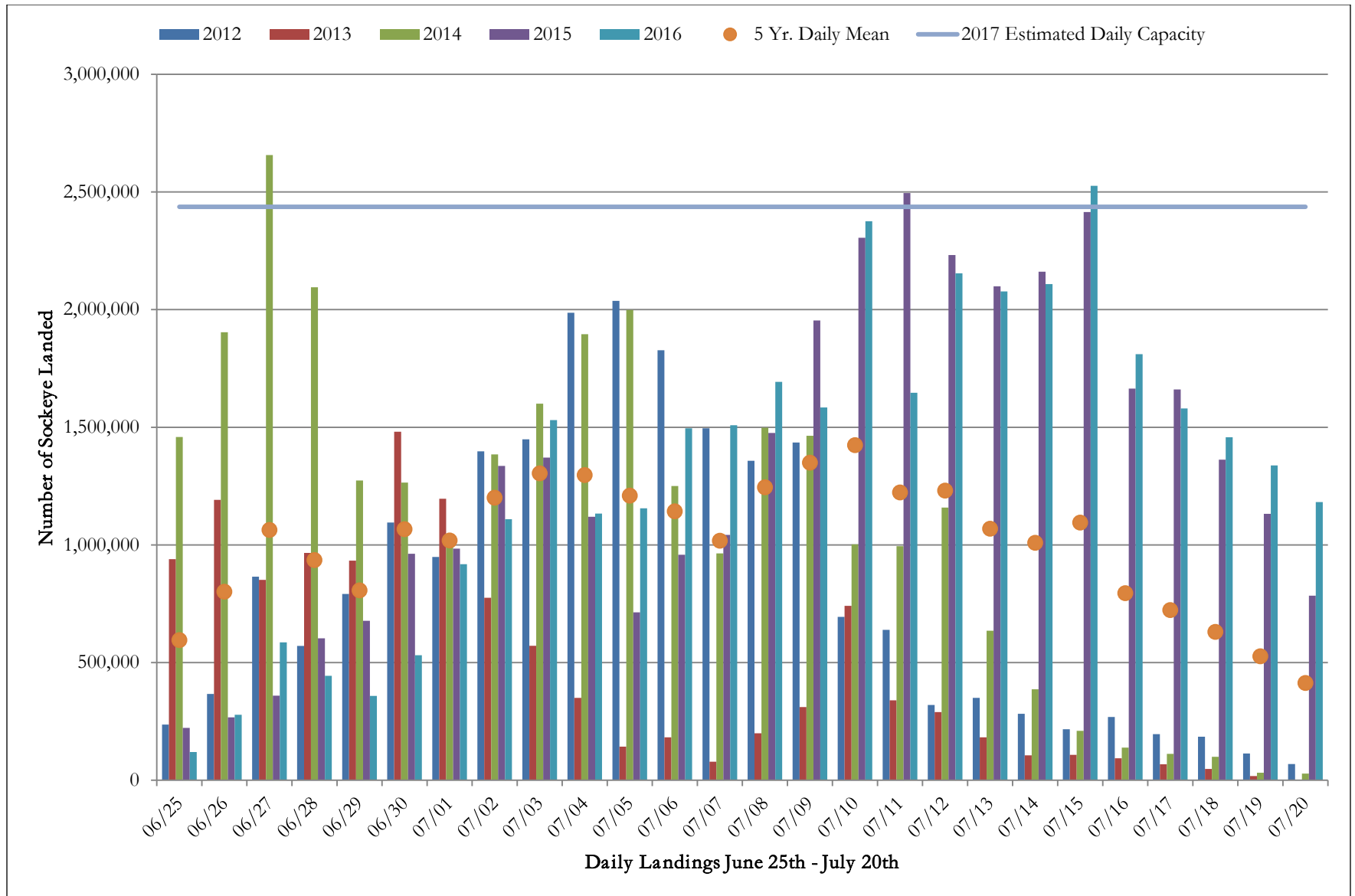


Figure 3.—Bristol Bay sockeye salmon daily landings, 2012–2016, with 5-year daily mean, and 2017 estimated daily capacity

**APPENDIX A: 2017 BRISTOL BAY SOCKEYE SALMON
FORECAST**

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF COMMERCIAL FISHERIES
NEWS RELEASE



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Date Issued: 11/15/2016

2017 BRISTOL BAY SOCKEYE SALMON FORECAST

FORECAST AREA: Bristol Bay

SPECIES: Sockeye Salmon

FORECAST OF THE 2017 RUN:

TOTAL PRODUCTION:	Forecast (millions)	Forecast Range (millions)
Total Run	41.47	31.20–51.73
Escapement	12.46	
Commercial Common Property Harvest	29.01	
Bristol Bay Harvest	27.47	
South Peninsula Harvest	1.53	
Inshore Run	39.93	

METHODS

The 2017 Bristol Bay sockeye salmon forecast is the sum of individual predictions of nine river systems (Kvichak, Alagnak, Naknek, Egegik, Ugashik, Wood, Igushik, Nushagak, and Togiak rivers) and four age classes (ages 1.2, 1.3, 2.2, and 2.3, plus ages 0.3 and 1.4 for the Nushagak River). Adult escapement and return data from brood years 1972–2013 were used in the analyses.

Predictions for each age class returning to a river system were calculated from models based on the relationship between adult returns and spawners or siblings from previous years. Tested models included simple linear regression and recent year averages. In general, models chosen were those with statistically significant parameters having the greatest past reliability (accuracy and precision) based on mean absolute deviation, mean absolute percent error, and mean percent error between forecasts and actual returns for the most recent three year (2014–2016) and five year (2012–2016) windows.

-continued-

The forecast range is the upper and lower values of the 80% confidence interval for the total run forecast. The confidence bounds were calculated from the deviation of actual runs and run forecasts from 2001 through 2016.

RESULTS

A total of 41.47 million sockeye salmon (range 31.20–51.73 million) are expected to return to Bristol Bay in 2017. This is virtually identical to the most recent 10-year average of Bristol Bay total runs (41.39) and 27% greater than the long-term mean of 32.76 million fish. All systems are expected to meet their spawning escapement goals.

Where practical, the department will manage escapements proportional to the run size and relative to the historical record (5AAC 06.355(d)(1)). Escapement is projected to be the midpoint of the upper half of the escapement goal range if the forecast is above the historical trend line (Ugashik, Egegik and Wood Rivers in 2017) or to the midpoint of the lower half of the escapement goal range if the forecast is below the historical trend line (Igushik, Nushagak, Naknek, Kvichak, and Togiak Rivers in 2017; Table 1, Figures 1 and 2). Because it is passively managed, the Alagnak River exploitation rate is assumed to be the same as the Kvichak River exploitation rate and therefore the escapement is projected to be the total run forecast minus expected harvest. Preseason projections are provided to aid industry in planning. Once the run begins to develop the department relies on catch and escapement data for management decisions.

A run of 41.47 million sockeye salmon would allow for a potential total harvest of 29.01 million fish, 27.47 million fish in Bristol Bay and 1.53 million fish in the South Peninsula fisheries. A Bristol Bay harvest of this size is 2% lower than the most recent 10-year harvest which has ranged from 15.43 million to 37.53 million, and 34% greater than the long-term harvest average of 20.52 million fish (1963 to present).

The run forecast to each district and river system is as follows: 16.07 million to Naknek-Kvichak District (7.76 million to the Kvichak River; 4.04 million to the Alagnak River and 4.27 million to the Naknek River); 10.65 million to the Egegik District; 5.46 million to the Ugashik District; 8.62 million to the Nushagak District (5.50 million to the Wood River; 1.87 million to the Nushagak River and 1.25 million to the Igushik River); and 0.66 million to the Togiak District (Table 1).

We forecast the 2017 run will consist of 12.05 million age-1.2 fish (29% of the total run), 9.35 million age-2.2 fish (23% of the total run), 16.50 million age-1.3 fish (40% of the total run) and 3.50 million age-2.3 fish (8% of the total run; Table 1).

DISCUSSION

Historically, sockeye salmon runs to Bristol Bay have been highly variable. The Bristol Bay total run has averaged 32.76 million from 1963 through 2016 and has averaged 41.39 million fish during the most recent 10-year period. Forecasting future salmon returns is inherently difficult and uncertain. We have used similar methods since 2001 to produce the Bristol Bay sockeye salmon forecast. These methods have performed well when applied to Bristol Bay as a whole. Since 2001, our forecasts have, on average, under-forecast the run by 10% and have ranged from 44% below actual run in 2014 to 19% above actual run in 2011. Forecasted harvests have had a mean absolute percent error of 15% since 2011.

Individual river forecasts have greater uncertainty compared to Bay-wide forecasts. Since 2001, on average, we have under-forecasted the returns to the Alagnak (-48%), Togiak (-20%),

Kvichak (-22%), Wood (-9%), Nushagak (-10%) and Naknek (-5%) rivers and over-forecasted returns to Igushik (15%), Egegik (18%), and Ugashik rivers (2%). Over-forecasting returns to some rivers while under-forecasting returns to other rivers means that the overall Bristol Bay forecast is generally more accurate than the forecast to any individual river.

The department would like to thank the following organizations for funding assistance and operating fishery monitoring programs: Bristol Bay Regional Seafood Development Association (BBRSDA), Bristol Bay Economic Development Corporation (BBEDC), Bristol Bay Regional Science and Research Institute (BBSRI), Trident, Choggiung Limited, Peter Pan, Manokotak Village Council, Bristol Bay Native Association (BBNA), Dylan Braund, Togiak Traditional Council, Twin Hills Village Council, North Pacific Seafoods, American President Line, and Copper River Seafoods. BBRSDA contributed \$225,000 towards management of 2016 Bristol Bay commercial fisheries. Without this contribution operational funds to manage the fishery would have been obtained through cost recovery test fishing. The Bristol Bay management program budget has been reduced 17% over the last two years and the department anticipates additional cuts in 2017. A Memorandum of Agreement has been signed by the department and BBSRI to explore alternative future funding strategies.

Greg Buck
Bristol Bay Area Research Biologist

**APPENDIX B: 2017 BRISTOL BAY SOCKEYE SALMON
SURVEY QUESTIONS**

Appendix B1.–Bristol Bay sockeye salmon survey questions.

Please answer the following questions about your plans to purchase sockeye salmon in Bristol Bay in 2017 by March 10, 2017. Thank you for your time and quick response to this survey. Your cooperation is greatly appreciated. If you have any questions, please phone Jennifer at (907) 465-6133 or Bert Lewis at (907) 267-2173.

Please note that all capacity data provided in this survey is ***protected as confidential*** information under Alaska Statute 16.05.815

1. Does your company intend to purchase and process Bristol Bay sockeye salmon during the 2017 season?

- Yes
 No

2. Please enter the amount of sockeye salmon your company intends to purchase in Bristol Bay in the 2017 season. Please provide this answer in POUNDS of fish.

Amount (in POUNDS)

Please tell us about your company's daily processing capacity.

3. What is your company's Daily Processing Capacity of sockeye salmon in Bristol Bay in 2017? Please provide the answer in POUNDS of fish.

Daily Processing Capacity:

4. How many days could your company sustain the daily processing capacity listed in Question 3?

Number of Days

5. What date do you expect to be at the daily processing capacity listed in Question 3?

Date

MM	DD	YYYY
<input type="text"/>	<input type="text"/>	<input type="text"/>

6. Comments on Daily Processing Capacity?

-continued-

In this section please tell us about your company's "In-Bristol Bay" tender fleet. Please DO NOT include information about your long haul tender fleet in this section.

*** 7. Does your company provide tenders?**

- Yes
- No

8. What is your tender fleet's "In Bristol Bay" holding capacity in POUNDS of fish? Please DO NOT include long hauls.

In-Bristol Bay holding capacity:

9. What date do you expect to have all your tenders in Bristol Bay?

Date MM / DD / YYYY

10. Comments on your company's tender fleet capacity?

Please tell us about your company's long haul tender fleet

*** 11. Will your company provide long haul tenders?**

- Yes
- No

12. What is the DAILY capacity of your long haul tender fleet in POUNDS of fish?

Daily Capacity

13. What is the SEASON capacity of your long haul tender fleet in POUNDS of fish?

Season Capacity:

14. What date do you expect to have all your long haul tender fleet available by?

Date MM / DD / YYYY

15. Comments on your long haul tender fleet capacity?

*** 16. Are there factors that would affect your company's ability to increase average daily capacity, and sustain this capacity at peak level, that you would like to tell us about?**

Thank you for completing this survey. Please fill out your contact information. If you have any additional questions or concerns please contact Bert Lewis at (907) 267 - 2173.

*** 17. Contact Information For Survey Respondent**

Name

Company

Email Address

Phone Number